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NOTE

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

DR. JAMES E. DAVIS, Secretary,
111 Josephine Avenue, Detroit.

[Minutes and discussions stenographically reported by William Whitford, Chicago, Ill.]
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CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS, GYNECOLOGISTS,

AND

ABDOMINAL SURGEONS

TOGETHER WITH

MINUTES OF THE THIRTY-SIXTH ANNUAL MEETING
AMERICAN ASSOCIATION
OF
OBSTETRICIANS, GYNECOLOGISTS,
AND
ABDOMINAL SURGEONS

CONSTITUTION

I. The name of this Association shall be The American Association of Obstetricians, Gynecologists, and Abdominal Surgeons.*

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Obstetrics, Gynecology, and Abdominal Surgery, except that which is peculiar to the male.

MEMBERS

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, Corresponding Fellows, and Senior Fellows.

The Ordinary Fellows shall not exceed one hundred and fifty in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council at least three months before the first day of meeting, by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least three months before the annual meeting, an original paper relating to Obstetrics, Gynecology, or Abdominal Surgery, as indicated in Article II.

HONORARY FELLOWS

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, but shall not be required to pay any fee.

*At the Annual Session held in Atlantic City, September, 1920, the name of the Association was changed as above indicated.
CORRESPONDING FELLOWS

V. The Corresponding Fellows shall be recommended by the Executive Council and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the annual Transactions.

They shall pay an annual fee of five dollars.

SENIOR FELLOWS

Senior Fellows shall be nominated by the Executive Council, and elected by the Association as provided for in the election of Honorary Fellows, and they shall enjoy the same privileges as are accorded Corresponding Fellows.

OFFICERS

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, an Assistant Secretary, a Treasurer, and six Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The first five officers shall enter upon their duties immediately before the adjournment of the meeting at which they shall be elected, and shall hold office for one year.

At the election next succeeding the adoption of these laws, the full number of Executive Councillors shall be elected; two for a term of three years, two for a term of two years, and two for a term of one year.

At every subsequent election two Councillors shall be elected for a term of three years, and shall continue in office until their successors shall have been elected and shall have qualified.

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS

VII. The time and place of holding the annual meeting shall be determined by the Association or may be committed to the Executive Council each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting: provided, that notice of the proposed amendment shall have been given in writing at the annual meeting next preceding: and provided further, that such notice shall have been printed in the notification of the meeting at which the vote is to be taken.
AMERICAN ASSOCIATION
OF
OBSTETRICIANS, GYNECOLOGISTS,
AND
ABDOMINAL SURGEONS

BY-LAWS

THE PRESIDING OFFICER

I. The President, or in his absence, one of the Vice-Presidents shall
preside at all meetings, and perform such other duties as ordinarily
pertain to the Chair.

The presiding officer shall be ex-officio chairman of the Executive
Council, but shall vote therein only in case of a tie.

SECRETARY

II. The Secretary shall attend and keep a record of all meetings of the
Association and of the Executive Council, of which latter he shall be
ex-officio clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the
same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association;
he shall superintend the publication of the TRANSACTIONS under the
direction of the Executive Council, and shall perform all the ordinary
duties of his office.

He shall be the custodian of the seal, books, and records of the Asso-
ciation.

ASSISTANT-SECRETARY

III. The Assistant-Secretary shall assist the Secretary, and shall as-
sume the duties of the latter, should he, for any reason, become inapac-
itated.

TREASURER

IV. The Treasurer shall receive all moneys from the Secretary, pay
all bills, and render an account thereof at the annual meetings, when an
Auditing Committee shall be appointed to examine his accounts and vouchers.

EXECUTIVE COUNCIL

V. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offenses involving law or honor; and it shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS

VI. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A.M.
   a. Reports of Committees on Scientific Questions.
   b. Reading of Papers and Discussion of the same.

2. One business Meeting shall be held at half-past nine o'clock A.M. on the first day of the session, and another on the evening of the second day (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. At these meetings the Secretary's record shall be read; the Treasurer's accounts submitted; the reports of Committees on other than scientific subjects offered; and all miscellaneous business transacted.

PAPERS

VII. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary not later than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

Abstracts of all papers read should be furnished to the Secretary at the meeting.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary complete before the final adjournment of the annual meeting.
QUORUM

VIII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM

IX. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE

X. Each Fellow, on admission, shall pay an initiation fee of thirty dollars, which shall include his dues for the first year.

Every Fellow shall pay, in advance (i.e., at the beginning of each fiscal year) the sum of twenty-five dollars annually thereafter.

[A fiscal year includes the period of time between the first day of the annual meeting and the first day of the next.]

Any Fellow neglecting to pay his annual dues for two years may forfeit his membership, upon the vote of the Executive Council.

The Secretary shall receive, annually, a draft from the President, drawn on the Treasurer, for a sum, to be fixed by the Executive Council, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall be placed annually at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE

XI. Any Fellow who shall neither attend nor present a paper for five consecutive years, unless he offers a satisfactory excuse, shall be dropped from fellowship, upon the vote of the Executive Council.

RULES

XII. Robert's Rules of Order shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS

XIII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; provided previous notice in writing shall have been given at the annual meeting next preceding the one at which the vote is to be taken.
OFFICERS FOR 1923-1924

PRESIDENT
JAMES FAIRCHILD BALDWIN, COLUMBUS, OHIO

VICE-PRESIDENTS
JOHN W. POUCHER, POUGHKEEPSIE, N. Y.
GEORGE CLARK MOSHER, KANSAS CITY, MO.

SECRETARY
JAMES E. DAVIS, DETROIT

ASST. SECRETARY
GEORGE VAN AMBER BROWN, DETROIT

TREASURER
W. G. DICE, TOLEDO, OHIO

EXECUTIVE COUNCIL
GORDON K. DICKINSON, JERSEY CITY
JOHN WM. KEEFE, PROVIDENCE
H. E. HAYD, BUFFALO
R. E. SKEEL, LOS ANGELES
HENRY SCHWARZ, ST. LOUIS
E. A. WEISS, PITTSBURGH
## LIST OF OFFICERS

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<th>Vice-Presidents</th>
<th>Secretary</th>
<th>Treasurer</th>
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<td>1898. III, Edward J.</td>
<td>Manton, W.</td>
<td>Potter, Wm. W.</td>
<td>Werder, X. O.</td>
</tr>
<tr>
<td>1903. Dorsett, W. B.</td>
<td>Howitt, H.</td>
<td>Potter, Wm. W.</td>
<td>Werder, X. O.</td>
</tr>
<tr>
<td>1912. Porter, M. F.</td>
<td>Bonifield, C. L.</td>
<td>Potter, Wm. W.</td>
<td>Werder, X. O.</td>
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<tr>
<td>1917. Goldspohn, A.</td>
<td>Smith, C. N.</td>
<td>Potter, Wm. W.</td>
<td>Werder, X. O.</td>
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HONORARY FELLOWS

1889.—Barbour, A. H. Freeland, M.A., B.S.C., M.D., F.R.C.P. Ed., F.R.S. Ed. Lecturer on Midwifery and Diseases of Women in the Edinburgh Medical School; Assistant Physician to the Royal Maternity Hospital; Assistant Physician for Diseases of Women to the Royal Infirmary; Physician to the Women’s Dispensary; Fellow of the Edinburgh and London Obstetrical Societies, and of the British Gynecological Society; Corresponding Fellow of the Royal Academy of Medicine, Turin. 4 Charlotte Square, Edinburgh, Scotland.

1899.—Beuttner, Oscar, M.D. Professor of the Faculty of Medicine; Directeur de la Clinique gynécologique et obstétricale de l’Université de Genève. Maison Royale, 46, Quai des Eaux-Vives, Geneva, Switzerland.

1889.—Croom, Sir J. Halliday, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E. Professor of Midwifery in the University of Edinburgh; Consulting Physician to the Royal Infirmary; Physician to the Royal Maternity Hospital; late President of the Royal College of Surgeons, Edinburgh. 8 Morningside Place, Edinburgh, Scotland.

1914.—Das, Kedarnath, M.D. Professor of Midwifery and Gynecology, Campbell Medical School; Obstetrician and Gynecologist, Campbell Hospital, Calcutta; Examiner in Midwifery and Gynecology, Calcutta University; Examiner in Midwifery, College of Physicians and Surgeons, Bengal; Fellow, Royal Society of Medicine, London. 22 Bethune Row, Calcutta.

1891.—Fernandez, Juan Santos, M.D. Prado, No. 105, Havana, Cuba.

1923.—Frankl, Oskar, Professor of Obstetrics and Gynecology at the University of Vienna; Honorary Member of the St. Louis Gynecological Society; Honorary Member of the St. Louis Medical Society; Honorary Fellow of the Royal Academy of Medicine in Ireland. Wein 1, Franz Josefs Kai 17, Vienna, Austria.

1891.—Griffin, Herbert Spohn, B.A., M.B., M.D., C.M. Surgeon to St. Joseph’s Hospital; Gynecologist to Hamilton City Hospital; 157 Main Street, Hamilton, Ontario, Canada.

1914.—Hertoghe, Eugene, M.D., Sc.D. 34 Chausse de Malines, Mechelsche Steenweg, Antwerp, Belgium.

1921.—Humiston, William Henry, M.D. Clinical Professor of Gynecology in the Medical Department of Western Reserve University; Gynecologist in Chief to St. Vincent’s Charity Hospital; Consulting Gynecologist to the City Hospital; President of the Ohio State Medical Society, 1898. Executive Council, 1902-1903, 1908, 1910-1911. President, 1909. Residence, 2041 East Eighty-ninth Street; Office, 536 Rose Building, Cleveland, Ohio.

1894.—Jacobs, Charles, M.D., Professor of the Faculty of Medicine of Brussels; Secretary-General of the Permanent Committee of the Periodic International Congress of Gynecology and Obstetrics; Honorary President of the Belgian Society of Gynecology and Obstetrics; Honorary Fellow of the Gynecological Societies of New York and Chicago; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Gynecological Society of Paris, Surgeon to the Brussels Polyclinic. 137 Avenue Louise, Brussels, Belgium.

1903.—Lane, Horace Manley, M.D., LL.D. President of Mackenzie College, S. Paulo, Brazil. 184 Rua da Consolacao, S. Paulo, Brazil, S. A.

1911.—Lincoln, Walter Rodman, B.A., M.D., Cocoa, Brevard County, Florida.

1919.—Lott, Henry Stokes, M.D. Member of Staff Attending Surgeons; Instructor of Nurses, Obstetrics and Gynecology, City Hospital, Residence, 810 West End Boulevard. Office, 308 Masonic Temple, Winston-Salem, North Carolina.

1891.—Machell, Henry Thomas, M.D., L.R.C.P. Ed. Lecturer on Obstetrics, Women’s Medical College; Surgeon to St. John’s Hospital for Women; Physician to Victoria Hospital for Sick Children and to Hillcrest Convalescent Home. 95 Bellevue Avenue, Toronto, Ontario, Canada.

1890.—Martin, August, M.D., Emeritus Professor of Gynecology in the University of Greifswald. Gehr. Med.-R. Berlin-Schöneberg, Freiherr vom Steinstr. 2, Untergundbhf. Stadtpark, Germany.

1897.—Mathews, Joseph McDowell, M.D. Professor of Diseases of the Rectum and Clinical Surgery, Hospital College of Medicine; President of the Kentucky State Board of Health; President American Medical Association, 1899; 404 Consolidated Realty Bldg., Los Angeles, Cal.

1910.—de Ott, Dimitrij Oskarovic. Professor of Obstetrics and Gynecology in the Royal Pavloona Clinical Institute of St. Petersburg; President of the Fifth International Congress of Obstetrics and Gynecology. Wassily Ostrow, University Place, Petrograd, Russia.

1891.—Pietranera, E., M.D. Professor of Obstetrics in the Medical Department of the National University; Director of the Maternity
Branch of the Clinical Hospital. 2711 Calle Rio Adaria, Buenos Ayres, Argentine Republic, S. A.

1919.—STANTON, BYRON, M.D. Consulting Obstetrician to Christ Hospital since 1888; Member of American Medical Association, American Public Health Association, Academy of Medicine of Cincinnati (Pres. 1903), Cincinnati Obstetrical Society (Pres. 1883); Member of Ohio State Board of Health, 1892 to 1909 (Pres. 1894, 1901, and 1908); Surgeon, 120th Ohio Voluntary Infantry, 1863-4; Surgeon, U. S. Vols., 1865; Superintendent, Ohio State Hospital, Cleveland, 1865-9. Residence, 6248 Savannah Avenue, Cincinnati, Ohio.

1917.—SUTCLIFFE, JOHN ASBURY, A.M., M.D., Capt., M.R.C., U. S. Army. Professor of Genito-urinary Surgery, Indiana University School of Medicine. Consulting Surgeon to St. Vincent’s Infirmary; Consultant in Genito-urinary Diseases to the City Hospital and to the Protestant Deaconess’ Hospital. Residence, 1121 Central Avenue; Office, 155 East Market Street, Indianapolis, Ind.

1921.—WESTMORELAND, WILLIS FOREMAN, M.D., F.A.C.S. Professor of Surgery at the Atlanta Medical College. Suite 241, Equitable Building, Atlanta, Ga.

1888.—WILLIAMS, SIR JOHN, BART., M.D., F.R.C.P. Blaen Llynant, Aberystwyth, Cardiganshire, Wales.

1898.—WRIGHT, ADAM HENRY, B.A., M.D. Univ. Toronto, M.R.C.S., Eng. Professor of Obstetrics in the University of Toronto; Obstetrician and Gynecologist to the Toronto General Hospital and Burnside Lying-in Hospital, President, 1891. 30 Gerrard Street, East, Toronto, Ont., Canada.

Total, twenty-four Honorary Fellows.
HONORARY FELLOWS, DECEASED


1892.—Boisliniere, L. Ch., A.B., M.D., LL.D., Saint Louis, Mo., 1896.


1888.—Cordeis, Auguste E., M.D., Geneva, Switzerland, 1914.

1890.—Corson, Hiram, M.D., Plymouth Meeting, Pa., 1896.


1889.—Eklund, Abraham Fredrik, M.D., Stockholm, Sweden, 1898.

1891.—Fisher, George Jackson, A.M., M.D., Sing Sing, N. Y., 1893.

1896.—Gaston, James McFadden, A.M., M.D., Atlanta, Ga., 1903.

1912.—Gilliam, David Tod, M.D., Columbus, Ohio, 1923.

1892.—Green, Traill, M.D., LL.D., Easton, Pa., 1897.


1889.—Leopold, G., M.D., Dresden, Germany, 1913.


1894.—Maclean, Donald, M.D., Detroit, Mich., 1903.

1895.—Mastin, Claudius Henry, M.D., LL.D., Mobile, Ala., 1898.

1891.—Moses, Gratz Ashe, M.D., Saint Louis, Mo., 1901.

1905.—Myers, William Herschel, M.D., Fort Wayne, Ind., 1907.

1889.—Nicolaysen, Julius, M.D., Christiania, Norway, 1915.

1889.—Saenger, Max, M.D., Prague, 1903.


1889.—Schultze-Jena, Bernhard Sigmund, M.D., Jena, Germany, 1919.
1890.—Segond, Paul, M.D., Paris, France, 1913.


1894.—Slaviansky, Kronid, M.D., St. Petersburg, Russia, 1898.


1899.—Storrs, Melancthon, A.M., M.D., Hartford, Conn., 1900.


1905.—Taylor, William Henry, M.D., President, 1888-1889, Cincinnati, Ohio, 1910.


1901.—Weber, Gustav C. E., M.D., LL.D., Willoughby, Ohio, 1912.

1889.—Von Winkel, F., M.D., Munich, Germany, 1912.


Total, Thirty-six.
ORDINARY FELLOWS

1920.—BABCOCK, WILLIAM WAYNE, A.M., M.D., F.A.C.S. Professor of Surgery, Temple University, Philadelphia; Surgeon, Samaritan, Garretson, and American Stomach Hospitals. Residence, Cloverly Lane, Rydal, Pa.; Office, 16th at Walnut St., Philadelphia, Pa.

1895.—BACON, JOSEPH BARNES, M.D., F.A.C.S. Professor of Rectal Diseases at the Post-Graduate Medical School; Instructor in Clinical Surgery in the Medical Department of Northwestern University, Chicago; Surgeon in Chief St. Francis Hospital, Macomb, Ill.

1911.—BAINBRIDGE, WILLIAM SEAMAN, M.D., A.M., LL.D., M.S., C.M., Sc.D., Commander, M.C., U.S.N.R.F. (on active duty). Adjunct Professor, New York Post-Graduate Medical School, 1902-6; Professor New York Polyclinic Medical School and Hospital since 1906; Surgeon, New York Skin and Cancer Hospital; Attending Surgeon, New York City Children’s Hospitals and Schools; Consulting Surgeon Manhattan State Hospital, Booth Memorial Hospital, Salvation Army Home and Hospital of New York City, College of Dental and Oral Surgery of New York, and Tarrytown Hospital, Tarrytown, N. Y.; Consulting Gynecologist, St. Andrew’s Hospital (New York) and St. Mary’s Hospital, Jamaica, Long Island and the Ossining Hospital, Ossining, N. Y.; Honorary President International Congress for Study of Tumors and Cancers, Heidelberg, Germany, 1906; Foreign Member of the Academie Royale de Medecine de Belgique; Vice-president, 1917-1918. Official delegate from the U. S. Navy to the Congrés International de Médecine et de Pharmacie Militaries, Bruxelles, 1921. Member of the Permanent Committee appointed by the above Congress. Officier legion d’Honneur. Officer Order of Leopold First, of Belgium. Fellow of the Royal Society of Medicine, London. 34 Gramercy Park, New York City.

1895.—BALDWIN, JAMES FAIRCHILD, A.M., M.D., F.A.C.S. Member Volunteer M.C.; Surgeon to Grant Hospital, 125 South Grant Avenue; President, 1923-1924. Residence, 405 E. Town Street; Office, 115 South Grant Ave., Columbus, Ohio.

1903.—BANDLER, SAMUEL WYLLIS, M.D., F.A.C.S. Instructor in Gynecology in the New York Post-Graduate Medical School and Hospital; Adjunct Gynecologist to the Beth Israel Hospital. Residence and Office, 134 West Eighty-seventh Street, New York, N. Y.

1911.—BARRETT, CHANNING W., M.D., F.A.C.S. Professor of Gynecology and Head of Division of Gynecology, University of Illinois Med-
ical School, Gynecologist and Head of Department of Gynecology, Cook County Hospital. 619 Deming Place; Chicago, Ill.

1913.—Baughman, Greer, M.D., F.A.C.S., Capt., M.C., U. S. Army, Honorably Discharged. Professor of Obstetrics, Medical College of Virginia; Visiting Obstetrician to the Stuart Circle Hospital, Virginia Hospital, and to the Memorial Hospital, Richmond, Virginia; Member of the Southern Surgical and Gynecological Association; Vice-president of the Medical Society of Virginia, 1905; President of the Richmond Academy of Medicine and Surgery, 1917; Member of the Tri-State Medical Association of Virginia and the Carolinas; Richmond Academy of Medicine and Surgery, Southern Medical Association and the American Medical Society. Residence and Office, 26 North Laurel St., Richmond, Virginia.

1907.—Bell, John Norval, M.D., F.A.C.S., Capt., M.C., U. S. Army, Associate Professor of Obstetrics, Detroit College of Medicine and Surgery; Attending Obstetrician, Providence Hospital; Consulting Obstetrician, Woman’s Hospital, Booth Memorial Hospital, St. Mary’s Hospital and Highland Park Hospital; Consulting Surgeon, Harper Hospital. Residence, 203 Pallister Avenue; Office, 1149 David Whitney Bldg., Detroit, Mich.

1914.—Bill, Arthur Holbrook, A.M., M.D., F.A.C.S. Associate Professor and Head of the Department of Obstetrics, School of Medicine, Western Reserve University; Obstetrician in Chief to the Maternity Hospital of Cleveland; Visiting Obstetrician and Department Head, Cleveland City Hospital; Director of the Out-Patient Obstetrical Department, Western Reserve University; Consulting Obstetrician to the Elyria Memorial Hospital, Elyria, Ohio, and The Community Hospital, Berea, Ohio. Vice-President, 1921. Residence, 1804 East Ninety-third Street; Office, 503 Osborn Building, Cleveland, Ohio.

1900.—Bonfield, Charles Lybrand, M.D. Professor of Gynecology, Medical Department of the University of Cincinnati. Member and Ex-President, Cincinnati Academy of Medicine, Cincinnati Obstetrical Society, Ohio State Medical Association and Ohio Clinical Association. Member of American Medical Association, Southern Surgical and Gynecological Society. President, 1914. Residence, 1763 East McMillan Street; Office, 409 Broadway, Cincinnati, Ohio.

Founder.—Boyd, James Peter, A.M., M.D. Emeritus Professor of Obstetrics and Diseases of Children in the Albany Medical College; Consulting Obstetrician to the Albany Hospital; Fellow of the British Gynecological Society; Fellow of the Royal Society of Medicine. 152 Washington Avenue, Albany, N. Y.

1889.—Branham, Joseph H., M.D. Professor of Surgery in the Maryland Medical College; Surgeon to the Franklin Square Hospital. 2200 Entaw Place, corner Ninth Avenue, Baltimore, Md.
1912.—Brown, George Van Amber, M.D. Gynecologist to Providence Hospital; Urologist to Highland Park General Hospital; Member Wayne County and Michigan State Med. Soc.; Member American Medical Association; President Northern Tri-State Med. Soc. 1918. Vice-president, 1922-1923. Asst. Secretary, 1923-1924. Residence, 2672 Taylor Ave.; Office, 13300 Woodward Avenue, Detroit, Mich.


1908.—Buteau, Samuel H., M.D., F.A.C.S. Former member of California State Board of Medical Examiners; formerly Visiting Surgeon to Alameda County Hospital. Residence, 1052 Telegraph Avenue; Office, 1307 Broadway, Oakland, Cal.

1914.—Chandler, George Fletcher, M.D., F.A.C.S., Maj., M.C., U. S. Army. Surgeon to the Kingston City Hospital. Residence and Office, 11 East Chestnut St., Kingston, N. Y.

1915.—Clark, Edmund Dougan, M.D., F.A.C.S., Lt. Col. M.C., U. S. A., Commander of Base Hospital No. 32, A. E. F. Professor of Surgery and Secretary of the Faculty, Indiana University School of Medicine; Consulting Surgeon, Indianapolis City Hospital; Visiting Surgeon, Methodist Hospital. Residence, 1321 N. Meridian St.; Office, Hume-Mansur Bldg., Indianapolis, Ind.

1923.—Cleland, Frederick A., M.B., B.A. Assistant Professor of Obstetrics and Gynecology, University of Toronto; Senior Assistant in Obstetrics and Gynecology, Toronto General Hospital; Attending Surgeon, St. John's Hospital; Consulting Surgeon, Grace Hospital. Residence and Office, 131 Bloor Street West, Toronto, Canada.


1901.—Crile, George W., A.M., M.D., F.A.C.S., Col. M.C., U. S. Army. Senior Consultant in Surgical Research, American Expeditionary Forces; Professor of Surgery, Western Reserve Medical College; Visiting Surgeon to Lakeside Hospital. Vice-president, 1906; President, 1919. Residence, 2620 Derbyshire Road, Cleveland Heights; Office, Cleveland Clinic, Euclid at East Ninety-third Street, Cleveland, Ohio.

1905.—Crossen, Harry Sturgeon, M.D., F.A.C.S. Clinical Professor of Gynecology in Washington University; Gynecologist to Washington University Hospital; Associate Gynecologist to Mullanphy Hospital; Consulting Gynecologist to Bethesda, City and Female Hospitals. Residence, 4477 Delmar Avenue; Office, University Club Bldg., Saint Louis, Mo.
1912.—Crotti, André, M.D., F.A.C.S. Capt., M.C., U. S. Army. Professor of Clinical Surgery, Ohio State University; Surgeon to Grant and Children’s Hospitals. Residence, 1592 E. Broad Street; Office, 246 E. State Street, Columbus, Ohio.

1923.—Dannreuther, Walter T., M.D., F.A.C.S. Associate Professor of Gynecology, New York Post-Graduate Hospital and Medical School; Consulting Female Urologist, Lutheran Hospital; Attending Gynecologist, St. Elizabeth’s Hospital. Residence and Office, 580 Park Avenue, New York, N. Y.

1912.—Darnall, William Edgar, A.B., M.D., F.A.C.S. Gynecologist, Atlantic City Hospital; Consulting Surgeon to North American Children’s Sanitarium for the Treatment of Surgical Tuberculosis, and Home for Incurables, Longport, New Jersey; Surgeon to the Max and Sarah Bamberger Home, Longport, N. J.; Vice-president American Medical Association, 1914. Residence and Office, 5 South Morris Avenue, Chelsea, Atlantic City, N. J.

1911.—Davis, Asa Barnes, M.D., F.A.C.S. Attending Surgeon of the Society of the Lying-in Hospital of the City of New York; Consulting Gynecologist to the Vassar Brothers’ Hospital, Poughkeepsie, N. Y. Vice-president, 1914. Residence and Office, 44 Park Avenue, New York, N. Y.

1915.—Davis, James Ethelbert, A.M., M.D. Professor of Pathology, Detroit College of Medicine and Surgery; Director of Laboratories, Providence and Woman’s Hospital; Pathologist, St. Mary’s Hospital; Consulting Pathologist Michigan State Board of Health; Ex-President Wayne County Medical Society; Member—The American and Canadian Section of the International Association of Medical Museums; American Medical Association; American Pathological Society. Secretary, 111 Josephine Ave., Detroit, Michigan.

1903.—Davis, John D. S., M.D., LL.D., F.A.C.S. Professor of Surgery in the Post-Graduate School of Medicine of the University of Alabama; Surgeon to Hillman Hospital; Consulting Gynecologist to St. Vincent’s Hospital; ex-President Jefferson County Medical Society; Vice-president, Southern Surgical Association, 1905; Vice-president, 1909. 2029 Avenue G, Birmingham, Ala.

1910.—Dice, William Gordon, A.B., M.D. Obstetrician to Flower and Mercy Hospitals. Treasurer, 240 Michigan Street, Toledo, Ohio.

1909.—Dickinson, Gordon K., M.D., F.A.C.S. Attending Surgeon to the Jersey City Hospital, and Christ Hospital, Jersey City; Consulting Surgeon, Bayonne City Hospital, North Hudson Hospital, Weehawken, and the Stumpf Memorial Hospital, Kearney; Past-president, Medical Society of the State of New Jersey, 1919-1920. Vice-president, 1915-1916. President, 1922-1923. 280 Montgomery St., Jersey City, N. J.
1920.—DORSETT, EDWARD LEE, M.D., F.A.C.S., Capt. M.C., U. S. A., 1918-1919. Attending Obstetrician (Chief of Service), St. Louis City Hospital; Consulting Obstetrician, St. Louis Maternity Hospital; Obstetrician and Gynecologist to the Missouri Baptist Sanitarium and the Evangelical Deaconess Hospital; Visiting Gynecologist, State Hospital No. 1, Fulton, Mo.; Instructor in Obstetrics, Washington University School of Medicine; Obstetrician, Out-Patient Department, Washington University School of Medicine. Member of the St. Louis Gynecological Society, the Association of Surgeons of St. Louis, and the St. Louis Surgical Society. Residence, 5093 Washington Blvd.; Office, 505-509 University Club Bldg., St. Louis, Mo.

1920.—DOUGLASS, FRED MELVIN, M.D., F.A.C.S. Surgeon to St. Vincent’s Hospital; Surgeon to Toledo Municipal Hospital. Residence, 2061 Robinwood Ave.; Office, 421 Michigan St., Toledo, Ohio.

1904.—ELBRECHT, OSCAR H., PH. B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in Charge, St. Louis Female Hospital; Visiting Surgeon, St. Louis City Hospital; Consulting Gynecologist, Missouri Pacific Hospital; Consulting Surgeon to St. Louis Maternity Hospital and former Chief of Staff; Consulting Surgeon, Bethesda Hospital; Member of Southern Surgical and Gynecological Association. Residence, Buckingham Hotel; Office, 423 Metropolitan Building, St. Louis, Mo.

1906.—ERDMANN, JOHN FREDERICK, M.D., F.A.C.S. Professor of Surgery, N. Y. Post-Graduate Hospital and Medical School; Consulting Surgeon to Gouverneur Hospital, Southampton Hospital; Mt. Vernon General Hospital, Mt. Vernon, N. Y.; Greenwich General Hospital, Greenwich, Conn.; Nassau Hospital, Mineola, L. I. Director of Surgery, New York Post-Graduate Hospital and Medical School. President, 1918. 60 West Fifty-second Street, New York, N. Y.

1920.—FARR, ROBERT EMMETT, M.D. Attending Surgeon, St. Mary’s Hospital. Residence, 2433 S. Bryant St.; Office, 301 Physicians & Surgeons Bldg., Minneapolis, Minn.

1911.—FINDLEY, PALMER, B.E., M.D., F.A.C.S. Professor of Gynecology, College of Medicine, University of Nebraska. Vice-president, 1919. 3602 Lincoln Boulevard, Omaha, Neb.

1910.—FOSTER, CURTIS SMILEY, A.B., M.D., F.A.C.S. Gynecologist to the Western Pennsylvania Hospital, Pittsburgh. Residence, 5749 Ellsworth Avenue; Office, 308 Diamond Bank Building, Pittsburgh, Pa.

1903.—FRANK, LOUIS, M.D., F.A.C.S. Professor of Abdominal and Pelvic Surgery, Medical Department, University of Louisville; Surgeon, Louisville City Hospital; Surgeon to John N. Norton Memorial Infirmary; Consulting Surgeon, Children’s Free Hospital; President Mississippi Valley Medical Association, 1912; President, Kentucky State

1912.—Furniss, Henry Dawson, M.D., F.A.C.S., Professor of Gynecology, New York Post-Graduate Hospital; Attending Gynecologist, New York Post-Graduate Hospital; Consulting Gynecologist, All Souls Hospital, Morristown; Consulting Gynecologist, New Rochelle Hospital; Consulting Gynecologist, St. Agnes Hospital, White Plains, N. Y.; Consulting Cystoscopist, New York Infirmary for Women; Fellow, New York Academy of Medicine, New York Medico-Surgical Society; New York Obstetrical Society, New York State and County Medical Societies, American Medical Association, American Urological Society. Office, 54 East Forty-eighth Street, New York, N. Y.

1921.—Garnett, Alexander Y. Peyton, M.D. Obstetrician, Garfield Hospital; Associate Professor of Obstetrics, Georgetown University; Obstetrician, Georgetown Hospital. Residence, 1612 Twenty-first Street; Office, 1824 Massachusetts Avenue, Washington, D. C.

1902.—Gillette, William J., M.D. Professor of Abdominal Surgery and Gynecology in the Toledo Medical College; Surgeon to Robinwood Hospital. 1613 Jefferson Street, Toledo, Ohio.

1895.—Goldspohn, Albert, M.S., M.D., F.A.C.S. Professor of Gynecology, Post-Graduate Medical School; Surgeon-in-Chief of Evangelical Deaconess Hospital, Chicago. Vice-president, 1901; President, 1917. Residence and Office, 2120 Cleveland Avenue, Chicago, Ill.

1912.—Goodman, Sylvester Jacob, Ph.G., M.D., F.A.C.S. Surgeon and Obstetrician to Grant Hospital, Columbus, Ohio. Chief of Obstetric Department, Mercy Hospital, Chief of Obstetric Department, Protestant Hospital, Consulting Gynecologist, Ohio Institution Feeble Minded, Surgeon, Ohio Jewish Infant Home. Major, M.C., U. S. Army, Honorable Discharge. Residence, 1718 Franklin Avenue; Office, 121 South Sixth Street, Columbus, Ohio.


1889.—Hall, Rufus Bartlett, A.M., M.D., F.A.C.S. Professor of Clinical Gynecology in the Ohio-Miami Medical College, Medical Department of University of Cincinnati; Gynecologist to the Cincinnati Hospital; Surgeon-in-Charge of the Hall Hospital; Member of the British Medical Society; of the Southern Surgical and Gynecological Association; of the American Medical Association; of the Ohio State Medical Society (President, 1900); of the Cincinnati Academy of Medicine
ORDINARY FELLOWS

(President, 1909); of the Cincinnati Obstetrical Society (ex-President). Vice-president, 1891; President, 1900; Executive Council, 1904-1909. Berkshire Building, 628 Elm Street, Cincinnati, Ohio.

1902.—Hamilton, Charles Sumner, A.B., M.D., F.A.C.S. Professor of Surgery, Medical Department, Ohio State University; Professor of the Principles of Surgery in Starling Medical College; Surgeon to Mt. Carmel and the Children’s Hospitals. 188 E. State St., Columbus, Ohio.

1921.—Harper, Paul Tompkins, M.D., Ph.B., F.A.C.S. Clinical Professor of Obstetrics, Albany Medical College; Attending Obstetrician, Anthony N. Brady Maternity Home; Obstetrician, Albany Hospital; Consulting Obstetrician, Mary McClenan Hospital and Glens Falls Hospital; Regional Consultant in Obstetrics, New York State Department of Health. Residence and Office, 289 State Street, Albany, N. Y.


1894.—Hayd, Herman Emil, M.D., M.R.C.S. Eng., F.A.C.S. Surgeon to the Deaconess Hospital; Vice-president, 1902; Executive Council, 1908-1910; President, 1910; Treasurer, 1911-1922. 493 Delaware Avenue, Buffalo, N. Y.

1908.—Hedges, Ellis W., A.B., M.D., F.A.C.S. Visiting Surgeon to Muhlenberg Hospital, Plainfield, N. J.; Consulting Surgeon to the Somerset Hospital, Somerville, N. J. 703 Watchung Avenue, Plainfield, N. J.


1922.—Heyd, Chas. Gordon, B.A., M.D. Professor of Surgery, New York Post-Graduate Medical School and Hospital; Attending Surgeon, New York Post-Graduate Hospital; Consulting Surgeon, Greenwich Hospital, Greenwich, Conn., Morristown Memorial Hospital, Morristown, N. J., Dover Hospital, Dover, N. J.; Member, New York Academy of Medicine, Medical Society of the State of New York, Medical Society of the County of New York, American Medical Association, American College of Surgeons, American Association for Thoracic Surgery, New York Surgical Society, American Association of Gastroenterologists, Association for Study of Internal Secretions. 116 East 53rd St., New York, N. Y.

1910.—Hill, Ira Leon, A.B., M.D. Clinical Instructor of Obstetrics at Cornell University Medical College; Visiting Obstetrician to the Red
Cross Hospital; Attending Obstetrician to Sydenham Hospital. 616 Madison Avenue, New York, N. Y.


1901.—ILL, CHARLES L., M.D., F.A.C.S. Surgeon to the German Hospital; Gynecologist to St. Michael’s and Surgeon to St. Barnabas’s Hospitals, Newark; Gynecologist to All Souls’ Hospital, Morristown. 188 Clinton Avenue, Newark, N. J.

Founder.—ILL, EDWARD JOSEPH, M.D., F.A.C.S. Emeritus Surgeon to the Woman’s Hospital; Emeritus Medical Director of St. Michael’s Hospital; Gynecologist and Supervising Obstetrician to St. Barnabas’s Hospital; Consulting Gynecologist to the Beth Israel Hospital of Newark, N. J., to All Souls’ Hospital, and Memorial Hospital, Morristown, N. J., and to the Mountain Side Hospital, Montclair, N. J.; Perth Amboy City Hospital, Muhlenberg Hospital (Plainfield), Somerset Hospital (Somerville), Skillman Home for Epileptics, Stumpf Memorial Hospital (Kearney), St. Elizabeth’s Hospital (Elizabeth), and St. James Hospital (Newark); Member of the Southern Surgical and Gynecological Association; Vice-president from New Jersey of the Pan-American Medical Congress of 1893; President of the Medical Society of the State of New Jersey, 1907. Vice-president, 1893; President, 1899; Executive Council, 1901-1903. 1002 Broad Street, Newark, N. J.

1906.—JONAS, ERNST, M.D., F.A.C.S. Clinical Professor of Surgery in Washington University Medical School; Surgeon in Charge of the Surgical Clinic at the Washington University Hospital; Gynecologist to the St. Louis Jewish Hospital; Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John’s Hospital; Surgeon to the Martha Parsons Free Hospital for Children. Residence, 4495 Westminster Place; Office, 465 North Taylor Avenue, St. Louis, Mo.

1910.—JONES, ARTHUR THOMS, M.D., F.A.C.S. Visiting Surgeon to Memorial Hospital, Pawtucket, R. L.; Consulting Surgeon to St. Joseph’s Hospital, Providence, R. I., and Woonsocket Hospital, Woonsocket, R. I. Formerly Visiting Surgeon to St. Joseph’s Hospital, Providence, and State Hospital for Insane, Howard, R. I. Vice-president, 1917. Office, 131 Waterman Street; Residence, 63 Orchard Ave., Providence, R. I.

1902.—KEEFE, JOHN WILLIAM, M.D., LL.D., F.A.C.S. Surgeon-in-Chief to ‘‘The John W. Keefe Surgery;’’ Consulting Surgeon to the Rhode Island Hospital, Providence City Hospital, St. Joseph’s Hospital, Memorial Hospital, Pawtucket and Woonsocket Hospital. Vice-president, 1907; President, 1916; Executive Council, 1911. 262 Blackstone Boulevard, Providence, R. I.
1923.—Kellogg, Foster Standish, M.D., A.B. Assistant in Obstetrics, Harvard Medical School; Assistant Visiting Obstetrician, Boston Lying-in Hospital; Obstetrician to Out Patients. Residence, 270 Bay State Road; Office, 19 Bay State Road, Boston, Mass.


1911.—King, James E., M.D., F.A.C.S. Professor of Clinical Gynecology, Medical Department, University of Buffalo, New York; Attending Gynecologist, Buffalo General and Erie County Hospital and Good Samaritan Dispensary; Fellow Royal Society of Medicine, London, England; Fellow of Am. Gyn. Soc. Vice-president, 1920. 1248 Main Street, Buffalo, N. Y.

1908.—Kirchner, Walter C. G., A.B., M.D., F.A.C.S., Major, M.C., U. S. Army. Formerly Superintendent and Surgeon in charge of the St. Louis City Hospital. Visiting Surgeon City Hospital, Consulting Surgeon, St. John’s Hospital. Office, 229 Metropolitan Building, St. Louis, Mo.

1918.—Kosmak, George W., A.B., M.D., F.A.C.S., Columbia University, College of Physicians and Surgeons, 1899. Attending Surgeon, Lying-In Hospital, N. Y.; Consulting Obstetrician, Booth Memorial Hospital, N. Y. Editor, American Journal of Obstetrics and Gynecology. Residence and Office, 23 East 93rd Street, New York City.


1914.—Leighton, Adam P., Jr., L. M. (Dublin), M.D. Attending Obstetrician to Dr. Leighton’s Maternity Hospital, Portland; Secretary of the Maine State Board of Registration of Medicine; Consulting Obstetrician to the Webber Hospital, Biddeford; Consulting Obstetrician to the Gardiner General Hospital, Gardiner. Residence, The Lafayette Hotel; Office, 192 State Street; Private Hospital, 109 Emery Street, Portland, Maine.

1915.—Litzenberg, Jennings, A.B., M.D., F.A.C.S. Professor of Gynecology and Obstetrics, University of Minnesota. Residence, 3137 Park Avenue; Office, Donaldson Building, Minneapolis, Minn.
1911.—LOTHROP, EARL P., A.B., M.D., F.A.C.S. Gynecologist to the Buffalo Woman's Hospital; Consulting Surgeon to Columbus Hospital, Buffalo; Surgeon to the J. N. Adams Memorial Hospital for Tuberculosis, Perry'sburg, N. Y. 319 Elmwood Avenue, Buffalo, N. Y.

1913.—LYNCH, JEROME M. R., M.D., F.A.C.S. Professor Rectal and Intestinal Diseases, New York Polyclinic; Consulting Surgeon Nassau Hospital, Mineola, L. I.; Attending Surgeon St. Mary's Hospital, Hoboken, N. J.; Member New York State and County Societies, American Medical Association, American Proctologic Society, North Western Medical and Surgical Society; Surgeon, Medical Reserve, U. S. N. Residence and Office, 205 East 61st St., New York City.

1910.—McClellan, Benjamin Rush, A.B., A.M., M.D., F.A.C.S. Capt., M.C., U. S. Army, Member American Medical Association; ex-President Ohio State Medical Society; Surgeon to McClellan Hospital. Vice-president, 1921. Residence, 636 South Detroit Street; Office 7 East Second Street, Xenia, Ohio.

1910.—McPherson, Ross, A.B., M.D., F.A.C.S. Attending Surgeon of the Lying-in Hospital of the City of New York; Consulting Obstetrician of the United Port Chester Hospital, Caledonian Hospital of Brooklyn, N. Y., and the Hackensack Hospital of New Jersey. Office, 125 East Thirty-ninth Street; Residence, 45 East Sixty-second Street, New York, N. Y.

1914.—Meeker, Harold Denman, A.B., M.D., F.A.C.S., Com., M.C., U. S. N. R. F. Professor of Surgery, Polyclinic Medical School and Hospital, New York; Visiting Surgeon to Park Hospital, New York. Residence, 420 East End Ave.; Office, 47 East 57th St., New York, N. Y.

1920.—Mendenhall, Arthur Monroe, B.S., M.D. Instructor in Obstetrics, Indiana University Medical School. Residence, 3304 Broadway; Office, 333 Newton-Claypool Bldg., Indianapolis, Ind.

Founder.—Miller, Aaron Benjamin, M.D., F.A.C.S. Governor Professor of Gynecology in the Medical Department, Syracuse University; Gynecologist to St. Joseph's Hospital; Consulting Gynecologist to Syracuse Memorial Hospital; Gynecologist to Syracuse General Hospital; Gynecologist to Dispensary. President New York State Board of Medical Examiners. Examiner in Obstetrics and Gynecology New York State Reagent Examinations. Vice-president, 1899, 1904; President, 1910; Executive Council, 1911, 1921, 1922, 1923. 326 Montgomery St., Syracuse, N. Y.

1905.—Miller, John D., M.D., F.A.C.S. Professor of Gynecology, University of Cincinnati; Director of Gynecologic Clinic (Out-patient's Dept.), Cincinnati General Hospital; Gynecologist of Good Samaritan, Christ Hospital, and Cincinnati General Hospital. Residence, 1707
E. McMillan St.; Office, N. W. cor. Eighth and Elm Streets, Cincinnati, Ohio.

1921.—Montgomery, Edward Brewer, M.D., F.A.C.S. Residence, 1461 Vermont Street; Office, 134 North 8th Street, Quincy, Ill.

1911.—Moots, Charles W., B.S., M.D., F.A.C.S. Commander, U. S. N. R. F. Gynecologist to Flower Hospital; President of Academy of Medicine of Toledo and Lucas County, 1912. Residence, The Belvedere Apts.; Office, 2485 Collingwood Ave., Toledo, Ohio.

1921.—Moran, John Francis, A.B., M.D. Professor of Obstetrics, Georgetown University School of Medicine; Obstetrician, Georgetown University Hospital, Columbia Hospital for Women, and Washington Asylum Hospital. Residence and office, 2426 Pennsylvania Ave., N. W., Washington, D. C.

1907.—Morlarta, Douglas C., M.D., F.A.C.S. Senior Surgeon to Saratoga Hospital; Surgeon in chief to Saint Christina's Hospital for Children; Director of State Experimental Station at Saratoga. 511 Broadway, Saratoga Springs, N. Y.

1890.—Morris, Robert Tuttle, A.M., M.D., F.A.C.S., Maj., M.R.C., U. S. Army. Professor of Surgery in the New York Post-Graduate Medical School and Hospital. Vice-president, 1892; Executive Council, 1906, 1908-1911; President, 1907. 114 East 54th Street, New York, N. Y.

1918.—Mosher, George Clark, A.M., M.D., F.A.C.S. Senior Obstetrician of the Kansas City General and Christian Hospitals; Consulting Obstetrician, Trinity, Lutheran and Bethany Hospitals; Formerly Professor of Obstetrics and Gynecology, Head of Dept., Medical School of University of Kansas; Vice-president, 1923; Chairman Committee on Maternal Welfare, 1922-23-24; Founder and ex-President, Kansas City Obstetrical Society. Residence, Hotel Lucerne; Office, 605 Bryant Building, Kansas City, Mo.

1896.—Noble, George Henry, M.D., D.C.L., F.A.C.S. Gynecologist to the Grady Hospital; Secretary to the Section on Obstetrics and Gynecology of American Medical Association, 1897; Professor of Clinical Gynecology, Atlanta Medical College (Emery University); Member of the Southern Surgical and Gynecological Association. 186 South Pryor Street, Atlanta, Ga.

1903.—Noble, Thomas Benjamin, M.D. Professor of Abdominal Surgery in the Central College of Physicians and Surgeons; Consultant in the Diseases of Women at the City Hospital, City Dispensary, and Protestant Deaconess's Hospital, Indianapolis. 720 Newton Claypool Building, Indianapolis, Ind.
1907.—Olmsted, Ingerson, M.D., F.A.C.S. Surgeon to the City and St. Joseph's Hospitals, Hamilton, Ont. 215 South James St., Hamilton, Ontario, Canada.

1899.—Pantzer, Hugo Otto, A.M., M.D., F.A.C.S. Past Professor, Surgical Pathology and Clinical Gynecology, in the Central College of Physicians and Surgeons; Past Professor Clinical Gynecology, Indiana Medical College, Medical Department of Purdue University; Late Professor of Clinical Gynecology in the Indiana Medical College, Medical Department of Indiana University; Gynecologist to Methodist Hospital; Past President of Indianapolis Medical Society; Member of Indiana State Association and American Medical Association. President, 1915. 601 Hume-Mansur Bldg., Indianapolis, Ind.


1899.—Pfaff, Orange G., M.D. Adjunct Professor of Obstetrics and Diseases of Women in the Medical College of Indiana; Gynecologist to the City, Deaconess', and St. Vincent's Hospitals; Vice-president, 1915, 1916. 1337 North Pennsylvania Street, Indianapolis, Ind.

1921.—Pfeiffer, William, M.D., F.A.C.S. Clinical Professor Obstetrics and Gynecology, Long Island College Hospital; Obstetrician and Gynecologist, Kings County Hospital; Obstetrician and Gynecologist, Holy Family Hospital; Obstetrician, Carson C. Peck Memorial Hospital; Fellow American College of Surgeons. Residence and Office, 368 McDonough Street, Brooklyn, N. Y.

1923.—Phaneuf, Louis E., M.D., F.A.C.S., Phm.D., Ph.C. Associate Professor of Clinical Gynecology, Tufts College Medical School, Boston; Gynecologist and Obstetrician, Carney Hospital; Visiting Obstetrician, St. Elizabeth's Hospital. Residence, 17 Gibbs Street, Brookline, Mass.; Office, 395 Commonwealth Avenue, Boston, Mass.

1920.—Polak, John Osborn, M.Sc., M.D., University of Vermont, College of Medicine, 1891; Long Island College Hospital, 1891. Professor of Obstetrics and Gynecology, Long Island Hospital; Obstetrician and Gynecologist, Long Island College Hospital; Director, Obstetrics and Gynecology, Zion Hospital; Consulting Gynecologist, Jewish Hospital; Deaconess, Bushwick, Coney Island, People's and Williamsburgh Hospitals; Consulting Obstetrician, Methodist Episcopal Hospital; Consulting Surgeon, Southampton Hospital, Southampton. Office, 20 Livingston St., Brooklyn, N. Y.
1898.—PORTER, MILES F., M.D., F.A.C.S. Chairman of the District Conscript Board No. 2, of Indiana. Professor of Surgery in the Indiana University School of Medicine; ex-President Indiana State Medical Society. Vice-president, 1902; President, 1912-1913. 2326 Fairfield Ave., Ft. Wayne, Ind.

1902.—PORTER, WILLIAM D., M.D. Professor of Clinical Obstetrics, Medical College, University of Cincinnati; Assistant Director, Obstetrical Department, Cincinnati General Hospital. Residence, 3031 Reading Road; Office, 1 Melrose Building, Cincinnati, Ohio.

1914.—POTTER, IRVING WHITE, M.D. Attending Obstetrician, St. Mary’s Maternity Hospital; Instructor of Obstetrics, Medical Department, University of Buffalo; Attending Obstetrician, German Deaconess Hospital. Residence and Office, 420 Franklin St., Buffalo, N. Y.

1903.—POUCHER, JOHN WILSON, M.D., F.A.C.S. Consulting Surgeon, Highland Hospital (Beacon, N. Y.), and Hudson River State Hospital (Poughkeepsie); Chief of Staff and Attending Surgeon, Bowne Memorial Hospital and St. Francis Hospital (Poughkeepsie). Member, Board of Managers of the Hudson River State Hospital. Vice-president, 1923. 339 Mill Street, Poughkeepsie, N. Y.

1919.—QUIGLEY, JAMES KNIGHT, A.B., M.D., F.A.C.S. Attending Obstetrician to the Rochester General Hospital; Consulting Obstetrician to the Thompson Memorial Hospital, Canandaigua, N. Y. Regional Consultant, State Department of Health. Member Alumni Society, Lying-in Hospital of the City of New York. Residence, 400 Westminster Road; Office, 303 Alexander Street, Rochester, N. Y.

1904.—REDER, FRANCIS, M.D., F.A.C.S. Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John’s Hospital. Residence, 6346 Pershing Avenue; Office, 415 University Club Building, St. Louis, Mo.

Founder.—REED, CHARLES ALFRED LEE, A.M., M.D., F.A.C.S. Maj., M.C., U. S. Army. Consulting Gynecologist, Cincinnati General Hospital; President, American Medical Association, 1900-1; Fellow, British Gynecological Society; Chevalier Legion of Honor, France; Fellow, National Academy of Medicine of Peru; President, Seventh Pan-American Medical Congress. President, 1898. Residence, 3544 Biddle Avenue; Office, 5 West Eighth Street, Cincinnati, Ohio.

1913.—RONGY, ABRAHAM JACOB, M.D., F.A.C.S. Attending Gynecologist, Lebanon Hospital; Attending Surgeon, Jewish Maternity Hospital; Consulting Gynecologist, Rockaway Beach Hospital. Residence and Office, 345 West 88th Street, New York City.

1909.—ROSENTHAL, MAURICE I., M.D., F.A.C.S. Surgeon to Saint Joseph’s Hospital. 336 W. Berry Street, Fort Wayne, Ind.
1920.—Royston, Grandison Delaney, M.D. Instructor in Clinical Obstetrics, Washington University Medical School; Associate Obstetrician, Barnes Hospital; Visiting Staff, St. Louis Maternity Hospital; Chief of Clinic in Obstetrics, Washington University Dispensary. Residence, 633 Hanley Road; Office, Wall Building, St. Louis, Mo.

1920.—Rucker, Marvin Pierce, A.M., M.D. Associate in Obstetrics, Medical College of Virginia; Associate Obstetrician, Memorial and Saint Phillip’s Hospitals. Residence, 400 N. Lombardy St.; Office, Medical Arts Bldg., Richmond, Va.

1902.—Runyan, Joseph Phineas, M.D. Division Surgeon to the Choctaw, Oklahoma and Gulf Railroad; Secretary of the Arkansas State Medical Association, President, 1904. State Bank Bldg., Little Rock, Ark.

1906.—Ruth, Charles Edward, M.D., F.A.C.S., Lt. Col. M.R.C., U. S. Army. Professor of Surgery and Clinical Surgery in the Keokuk Medical College (College of Physicians and Surgeons); Surgeon, Iowa M. E. Hospital; Chief of Surgical Service, Base Hospital, Camp Dodge, Ia.; Chief Surgical Service of General Hospital No. 2, Baltimore, Md.; Commander, Post Hospital, Fort Wm. McKinley, Rizal, P. I. Iowa Building, Des Moines, Iowa.

1903.—Sadlier, James Edgar, M.D., F.A.C.S. Attending Surgeon, St. Francis Hospital, Poughkeepsie, N. Y.; Surgeon-in-Chief, The Sadlier Hospital, Poughkeepsie, N. Y.; Consulting Surgeon, Highland Hospital, Beacon, N. Y.; Consulting Surgeon, Sharon Hospital, Sharon, Conn. Vice-president, 1909. Residence and Office, 295 Mill Street, Poughkeepsie, N. Y.


1910.—Schildecker, Charles Bushfield, M.D. Assistant Gynecologist to Western Pennsylvania Hospital; Coroner’s Physician of Allegheny County. Residence, 414 Rebecca Street; Office, 1105 Park Building, Pittsburgh, Pa.

1921.—Schmitz, Henry, M.D., A.M., F.A.C.S. Professor of Gynecology, and Head of Department, Loyola University School of Medicine; Attending Senior Gynecologist at Mercy Hospital; Attending Gynecologist, Cook County Hospital; Consulting Gynecologist, St. Mary’s of Nazareth Hospital; Consulting Radiologist, Augustana Hospital, and Consulting Gynecologist of Misericardia Hospital. Residence, 3051 Logan Blvd.; Office, 25 East Washington St., Chicago, Ill.

1904.—Schwarz, Henry, M.D., F.A.C.S. Professor of Obstetrics, Medical Department of Washington University. Vice-president, 1910; President, 1920. 440 North Newstead Avenue, St. Louis, Mo.
1918.—Schwarz, Otto H., M.D. Associate Professor of Obstetrics, Washington University School of Medicine; Obstetrician-in-Chief to Barnes Hospital and the Washington University Dispensary. Residence, 4937 Laclede Ave.; Office, Washington University School of Medicine, Scott and Euclid Aves., St. Louis, Mo.


1912.—Skeel, Arthur Julius, M.D., F.A.C.S. Assistant Professor of Obstetrics, Western Reserve University; Obstetrician to St. Luke’s Hospital; Consulting Obstetrician to the Florence Crittenden Home, Consulting Obstetrician to the Woman’s Hospital. Residence and Office, 1834 East 65th Street, Cleveland, Ohio.

1901.—Skeel, Roland Edward, M.D., F.A.C.S., M.S., A.M., Major M.C., U. S. Army, Hon. discharged. Formerly Associate Clinical Professor of Gynecology in Western Reserve University; Formerly Gynecologist to St. Luke’s, Cleveland, Ohio. President, 1921. Office, 302 Title Insurance Bldg., Los Angeles, Cal.

1922.—Sloan, E. P., M.D. Chief Surgeon to the Mennonite Hospital and St. Joseph Hospital, Bloomington, Ill.; President of the Illinois State Medical Society; Chairman of the Illinois State Board of Health; Vice-President of the Tri-State Medical Society. Office, 1417 North Main Street, Bloomington, Ill.

1910.—Smead, Lewis Frederic, A.B., M.D., F.A.C.S. Surgeon to Flower Hospital and Toledo Hospital, Toledo, Ohio. Residence 620 Nesselwood Ave.; Office, 227 Michigan St., Toledo, Ohio.

1920.—Speidel, Edward, M.D., Ph.G. Professor of Obstetrics, University of Louisville; Chief of Obstetrical Staff, Louisville City Hospital. Residence, The Besten; Office, Francis Bldg., Louisville, Ky.

1902.—Stark, Sigmar, M.D., F.A.C.S. Professor of Gynecology, Medical Department of the University of Cincinnati; Director of First Gynecological Service, Cincinnati General Hospital, and Director of Gynecology, Jewish Hospital. Residence, 1108 E. McMillan St.; Office, 11½ E. Eighth St., Cincinnati, Ohio.

1919.—Stein, Arthur, M.D., F.A.C.S. Visiting Gynecologist, Harlem Hospital; Associate Gynecologist, Lenox Hill Hospital; Consulting Gynecologist, Hospital for Deformities, New York City. Residence and Office, 48 East 74th Street, New York, N. Y.
1908.—Stewart, Douglas Hunt, M.D., F.A.C.S. Adjunct Surgeon, O. P. D. Knickerbocker Hospital. Residence, 128 West 86th Street, New York, N. Y.

1899.—Swope, Lorenzo W., M.D., F.A.C.S. Surgeon to the Consolidated Traction Company; Chief Surgeon to Wabash Railroad, Pittsburgh Division; Surgeon to Western Pennsylvania Hospital; Surgeon to Passavant Hospital; Member of the Allegheny County Medical Society; Member of the American Medical Association. Residence, 4629 Bayard Street; Office, 1105 Park Building, Pittsburgh, Pa.

1901.—Tate, Magnus Alfred, M.D., F.A.C.S. Professor of Obstetrics Miami Medical College; President, Cincinnati Academy of Medicine, 1905; Obstetrician to the Cincinnati General Hospital and to the Good Samaritan Hospital. 19 West Seventh Street, Cincinnati, Ohio.

1920.—Titus, Paul, M.D., F.A.C.S. Obstetrician, Western Pennsylvania Hospital, Pittsburgh; Obstetrician and Gynecologist, City Tuberculosis Hospital, Pittsburgh; Pittsburgh City Hospital, and Homes, Mayview. Residence, Alder Court Apts.; Office, Highland Bldg., Pittsburgh, Pa.

1922.—Toombs, Percy W., A.B., M.D., F.A.C.S. Professor of Obstetrics, University of Tennessee College of Medicine; Obstetrician-in-Chief, Baptist Memorial Hospital and Memphis General Hospital; Consulting Obstetrician, Ella Oliver Refuge. Office, 1042 Madison Ave., Memphis, Tenn.


1917.—Tovey, David William, M.D. Adjunct Professor of Gynecology, N. Y. Polyclinic Medical School; Gynecologist N. Y. Polyclinic Hospital; Gynecologist Harlem Dispensary. Residence and Office, 240 Riverside Drive, New York, N. Y.

1919.—Tracy, Stephen E., M.D., F.A.C.S. Medical Director, Stetson Hospital; Gynecologist to the Stetson, Gyncecian and American Hospital for Diseases of the Stomach; Consulting Gynecologist to the Jewish Maternity Hospital. Residence, 615 Sixty-fifth Ave.; Office, 1527 Spruce Street, Philadelphia, Pa.

Founder.—Vander Veer, Albert, A.M., M.D., Ph.D., LL.D., F.A.C.S., Member Volunteer M.C. Senior Consulting Surgeon to the Albany Hospital; five years Professor of Anatomy, thirty-eight years Professor of Surgery and Abdominal Surgery, Albany Medical College; Surgeon-in-Chief, Albany Hospital; Consulting Surgeon, South End Dispensary; Consulting Surgeon, Benedictine Hospital, Kingston, N. Y.; Consulting
Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y.; Consulting Surgeon, Crippled and Ruptured Children, West Haverstraw, N. Y.; Fellow of the American Surgical Association (President, 1906); Fellow of the British Gynecological Society; Member of the American Medical Association (First Vice-president and President, 1915); Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Gynecological Society; Regent, and Vice-Chancellor and Chancellor of the Board of Regents of the University of the State of New York. Member and Ex-President of the Medical Society of the State of New York. Executive Council, 1889-1891, 1895-1905; President, 1892. 28 Eagle Street, Albany, N. Y.

1913.—Vander Veer, Edgar Albert, Ph.D., M.D., F.A.C.S. Attending Surgeon Albany Hospital; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y. Vice-president, 1921. Residence, 150 State St.; Office, 28 Eagle St., Albany, N. Y.

1912.—Van Sweringen, Budd, M.D., Maj., M.R.C., U. S. Army. Gynecologist to the Lutheran Hospital, Surgeon to Pennsylvania Railroad; Formerly Professor of Medicine, Ft. Wayne College of Medicine. 208 Washington Boulevard, Fort Wayne, Indiana.

1909.—Wade, Henry Albert, M.D., F.A.C.S. Visiting Surgeon to Bethany Deaconess’s Hospital; Attending Gynecologist to Williamsburg Hospital, Brooklyn. 495 Greene Avenue, Brooklyn, N. Y.

1907.—Weiss, Edward Aloysius, M.D., F.A.C.S., Lieut. Com., M.C., U. S. N. R. F. Honorably Discharged. Assistant Professor of Gynecology, School of Medicine, University of Pittsburgh; Chief Gynecologist, Mercy Hospital; Gynecologist, Elizabeth Steele Magee Hospital for Women; Obstetrician to Rosalia Maternity Hospital. Vice-President, 1918; Executive Council, 1921. 714 Jenkins Building, Pittsburgh, Pa.

1914.—Welton, Thurston Scott, M.D., F.A.C.S. Clinical Instructor of Gynecology and Obstetrics in the Long Island College Hospital; Associate Attending Gynecologist and Obstetrician to the Williamsburg Hospital; Associate Visiting Gynecologist and Obstetrician to the Greenpoint Hospital; President Brooklyn Medical Society, 1917; Fellow, Brooklyn Gynecological Society. Residence and Office, 842 Union Street, Brooklyn, New York.

1904.—West, James Nephew, M.D., F.A.C.S. Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital. Member, New York County Medical Society; New York Academy Medical Society. Vice-president, 1906. 71 West Forty-ninth Street, New York, N. Y.
1921.—**Wetherell, Frederick Stephen**, M.D. Associate Gynecologist, St. Joseph’s Hospital; Instructor in Anatomy, Medical College of Syracuse University. Residence, 111 Durston Avenue; Office, 533 Butternut St., Syracuse, N. Y.

1916.—**Wing, Lucius Arthur**, B.Sc., M.D., F.A.C.S., Major, Med. O. R. C., U. S. Army, Attending Surgeon, Lying-In Hospital, City of New York; Surgeon, St. Mary’s Free Hospital for Children; Adjunct Surgeon, Seaside Hospital; Instructor in Clinical Surgery, Cornell University Medical College. 114 East 54th Street, New York, N. Y.

1923.—**Wright, Thew**, A.B., M.D., F.A.C.S. Surgeon-in-Chief Children’s Hospital, Buffalo; Attending Surgeon, Buffalo General Hospital; Assistant Professor Surgery, University of Buffalo. Residence and Office, 575 Delaware Avenue, Buffalo, N. Y.

1909.—**Yates, H. Wellington**, M.D., F.A.C.S. Professor of Gynecology and Head of the Department, Detroit College of Medicine and Surgery; Chief of Staff and Head of Department of Gynecology, Receiving Hospital; Attending Gynecologist to Providence Hospital and William Booth Memorial Hospital. Residence, 2475 Edison Ave., Office, 1229 David Whitney Building, Detroit, Mich.


Total one hundred and thirty-nine Ordinary Fellows.
ORDINARY FELLOWS DECEASED

1890.—Asdale, William James, M.D., Beaver Falls, Pa., 1912.
1913.—Blume, Frederick, M.D., Pittsburgh, Pa., 1918.
1896.—Bosher, Lewis C., M.D., F.A.C.S., Richmond, Va., 1920.
1894.—Brown, John Young, M.D., F.A.C.S., St. Louis, Mo., 1919.
1889.—Burns, Bernard, M.D., Allegheny, Pa., 1892.
1890.—Coles, Walter, M.D., St. Louis, Mo., 1892.
1889.—Davis, William Elias B., M.D., Birmingham, Ala., 1903.
1892.—Dorsett, Walter Blackburn, M.D., F.A.C.S., St. Louis, Mo., 1915.
1892.—Duff, John Milton, A.M., M.D., Ph.D., Pittsburgh, Pa., 1904.
1898.—Dunn, James C., M.D., Pittsburgh, Pa., 1907.
1892.—Dunning, Lehman Herbert, M.D., Indianapolis, Ind., 1906.
1895.—Ferguson, Alexander Hugh, M.D., Chicago, Ill., 1911.
1890.—Frederick, Carlton Cassius, B.S., M.D., Buffalo, N. Y., 1911.
1913.—Freeland, James Roy, M.D., F.A.C.S., Pittsburgh, Pa., 1917.
1891.—Gibbons, Henry, Jr., A.M., M.D., San Francisco, Cal., 1912.
1904.—Goodfellow, George E., M.D., Los Angeles, Cal., 1910.
1892.—Haggard, William David, Sr., M.D., Nashville, Tenn., 1901.
  Founder.—Hill, Hampton Eugene, M.D., Saco, Me., 1894.
1912.—Hotaling, Albert Steuben, M.D., Syracuse, N. Y., 1913.
1898.—Hyde, Joel W., M.D., Brooklyn, N. Y., 1907.
1897.—Ingraham, Henry Downer, M.D., Buffalo, N. Y., 1904.
  Founder.—Jarvis, George Cyprian, M.D., Hartford, Conn., 1900.
1892.—Jelks, James Thomas, M.D., Hot Springs, Ark., 1902.
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ORDINARY FELLOWS, DECEASED

Founder.—Lothrop, Thomas, M.D., Buffalo, N. Y., 1902.
1900.—Linville, Montgomery, A.B., M.D., New Castle, Pa., 1910.
1890.—Longyear, Howard Williams, M.D., F.A.C.S., Detroit, Mich., 1921.
1896.—Lyons, John A., M.D., Chicago, Ill., 1919.
1891.—McCann, James, M.D., Pittsburgh, Pa., 1893.
1898.—McCann, Thomas, M.D., Pittsburgh, Pa., 1903.
1896.—Mooney, Fletcher D., M.D., St. Louis, Mo., 1897.
1894.—Murphy, John Benjamin, A.M., M.D., F.A.C.S., Chicago, Ill., 1916.

Founder.—Potter, William Warren, M.D., Buffalo, N. Y., 1911.

Founder.—Price, Joseph, M.D., Philadelphia, Pa., 1911.
1896.—Rhett, Robert Barnwall, Jr., M.D., Charleston, S. C., 1901.
1889.—Rohe, George Henry, M.D., Baltimore, Md., 1899.
1892.—Rosenwasser, Marcus, M.D., Cleveland, O., 1910.
1890.—Ross, James Frederick Wm., M.D., C.M., L.R.C.P., Toronto, Ontario, Canada, 1911.
1889.—Seymour, William Wotkyns, A.B., M.D., Troy, N. Y., 1904.
1902.—Simons, Manning, M.D., Charleston, S. C., 1911.
1913.—Smith, Lewis W., A.B., M.D., Pittsburgh, Pa., 1917.
1913.—Stamm, Martin, M.D., F.A.C.S., Fremont, O., 1918.
1911.—Stillwagen, Charles A., Pittsburgh, Pa., 1921.
1914.—Strasser, August Adrian, M.D., F.A.C.S., Arlington, N. J., 1918.

Founder.—Townsend, Franklin, A.M., M.D., Albany, N. Y., 1895.
1891.—Walker, Edwin, M.D., Ph.D., F.A.C.S., Evansville, Ind., 1923.

Founder.—Werder, Xavier Oswald, M.D., F.A.C.S., Pittsburgh, Pa., 1919.
1900.—Zinke, Ernst Gustav, M.D., F.A.C.S., Cincinnati, Ohio, 1922.
Total: Fifty-six.
## ORDINARY FELLOWS

### Classified

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<tr>
<th>State</th>
<th>Name, Initials</th>
<th>Address</th>
<th>City</th>
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<tbody>
<tr>
<td>ALABAMA</td>
<td>Davis, J. D. S.</td>
<td>2029 Avenue G., 325 Woodward Bldg.</td>
<td>Birmingham</td>
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<td></td>
<td>Torrance, Gaston</td>
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<td>ARKANSAS</td>
<td>Runyan, J. Phineas</td>
<td>State Bank Bldg.</td>
<td>Little Rock</td>
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<td>CALIFORNIA</td>
<td>Skeel, R. E.</td>
<td>302 Title Insurance Bldg., 1307 Broadway,</td>
<td>Los Angeles</td>
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<td></td>
<td>Buteau, S. H.</td>
<td>Oakland Bank and Savings Bldg.</td>
<td>Oakland</td>
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<td>Hadden, D.</td>
<td>1030 So. Alvarado St.</td>
<td>Los Angeles</td>
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<td>Perry, J. F.</td>
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<td>CANADA</td>
<td>Cleland, F. A.</td>
<td>131 Bloor St., 215 South James St.</td>
<td>Toronto, Canada</td>
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<td>Olmsted, Ingersoll</td>
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<td>Hamilton, Ontario</td>
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<td>GEORGIA</td>
<td>Noble, G. H.</td>
<td>186 South Pryor Street</td>
<td>Atlanta</td>
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<tr>
<td>ILLINOIS</td>
<td>Sloan, E. P.</td>
<td>1417 N. Main St., 619 Deming Place, 2120 Cleveland Ave., 25 E. Washington St., 134 North 8th St.</td>
<td>Bloomington, Chicago, Chicago, Chicago, Macomb, Quincy</td>
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<td>Barrett, C.</td>
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<th>State</th>
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<th>Address 1</th>
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<tr>
<td>Iowa</td>
<td>Ruth, Charles E.</td>
<td>Iowa Bldg.,</td>
<td>Des Moines.</td>
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<td>Frank, Louis,</td>
<td>The Atherton,</td>
<td>Louisville.</td>
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<td>Speidel, Edward</td>
<td>Francis Bldg.,</td>
<td>Louisville.</td>
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<tr>
<td>Maine</td>
<td>Leighton, Adam P.</td>
<td>192 State St.,</td>
<td>Portland.</td>
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<td></td>
<td>Branham, Joseph H.</td>
<td>2200 Eutaw Place,</td>
<td>Baltimore.</td>
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<td></td>
<td>Kellogg, Foster S., Phaneuf, Louis E.</td>
<td>19 Bay State Road, 395 Commonwealth Ave.,</td>
<td>Boston.</td>
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<td></td>
<td>Findley, Palmer,</td>
<td>3602 Lincoln Blvd.,</td>
<td>Omaha.</td>
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</tbody>
</table>
ORDINARY FELLOWS

NEW YORK
152 Washington Ave.,
289 State Street,
28 Eagle Street,
20 Livingston St.,
368 McDonough St.,
287 Clinton Ave.,
495 Greene Ave.,
842 Union St.,
493 Delaware Ave.,
1248 Main St.,
319 Elmwood St.,
420 Franklin St.,
575 Delaware Ave.,
11 East Chestnut St.,
189 Centre Ave.,
34 Gramercy Park,
134 West Eighty-seventh St.,
580 Park Ave.,
44 Park Ave.,
60 West Fifty-second St.,
54 East Forty-fifth St.,
100 East Sixty-sixth St.,
116 East Thirty-third St.,
616 Madison Ave.,
23 East Ninety-third St.,
295 East Sixty-first St.,
125 East Thirty-ninth St.,
47 East Fifty-seventh St.,
114 E. Fifty-fourth St.,
345 West Eighty-second St.,
48 East Forty-second St.,
128 West Sixty-sixth St.,
240 Riverside Drive,
71 West Forty-ninth St.,
114 E. Forty-second St.,
295 Mill St.,
339 Mill St.,
1775 East Ave.,
303 Alexander St.,
511 Broadway,
326 Montgomery St.,
553 Butternut St.,

OHIO
409 Broadway,
628 Elm St.,
628 Elm St.,
N. W. Cor. 8th and Elm,
Melrose Bldg.,
5 West 8th St.,
11\frac{1}{2} East 8th St.,
19 West Seventh St.,
Osborn Bldg.,
Cleveland Clinic,
Euclid at E. 93rd St.,
1834 East 65th St.,
115 So. Grant Ave.,
151 East Broad St.,
121 South 6th St.,
188 E. State St.,
240 Michigan St.,
421 Michigan St.,
1613 Jefferson St.,
2455 Collingwood Ave.,
227 Michigan St.,
7 East Second St.,

Albany.
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Saratoga Springs.
Syracuse.
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Cleveland.
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Columbus.
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Columbus.
Toledo.
Toledo.
Toledo.
Xenia.
ORDINARY FELLOWS

PENNSYLVANIA


2033 Walnut St., 241 N. 18th St., 1527 Spruce St., 308 Diamond Bank Bldg., 1018 Westinghouse Bldg., Jenkins Bldg., Jenkins Bldg., 1105 Park Bldg., Jenkins Bldg., 1105 Park Bldg., 1015 Highland Bldg., 714 Jenkins Bldg., 406 Morewood Ave.,


RHODE ISLAND

Jones, Arthur T., Keefe, John W.,

131 Waterman St., 262 Blackstone Blvd.,

Providence. Providence.

TENNESSEE

Toombs, Percy W.,

1042 Madison Ave.,

Memphis.

VIRGINIA

Lankford, Burnley, Baughman, Greer, Rucker, M. Pierce,

400 Fairfax Ave., 26 North Laurel St., Medical Arts Bldg.,

Norfolk. Richmond. Richmond.
MINUTES OF THE PROCEEDINGS

OF THE

THIRTY-SIXTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS, GYNECOLOGISTS

AND

ABDOMINAL SURGEONS

HELD IN

THE BELLEVUE-STRATFORD HOTEL

PHILADELPHIA, PENNSYLVANIA

SEPTEMBER 19, 20 AND 21, 1923.
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<tr>
<th>Name</th>
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<tr>
<td>BABCOCK, WM. WAYNE</td>
<td>Philadelphia, PA.</td>
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<td>BAINBRIDGE, WM. SEAMAN</td>
<td>New York City</td>
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<td>BALDWIN, JAS. F.</td>
<td>Columbus, Ohio</td>
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<td>BAUGHMAN, GREER</td>
<td>Richmond, Va.</td>
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<td>BONIFIELD, CHAS. L.</td>
<td>Cincinnati, Ohio</td>
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<td>CHANDLER, GEO. F.</td>
<td>Kingston, N. Y.</td>
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<td>CLELAND, F. A.</td>
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<td>CRILE, GEO. W.</td>
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<td>DANNREUTHER, WALTER T.</td>
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<td>DARNALL, WM. EDGAR</td>
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<td>DAVIS, A. B.</td>
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<td>DAVIS, JAMES E.</td>
<td>Detroit, Mich.</td>
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<td>DICE, WM. G.</td>
<td>Toledo, Ohio</td>
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<td>DICKINSON, GORDON K.</td>
<td>Jersey City, N. J.</td>
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<td>DOUGLASS, F. M.</td>
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<td>FARR, R. E.</td>
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<td>FURNISS, HENRY D.</td>
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<td>GARNETT, ALEXANDER P</td>
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<td>HADDEN, DAVID.</td>
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<td>HALL, R. B.</td>
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<td>HARRAR, JAS. A.</td>
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<td>HAYD, H. E.</td>
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<td>HEDGES, E. W.</td>
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<td>HEYD, CHAS. G.</td>
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<td>ILL, CHAS. L.</td>
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<td>ILL, EDWARD J.</td>
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<td>JONES, A. T.</td>
<td>Providence, R. I.</td>
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<td>KEEFE, JOHN W.</td>
<td>Providence, R. I.</td>
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<td>KELLOGG, FOSTER S.</td>
<td>Boston, Mass.</td>
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<td>KING, JAS. E.</td>
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<td>KOSMAK, GEO. W.</td>
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<td>LANKFORD, BURNLEY</td>
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<td>LEIGHTON, ADAM P.</td>
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<td>LYNCH, JEROME M.</td>
<td>New York City</td>
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<td>McPHERSON, ROSS</td>
<td>New York City</td>
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<tr>
<td>MILLER, A. B.</td>
<td>Syracuse, N. Y.</td>
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The following named registered guests were extended the privileges of the floor and invited to participate in the discussions:

ANGEAR, B. H. S. .......................................................... Sublette, Ill.
BLOSS, JAS. R. ............................................................. Huntingdon, W. Va.
BRAND, W. W. ............................................................. Toledo, Ohio
COGILL, LIDA STEWART .................................................. Philadelphia, Pa.
CONAWAY, WALT. P. ...................................................... Atlantic City, N. J.
COSGROVE, S. A. ........................................................... Jersey City, N. J.
COOK, A. D. ................................................................. Canton, China
COVENTRY, W. A. .......................................................... Duluth, Minn.
CRIST, O. H. ............................................................... Danville, Ill.
THIRTY-SIXTH ANNUAL MEETING

DAVIS, A. B. ................................................. Camden, N. J.
FORMAN, W. B ................................................. Buckhannon, W. Va.
GRUHZIT, O. M. ................................................. Detroit, Mich.
HEATH, H. H. .................................................. Toledo, Ohio
HYDE, REV. T. A.............................................. Jersey City, N. J.
IRVING, FRANCIS R. .............................................. Syracuse, N. Y.
JONES, T. E. .................................................. Cleveland, Ohio
KOEYAN, J. J. ................................................ Wilkesbarre, Pa.
LEE, GEO. H. ................................................ Galveston, Texas
MEYER, I. H. ................................................ Providence, R. I.
MILLER, W. PORTER .......................................... Syracuse, N. Y.
OWENS, CLARENCE E. ......................................... Columbia, S. C.
PORTMANN, U. V. .............................................. Cleveland, Ohio
SOLOMAN, S. ................................................. New York City
SPICER, R. W. .............................................. Goldsbar, N. C.
STREET, I. H. ................................................ Alexander City,
WEST, GORDON F. ............................................. Camden, N. J.
WHITFORD, WM .............................................. Chicago, Ill.
WILSON, LESTER R. ........................................... Camden, N. J.
WOOD, H. D. ................................................. Fayetteville, Ark.

First Day.—Wednesday, September 19, 1923

Morning Session.—The Association met in the Red Room of the Bellevue-Stratford Hotel, and was called to order at 9:30 a.m. by the President, Dr. Gordon K. Dickinson, Jersey City, New Jersey.

Address of Welcome by Hon. J. Hampton Moore, Mayor of Philadelphia

Mr. President and Members of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons:
I welcome you most heartily to the City of Brotherly Love, the
third city in the United States in population, the second in manu-
factures, and the first in medical affairs. We have the most patriotic
institutions here and the best known landmarks in the United States.
I will not undertake to catalogue them because most of them are
familiar to you. We have Independence Hall, where the Constitution
was signed, and we are celebrating this week Liberty Bell. We have
Christ's Church. We have the birthplaces of some of the founders,
and burial places of some of the signers, of the Declaration of
Independence. We do not concede any other section of the country
as superior to our city, except we are always proud of our offspring,
and like to boast of those who went from us and succeeded. We
see the sun first in Philadelphia; that is, we are nearer east than
our friends out west and feel some pride in this, notwithstanding
it takes some time for them to catch up to what we have already done.

We are proud of the medical institutions we have in Philadelphia.
We have most of the beginnings in this city of things that are pa-
triotic, scientific and medical. We date back to that period in our
eyearly history when there were some men known as quacks because
there was not much experience or medical science at that time, and
it was suggested that obstetrics might be preferably left to Nature
and let Nature take its course, and not let any of these fellows be
called upon. All that has changed since, and we are pleased with
the institutions we have here.

I have been directly connected with the municipal institutions and
am always ready to speak highly of them, and I often boast of our
private and medical scientific institutions. I think they are without
fear of any unfavorable criticism. I may say our Philadelphia Hos-
pital, which is a municipally conducted hospital, is regarded as one
of the finest in the United States. Under this administration it has
undertaken to remove the alms house known as Blockley. We have
built up a scientific institution conducted upon the best modern meth-
ods and directed by men who are possessed of the best modern
thought upon all those subjects in which you are interested.

I would suggest that before you leave Philadelphia some ar-
rangeinent be made with the Director of the Department of Public
Health in order that you may visit that institution if you care to
do so. We think it is an institution that stands very high amongst
the municipally conducted institutions of the United States.

Your Association, I understand, is composed of specialists. Of
course, all things in medicine, in science, and even in law today are
running toward specialties. The eye, ear, nose and throat doctor
is with us, good and strong, and is increasing constantly. It may be
considered the course of least resistance to some extent. We are
losing that well-rounded country doctor and are dealing with another
element.
As to those of you who come from afar, I have addressed a simple word of welcome that would be expected of the mayor of a great municipality and words of cordiality. We have a high respect and appreciation for those who have gone forth to the west, to the north and south from this original center of American civilization and with all of its concomitants, liberty, freedom and independence. We look with pride to those who come back to us, remembering their grandfathers were here, or whose portraits they can examine as they hang in Independence Hall.

While I would not venture to enter into a discussion with learned and distinguished speakers from various parts of the country, I will simply say in a simple, ordinary, everyday prosaic way that you are caring for womanhood, providing for childbirth. There is perhaps nothing more essential in municipal life, nothing more essential in national life, and nothing more essential in the life of the civilized world than in caring for womanhood and childbirth.

We have erected schools and colleges and have thereby become cleaner, more refined and educated human beings, and along with this sort of civilization have come methods that the unscrupulous and the vicious and the money-mad have utilized in terms of civilization, in terms of humanity falsely enough to work out their particular schemes, or to make it necessary for legitimate professions to be properly protected.

We have no time for quacks in the City of Philadelphia, and yet we may have some. We do not encourage them. We do not want the uncivilized nor the brutal class to mingle with those who practice their alleged profession upon the ragged edge of decency or the ragged edge of the law. Therefore, when strong and learned men come from various sections of the country we have excellent reason to welcome and to encourage them in the civilizing and philanthropic work they have to do.

What is the tendency of the age with respect to this and many other things, moral and human? A few days ago I was obliged to close a so-called respectable theater, erected with large funds by private citizens who were very clever in the matter of investment, but which theater was producing what we may call salacious or thoroughly rotten shows unfit for respectable people to see, and for which respectable people paid their money to go into the show. The mayor closed the show. There may have been some legal technicality, and according to one of the judges there was. But the effect was good. The newspapers were in favor of the action of the mayor in suppressing this improper show. They said the mayor took the law into his own hands, and that while he should be rebuked, most of the citizens do not stand that way. The people in Philadelphia do not stand that way. The moral sentiment of the community is such that
they will not stand for shows of the character I have mentioned, and that is in accord with ethics and the law. As I am not a professional man at this time and cannot talk upon purely professional lines, I might say a word or two about those who come into the world and some who ought not to come into the world and for which your Association can do a good deal. Think of the awful responsibility thrust upon the community for the malformations and the misfits and the unfit we see in this world. This question may be discussed privately as it not only affects the rest of the world, but it affects the nations and municipalities like this, and we as administrators have to deal with the actual facts and conditions, and we realize that there must be nurses, that there must be physicians to stand over them, while others preach fellowship, charity and kindness, but are never present when these things are operating.

The responsibility of the obstetrician and gynecologist for the welfare of humankind, it seems to me, cannot be overestimated. Those of us who are fathers of families realize the great inclination toward the perfection of the race. We cannot adopt the method of the dog, eat or cow. There must be some civilizing influence, some medical influence to assist in this work, and here is where the obstetrician comes in, and since my first born came into the world I have looked upon the obstetrician as virtually a benefactor of the race or of the families which constitute the race. It may be that you cannot dispose of those who are unfit; it may be you must aid in bringing into the world those who will probably do the world no good, but you can assist by that skill and knowledge which is yours, and you can use your influence with the family and the family circle, and regarding the individual concerned you can by your influence and the maintenance of your high ethics make a change so as to shape the course of citizenship.

I may be asking too much and drawing too long a bow in saying that the physician who is in at the beginning may to a very large degree influence the course of citizenship which is civilization. On this general hypothesis, this general thought with respect to the usefulness of the obstetrician and gynecologist, I most heartily again welcome you to the City of Philadelphia and trust that your deliberations will be helpful to the country over. (Applause.)

RESPONSE TO THE ADDRESS OF WELCOME OF MR. MOORE BY DR. WILLIAM SEAMAN BAINBRIDGE

Mr. President and Fellows of the Association: I want to thank the Mayor for his splendid welcome to Philadelphia. I came from a city where perhaps a rather different speech would be delivered than the one we have just heard under similar circumstances. Certainly,
the high tone, the humanitarianism, and patriotism and far-sighted vision are worthy of this occasion, worthy of this great city, and I am sure we will all be very glad to take home the thoughts that have been brought out here.

I was greatly taken with the finesse in which the Mayor touched on some of the great questions which are before civic bodies, medical bodies, and national bodies today and occupying so much of their attention. As I analyzed his speech, there were some 17 different topics in that speech that today are moving great bodies in their efforts to convince America of their particular line of reasoning. You sense I am sure what I refer to at least.

In behalf of the Association I want to thank the mayor for his inspirational and far-sighted address.

While we all came from Philadelphia originally, and of course must admit with the Mayor that we are only coming back home, I heard it said in every country and community abroad that it is not essential that people study so much about themselves but to study how those that have gone out from those communities and have come back and have been made better. (Applause.)
ADDRESS BY DAVID REISMAN, M.D., PRESIDENT OF THE
PHILADELPHIA COUNTY MEDICAL SOCIETY TO THE
AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNE-
COLOGISTS, AND ABDOMINAL SURGEONS,
SEPTEMBER 19, 1923.

Gentlemen:

On behalf of the Philadelphia County Medical Society, with its mem-
bership of over two thousand, I have the honor to welcome you in
this historic city where so much has happened of importance to
civilization and to our profession. I may be permitted to remind you
that the greatest surgical operation of all time took place here—the
amputation of the American colonies from the mother country. And
with equal propriety I may say that the greatest achievement in all
history occurred in a small but sacred building at Fifth and Chestnut
Streets—the birth of a nation, on July 4th, 1776.

That Philadelphia is the home of the first medical school in this
country is a fact well known to you, and that our city for genera-
tions was the leading medical center cannot be gainsaid. With the
growth of medical schools in other large cities, such preeminence is
more difficult to maintain; nevertheless Philadelphia is striving,
not perhaps primarily to uphold its fame, for that is less important,
but to lift high the noble banner of science under which medicine is
progressing as no other science save physics, and the achievements
of that are soon appropriated by the alert in medicine and surgery.

In your distinguished society abdominal surgery, gynecology and
obstetrics are represented—branches to the advancement of which
Philadelphia has contributed no mean share. The foundation of
surgery is anatomy. We have had a Wistar, a Horner, a Leidy and
a Piersol. The one hundredth anniversary of the birth of Dr. Leidy,
well called the American Darwin, will soon be celebrated. Philip
Syng Physie certainly ranks as the father of American surgery. His
spiritual descendants have been no less distinguished—Dorsey, Gross,
Atlee, Agnew, Ashhurst, not to mention those still living.

Seven cities of Greece contended for the grave of Homer. I know
not how many cities are vying for the honor of the first operation
for appendicitis. Unprejudiced Philadelphians have stated it reluc-
tantly many times that the first operation for that surgically so profit-
able disease took place in the Pennsylvania Hospital in 1887.

In gynecology and obstetrics Philadelphia has helped to make his-
tory. It was here that that unique personality, J. Marion Sims, got
his medical education; it was here that the courageous Atlee was
called a murderer by his timid, conservative colleagues; it was here
that Penrose, Parvin and Goodell taught generations of medical men
how to put the forceps on Mrs. Flaherty's baby without injury to
mother or child.

So you see, gentlemen, the ground you stand on is holy ground.
Let us, the inheritors of great traditions, the sons of great men,
keep it forever holy. (Applause.)

ADDRESS OF WELCOME BY DR. WILLIAM E. PARKE, PRESIDENT OF THE
PHILADELPHIA OBSTETRICAL SOCIETY

Mr. President, Ladies and Gentlemen: I am glad indeed of the
privilege of welcoming you to the City of Brotherly Love, where the
medical teaching in the United States had its earliest foundation.

Permit me to allude briefly to the names of a few of our guild,
who by their preeminent attainments have left their impress on
medical teaching and practice throughout the country.

Wm. Shippen, Jr., (1736-1808) scholar, gentleman, learned physician
and eloquent speaker, established the first maternity hospital in this
country for the practical instruction of his students.

Thomas C. James (1766-1835) occupied the first chair of obstetrics
in this country at the University of Pennsylvania; and is remembered
for his advocacy of the induction of premature labor in cases of con-
tracted pelvis.

William P. Dewees (1768-1841), whose career as a physician began
at the time when a doctor's degree was sought by and given to but
few practitioners, applied in 1806 after years of successful practice
to the University of Pennsylvania for a diploma, and presented a
thesis on the means of moderating or relieving pain during the proc-
ess of parturition, assuming that pain was a morbid symptom of
labor. The remedy on which he relied was copious blood letting.
Later he wrote the first regular systematic treatise on midwifery,
thus marking an epoch in the progress of the science in this country.

Hugh L. Hodge (1796-1876) an eminent teacher will be remembered
for his study of the planes of the pelvis and the mechanism of labor
as well as by the obstetric forceps which he devised.

Charles V. Meigs (1792-1873) was an eminent teacher and brilliant
speaker. These two contemporary professors of obstetrics at the
University and Jefferson Medical Colleges dominated the beliefs and
practice of a generation of obstetricians in this country.

Many members of your Association will remember the successors
of these great teachers—R. A. F. Penrose and Ellerslie Wallace. Can
any one who sat in at Penrose's didactic lectures ever forget the
dramatic conduct of labor on the manikin, Mrs. O'Flaherty; the re-
productions of groans which characterize the first and second stages
of labor; the line of talk addressed to Mrs. O'Flaherty with the utmost seriousness and gravity? This was, of course, before the period of clinical demonstrations and it was only after his students went out and conducted their first accouchement that they realized the accuracy of this didactic demonstration.

Ellerslie Wallace was born in Philadelphia in 1819 and died in 1885, and was professor of obstetrics at Jefferson Medical College for twenty years. He devised a forceps which was very popular.

Out of these antecedents sprung the obstetrical society, one of the earliest organizations of its kind in this country. Founded in 1868 it has included in its membership the names, not only of men and women who acquired local distinction, but also the names of many who by their pioneer work and writing have achieved a national and international reputation. The name of Joseph Price, who was, I believe, one of the founders of your Association, will at once occur to you. His resistless energy, acrimonious debate and dramatic presentation of case reports drew the limelight upon him and went far toward establishing the newer pathology in the inflammatory diseases of the pelvis.

The pros and cons of the merits of podalic version versus the forceps were discussed with as much ardor in 1874-75 as in 1920-23, with this difference, however, that both procedures were undertaken for contracted pelves. The continued debate on this topic between those eminent teachers Goodell and Wilson arose to the dignity of a classic.

Dr. B. F. Baer's contribution to the technic of hysterectomy, namely, dropping of the stump, was a pioneer step in the development of that procedure.

These and many others, both living and dead, have placed Philadelphia in the front line of advance in the art and science to which your Association is dedicated, and today you will find in our hospitals worthy successors of the great men who have gone to their reward, who are carrying on, advancing the line of scientific attainment. And moreover, and I say it with pride, maintaining a standard of good fellowship not excelled by any community in this country, and to these I bid you welcome. (Applause.)

RESPONSE TO THE ADDRESSES OF WELCOME BY DR. JAMES A. HARRAR OF NEW YORK

Mr. President, Dr. Riesman, Dr. Parke, Fellow Members and Guests:

It is with especial pleasure that I have this opportunity to accept on behalf of our association the courteous and cordial welcome extended by my former instructor in Pathology, now Professor of Clinical Medicine at the University of Pennsylvania, Dr. Riesman, and by Dr. Parke, now obstetrician at the hospital where I served as interne twenty-two years ago.
Those were the days when we had no attending obstetrician, and when by chance a case of obstructed labor came in, the nearest thing to an obstetrician that we had to call upon was the genitourinary surgeon. Well can I remember his efforts once at instrumental delivery of a case of dystocia over a period of several hours, while the surgical staff and interns gazed upon his struggles with wonder and admiration.

It will be our unavoidable loss not to have the time during the crowded hours of our short session here to enjoy the wealth of material exhibited in Philadelphia's present splendid gynecological and obstetrical clinics.

We come humbly to this great seat of medical learning with its old established schools of national fame, hoping in the discussion of our problems and in the recital of our observations to lend somewhat of knowledge, and in our activities surely to borrow from the attainments of the great medical men who in this city have lived and labored, an abundance of inspiration.

As spokesman for my associates, I offer to you our sincere and heartfelt thanks for your welcome, and request that you will convey this message to the societies you so well represent. (Applause.)

Papers were then read and discussed as follows:

1. "Reflections upon Hospitals," by Dr. John W. Keefe, Providence, Rhode Island, which was discussed by Drs. Speidel, Mosher, Sadlier, Moriarta, Weiss, Lynch, Tate, Hyde, Davis (James E.), and Baldwin, after which the discussion was closed by the author of the paper.

2. "Cutting the Ileoceleal Fold as a Routine Measure in the Operation for Appendicitis," by Dr. George F. Chandler, Kingston, New York.

Discussing by Drs. Morris, Pantzer, Lynch, Farr, Reder, Noble, and in closing by the essayist.


On motion, the Association adjourned to meet at 2:30 P.M. at Dr. Babcock's farm.

Afternoon Session.—The Association reconvened at 2:30 P.M. and was called to order by the President.

4. "The Use of Local Anesthesia in Handling Septic Conditions Within the Abdomen," by Dr. Robert E. Farr, Minneapolis, Minnesota, which was discussed by Dr. Morris, and in closing by the essayist.


Discussing by Drs. Farr, Hewitt, Noble, Schwarz, Bonifield, Polak, Babcock, Davis (James E.), and in closing by the essayist.

This paper was discussed by Drs. Bonifield, Hadden, Noble, Farr, and in closing by the essayist.

7. "Extraperitoneal Cesarean Section (Abdominal Opening Near and Parallel to Poupart's Ligament) in Mismanaged, Presumably Infected Cases," by Dr. Asa B. Davis, New York City, which was discussed by Drs. Harrar, Schwarz, Polak, Rongy, Pantzer, and Baldwin, after which the discussion was closed by the author of the paper.

8. "The Use of X-Ray Therapy in Disturbed Menstruation," by Dr. Abraham J. Rongy, New York City, which was discussed by Dr. Schmitz, and in closing by the essayist.

Dr. Farr moved that a rising vote of thanks be extended to Dr. and Mrs. Babcock for the delightful and beautiful entertainment furnished the members and guests.

Seconded and unanimously carried.

On motion, the Association adjourned until 8 P.M.

Evening Session.—The Association reconvened at 8 P.M. and was called to order by the President.


The address was discussed by Dr. Morris.

At the conclusion of the discussion, a rising vote of thanks was extended to Professor Bovie for his instructive, interesting and scholarly address.

10. "Lesions of the Cervical Stump of a Supravaginally Ablated Uterus," by Dr. Francis Reder, St. Louis, Missouri, which was discussed by Drs. Polak, Baldwin, Tovey, Schmitz, Phaneuf, Bainbridge, Hall, Sloan, and in closing by the essayist.


Discussed by Drs. Tovey, Baldwin and Mosher.

12. "Fulguration of Hunner Ulcers," by Dr. Henry Dawson Furniss, New York City, which was discussed by Dr. Reder.

On motion, the Association adjourned until 9 A.M., Thursday, September 20.

Second Day.—Thursday, September 20, 1923

Morning Session.—The Association met at 9 A.M. and was called to order by the President.

13. "A Study of 300 Private Cases, Six Weeks or Longer Postpartum, with Special Reference to the Pelvic Floor, Cervix and Fundus," by Dr. Burnley Lankford, Norfolk, Virginia.

This paper was discussed by Drs. Mosher, Speidel, Polak, Rongy, Davis (James E.), Hall, Reder, Tate, and in closing by the author of the paper.
   This paper was discussed by Drs. Pantzer, Reder, Davis (James E.), Hall, and in closing by the essayist.

   "Maternal Morbidity and Mortality," by Dr. George Clark Mosher, Kansas City, Missouri.

   These two papers were discussed together by Drs. Speidel, Davis (James E.), Polak, Davis (Asa B.), Poucher, Gruhzit, and Lankford.


18. Address of the President: "The College, the Hospital, the Medical Student," by Dr. Gordon K. Dickinson, Jersey City, New Jersey.

   During the delivery of the President's Address Dr. James A. Harrar, Second Vice-President, occupied the chair.

   On motion, the Association adjourned until 2 p.m.

Afternoon Session.—The Association reconvened at 2 p.m. and was called to order by the President.


   Discussed by Drs. Speidel, Rongy, Schwarz, and in closing by the essayist.


   Discussed by Drs. Polak, Schwarz, Rongy, Gruhzit, and in closing by the author of the paper.


   Discussed by Drs. Rongy, Schwarz, Phaneuf, Lankford and Davis (James E.), after which the discussion was closed by the essayist.

22. "1. Frozen Sections Through the Uterus of a Woman Dying During the First Stage of Labor, Illustrating the Mechanism of Placental Separation and Extrusion. 2. Frozen Sections Through the Uterus of a Woman Dying from Central Placenta Previa, Following Version of Braxton-Hicks," by Dr. Paul Titus and Dr. Vernon L. Andrews, Pittsburgh, Pennsylvania (by invitation).


24. "Hepatitis in Its Relation to Inflammatory Diseases of the Abdomen; Clinical and Laboratory Study," by Dr. Charles Gordon Heyd.
New York City, associated with Dr. W. J. MacNeal and Dr. John J. Killian.

These papers were discussed together by Drs. Crile, Wetherell, Davis (James E.), Babcock, Killian and Heyd.

Symposium on the Relative Rôle of Surgery, X-Rays and Radium in the Treatment of Carcinoma of the Uterus.


27. "The Rôle of Surgery in the Treatment of Carcinoma of the Uterus," by Dr. George W. Crile, Cleveland, Ohio.

The symposium was discussed by Drs. Weiss, Ill, Hall, Hayd, Crile, Schmitz, Hewitt, Bonifield and King, after which the discussion was closed by the authors of the papers.

On motion, the Association adjourned until 9 a.m., Friday, September 21.

**Third Day.—September 21, 1923**

*Morning Session.*—The Association met at 9 a.m. and was called to order by the President.


Discussed by Dr. Davis (James E.), and in closing by the essayist.

**Maternity Problem**

*President Dickinson.*—I wish to call attention to the inactivity of the Association as to the relation of the maternity problem to the public. We blame lawyers because they make no effort to control the crime wave, and we are making very little effort as a body to control the morbidity and mortality of midwives and a certain class of practitioners in our profession. There are some here who want to propose a resolution. I am going to ask Dr. Kosmak to discuss this subject.

*Dr. George W. Kosmak,* New York City.—It devolves upon me to begin this discussion. This as well as other special societies have for too long a time kept themselves in their own shells with the door closed, and it would seem appropriate at this time, when the public is taking such a reasonable attitude toward medical discoveries, etc., that we should cooperate with them with this spirit, and I am sorry those gentlemen are not here to introduce that resolution involving the Association in a more or less public discussion of this important subject, because we owe a duty not only to ourselves in providing in-
teresting material for discussion at our meetings, but as an organization we should assume a larger function and work with other outside public interests to develop and perfect methods in which our members are especially interested.

The report of the committee, as detailed on a previous occasion, has some relation to this idea, and it might be well if that committee were given larger functions. They have been in touch with the committees of other national organizations, and the members are more or less familiar with what is required, and this Association could do no better than to relegate every action in this matter to the committee and ask them at the next meeting to present definite recommendations as to what this Association might do. I think we would waste much time in discussing this matter here pro and con, and perhaps not arrive at any definite understanding, whereas this committee, already familiar with what is required, might take up the function and proceed with it.

I would like to hear from the other members who are interested whether they would agree with that view. As Editor of the American Journal of Obstetrics and Gynecology, I shall be glad to cooperate in every manner with the committee and its work and to publish whatever they desire to bring before the profession. In this connection it would be well if the society could enlist the efforts of the public press to some extent and let the people know that there are organizations which are taking up this matter, and it will help to overcome this desire on the part of medical and lay organizations to blame the doctor as such for what is undoubtedly a deplorable condition, but which I believe is not entirely due to the doctor's fault. I hope, among other things, we can get over harping on the phrase that the midwife has less mortality and less morbidity than the doctor. That may be true in some respects, but it should not be taken as a slogan and accepted as a matter of course by this or any other organization.

We should enter public discussions and combat some of this unfortunate propaganda which is being broadcasted with selfish interests by lay organizations who desire to prevent midwife practice and similar movements.

I hope the Association will take some definite action in this regard and put itself on record. The committee consists of Dr. Mosher, as Chairman, Dr. Schwarz and myself.

Dr. James E. Davis, Detroit, Michigan.—This is placing an injustice on the work carried on by the committee. Dr. Mosher has an elaborate report; he has spent a great deal of time in studying this question, and we have not heard his report. The campaign that has been carried on in the newspapers has been a little premature in some ways. Information has been picked up from the general remarks
and papers that have been read, but the real work of this committee has not been reported to us by Dr. Mosher.

It was moved, seconded and carried that the report of Dr. Mosher be submitted later on in the session.

Dr. Robert E. Farr, Minneapolis, Minnesota, presented a series of motion pictures on local anesthesia.

Dr. John F. Moran, Washington, D. C., presented a series of motion pictures visualizing the stages of labor which were presented in detail by animated diagrams.

29. "One Case of Abdominal Hemorrhage from Ruptured Ovarian Cyst; Two Cases of Recurrent Cyst Adenoma of Ovary," by Dr. David Hadden, Oakland, California.

30. "Endometrial Tissue in the Ovary," by Dr. Otto H. Schwarz and Dr. Robert Crossen, St. Louis, Missouri.

Discussed by Drs. Davis (James E.), Reder, Sadlier, Bainbridge, Ill. Weiss, and in closing by Dr. Schwarz.

31. "Eclampsia—Is It a Biologic Necessity?" by Dr. O. M. Gruhzit, Detroit, Michigan (by invitation).

Discussed by Drs. Bainbridge, Speidel, Farr, Davis (James E.) and in closing by the essayist.


Discussed by Drs. Reder and Hadden, after which the discussion was closed by Dr. Speidel.

33. "Radical Surgical Treatment of Procidentia Uteri with Report of Cases," by Dr. E. P. Sloan, Bloomington, Illinois, which was discussed by Drs. Rucker, Hall, Schmitz, Wetherell, Hewitt, Cleland, and in closing by the essayist.

On motion, the Association adjourned until 2:30 p.m.

Afternoon Session.—The Association reconvened at 2:30 p.m. and was called to order by the President.


Discussed by Drs. Miller, Ill, Wetherell, Hewitt, Hall, Davis (James E.), and in closing by the author of the paper.


At the conclusion of the report, Dr. Bonifield made the following motion: In view of the fact that this is one national society whose title begins with the name of obstetricians, it seems to me we should be interested in this particular problem, and with that end in view, I move that the report be received, published in the transactions, and
the committee be continued, and if necessary a small amount of money be given for expenses.

Seconded by Dr. Bainbridge.

Dr. Davis moved to amend that an effort be made to secure an appropriation adequate for the carrying out of this work. Seconded.

Dr. Kosmak.—About the effort to secure an appropriation, I am quite convinced that several large philanthropic institutions would be ready to make such appropriations in short order if the matter was presented to them in the proper way, and I am sure the committee could secure these funds. These institutions are much interested in having medical bodies take up this work rather than lay organizations.

Dr. Bonifield accepted the amendment, and the motion as amended was put to a vote and carried.

The report was then discussed by Drs. Kosmak, Davis (James E.), and Cógill.

Dr. James E. Davis, Detroit, Michigan, presented In Memoriams on Professor Bernard Sigmund Schultze Jena, Honorary Fellow, and Professor J. W. Ballantyne, Honorary Fellow.

On motion, which was duly seconded and carried, the Association adjourned to meet in Cleveland, Ohio, in 1924.

JAMES E. DAVIS, M.D., Secretary.

EXECUTIVE SESSIONS

Wednesday, September 19, 1923

The President, Dr. Gordon K. Dickinson, in the Chair.

The Secretary stated that the meeting of this year began last night (Tuesday) with an executive session. Candidates for membership were considered, and also changes in the Constitution and By-Laws. These changes would be incorporated in the report of the Chairman of the Committee, Dr. Weiss, appointed for that purpose.

There were two resignations last year, Dr. Louis Burckhart, of Indianapolis, Indiana, and Dr. George R. White, of Savannah, Georgia.

The Executive Committee recommended the acceptance of these resignations.

It was moved, seconded and carried that the recommendation be concurred in.

The Secretary read a communication from Dr. Eugene Hertoghe, Antwerp, Belgium, an Honorary Fellow of the Association.

The following new members were voted on and declared duly elected: Dr. Thew Wright, Buffalo, New York; Dr. F. A. Cleland, Toronto, Ontario, Canada; Dr. Louis E. Phaneuf, Boston, Massachusetts, and Dr. Walter T. Dannreuther, New York City.

Adjourned.
The President in the Chair.

The first order of business being the selection of place of next meeting, Dr. George W. Crile extended a cordial invitation for the Association to hold its next annual meeting in Cleveland.

Dr. Hayd moved that the invitation be accepted.
Seconded and carried.

The President appointed as a committee to audit the accounts of the Secretary and Treasurer, Drs. Pantzer and Miller.

The President called for the report of the Committee on Revision of the Constitution and By-Laws.

Dr. Weiss, the Chairman of this Committee, stated that the changes could not be acted on at this meeting, but must go over until the next annual meeting to be voted on.

The Secretary presented his report.

Dr. Bonifield moved that the report be received and filed.
Seconded and carried.

The Treasurer presented his report showing a balance in the treasury of $1,139.80 with a liberty bond of $1,000.00.

The report was referred to the Auditing Committee.

The Auditing Committee subsequently reported having examined the books and accounts of the Treasurer and had found them correct.

It was moved, seconded and carried that the report be accepted.

The Secretary read letters and telegrams from absent fellows expressing their hopes for a successful meeting and sending regrets at their inability to attend, as follows: E. B. Montgomery, Quincy, Illinois; James N. West, New York City; Charles W. Moots, Toledo, Ohio; Walter C. G. Kirchner, St. Louis, Missouri; G. Van Amber Brown, Detroit, Michigan; Roland E. Skeel, Los Angeles, California; Irving W. Potter, Buffalo, New York; Andre Crotti, Columbus, Ohio; John N. Bell, Detroit, Michigan; Jennings C. Litzenberg, Minneapolis, Minnesota; H. S. Lott, Winston-Salem, North Carolina, and James F. Percy, Los Angeles, California.

On motion of Dr. Mosher, the Secretary was instructed to send letters of sympathy to those Fellows who were absent on account of sickness.

Dr. Foster Standish Kellogg, Boston, Massachusetts, was recommended by the Executive Council for membership.

Dr. Hayd moved that he be accepted.
Seconded and carried.

The Secretary called attention to a change that would go into effect in due time, namely, of having new Fellows proposed at a much earlier date than had been previously done. If new members are proposed at a much earlier period, it will make things run more smoothly.
The Executive Council recommended that the allowance for stenographer to the Secretary be increased $50.00.

Dr. Hayd moved that the recommendation be concurred in.
Seconded and carried.

The election of officers being the next order of business, nominations for President were called for.

Dr. Hayd nominated for President Dr. James F. Baldwin, Columbus, Ohio.

The nomination was seconded by Drs. Crile, Hall, Mosher, Tate, and Miller, after which Dr. Kosmak moved that nominations be closed, and that the Secretary be instructed to cast one ballot for the election of Dr. Baldwin.
Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Baldwin was declared duly elected.

Dr. Hayd and Dr. Crile were appointed a committee to escort Dr. Baldwin to the platform.

Dr. Baldwin thanked the Association for the great honor conferred upon him.

The following were nominated and declared duly elected: First Vice-President, Dr. John W. Poucher, Poughkeepsie, New York; Second Vice-President, Dr. George Clark Mosher, Kansas City, Missouri; Secretary, Dr. James E. Davis, Detroit, Michigan (reelected); Assistant Secretary, Dr. G. Van Amber Brown, Detroit, Michigan; Treasurer, Dr. William G. Dice, Toledo, Ohio (reelected); Members of the Executive Council, Dr. John W. Keefe, Providence, Rhode Island, and Dr. Gordon K. Dickinson, Jersey City, New Jersey.

The business of the executive session having been completed, on motion, which was duly seconded and carried, the Association adjourned sine die.

JAMES E. DAVIS, M.D., Secretary.

GREETINGS FROM HONORARY FELLOWS

Le 24 May, 1923.

Dear Dr. James E. Davis,

I received your kind invitation today and feel very much honored and thankful. I deeply regret not to be able to accept it. However, I am ex corde with you and the Association and wish to express my admiration for your noble efforts and scientific spirit.

Yours truly devoted,

(Signed) Dr. Hertoghe.
The President, Officers and Fellows
of The A. A. of O. and G.

Gentlemen:

In the inevitably shortening days of my life, few things, if any, afford me more pleasure than to recall the instructive, keenly inspirational to betterment, and, withal, pleasurable days spent at past annual meetings of your Association. For this reason, and because of many acts of personal kindness, I greet you at this, your thirty-sixth annual gathering, and wish your work ever increasing renown in the advancement of the Profession to which you have devoted your lives.

There are still in your ranks, able and valiant members of the "Old Guard" who well remember the difficulties and trials of the early years in the Association's history.

Today your printed transactions speak for what earnest and faithful work can accomplish; the deeds and lives of our great and honored departed are inspirations to still greater efforts, and, moreover, there is now being erected as an appreciation of greatness, by the medical profession, assisted by others who value actual worthiness, a Memorial Hall which will be, for all time, a professional center of this Continent. Here will be commemorated the life and deeds of Dr. John Benjamin Murphy—a Fellow of the Association, who in boyhood was a tiller of the soil, but by his gifts, energy, faithfulness, purity and probity, justly won an uniquely eminent standing among the renowned of the departed in our profession.

In my last contribution to the work of the Society, read at Detroit, there are quite a number of typographical errors; a prolonged absentee from home when the proof sheets arrived prevented revision. Will you who have Volume XX, kindly erase Fig. 1 under the photograph of tumor, and change each of the following figures one numeral less. The object of the paper was to bring to the notice of the profession an easy, safe, almost bloodless and nonmutilating operation, for what hitherto had been mutilating and critical.

Again accept my sincere thanks for the honor of Senior Fellowship, an honor of which I am exceedingly proud.

With kindest regards and all good wishes, I remain,

Yours very gratefully,

(Signed) H. Howitt,

128 London Road,
Guelph, Ontario.
PAPERS

READ AT THE

THIRTY-SIXTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS, GYNECOLOGISTS

AND

ABDOMINAL SURGEONS

HELD IN

THE BELLEVUE-STRATFORD HOTEL

PHILADELPHIA, PENNSYLVANIA

SEPTEMBER 19, 20 AND 21, 1923
PRESIDENTIAL ADDRESS

THE COLLEGE—THE HOSPITAL—THE MEDICAL STUDENT

By G. K. Dickinson, M.D., F.A.C.S., Jersey City, N. J.

He is honored of men who, by his peers, is raised to a place of prominence. To be selected by the Fellows of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons as their president carries the greatest honor that can come to any one in our profession, and humbly do I fill the position thus given me.

But all honors involve an obligation. To be president of this organization means much more than a chairmanship. It means going down into the cockles of the heart, where the blood is warm, and searching for some truth, for some idealism to present, hoping it may stimulate in the minds of those who listen an activity which will bear fruit.

"I have gone many ways in the wanderings of thought," and feel that nothing is more pleasing or more important than some thoughts on "The Lad." The making of a medical mind will be swerved according to mentality, which is largely ordained by the Fates, for the blood of ancestry fixes character. When the young man launches towards his life work he lacks experience; that comes many years later. He is directed by unconscious motives. Associations and friendships give him some inkling of the germ that is within him, and, without logic, without concrete thought, he endeavors to make a proper decision.

Having an imperfect vision of the future, obsessed largely by his schooling, confident in himself, affected by the urge of his endoerines, youth goes ahead, trusting that those whom he may meet in the schools of training will be honest, fair and helpful, little realizing how much the personal equation of the professor, the bias of the times and the shortsighted laws of governing bodies may affect his entire life.

The intellectual type will find no person for his stimulation and special growth. Genius has no friends. Capable persons are never liked. The mediocre will be allowed to plod, guided at times and hindered at others. Perhaps this picture can be best visualized by some personalities.

It seems now as if the college we attended was instituted not so much for training the young man to be a doctor, as to add to the income of the professors and give them prestige in the community. A red ticket was purchased for a certain privilege, anatomy, and we were taught and did dissections without a viewpoint of practical application. We knew Gray and the cadaver, but not the reason.
Surgery was an exhibition of skill and rapidity, not of diagnosis and careful thought. We were expected to applaud and yet not get the touch. Pathology was almost unknown, but morbid anatomy was passed around on a platter to be fingered, and the contaminated finger put into the pocket where previous contaminations had gone.

Gynecology was the mucous plug of the cervix and the stick of nitrate of silver. Obstetrics was taught by absent treatment, for we never saw a child born. And so through the gamut we would sit on benches and hear talks, see little, and have examinations. It was possible, in a year, for the greenest man to obtain a degree, and when we consider that the boy whose father found a failure in life, could be thrust into medicine and made a doctor, one can comprehend the type of physician of the day.

Further proof is that after leaving college we joined our medical societies where little that was scientific or clinical was brought up, but where most of the time was spent in dissensions and idle talks.

But in all this there was a ray of light. Two things, both important in professional contact, were not suppressed in the human nature of the young man, for the mysteries and faith had not been stunted nor killed—faith in drugs as we nowadays have faith in aids, forgetting as Paré said, "The physician treats, but God cures."

This chaotic and almost criminal method of making doctors after the gristmill fashion of grinding up anything that comes along and calling it success, could not continue indefinitely, and in 1910 the voice of Jeremiah was heard, when Flexner issued his report—a seething denunciation, yet truthful statement, of educational conditions in the United States and Canada. He found nearly two hundred colleges, very few of them giving an education leading up to proper thought and meditation, or one providing mental food to nourish and stimulate the higher centers. In the great majority the student was being rushed through and tinselled as he was in our time.

The young man with good preliminary training, an inherited poise and love for the truth and an irresistible desire to investigate for himself and to know rather than to accept, would come out of any institution a credit. The history of the past in the profession is the history of just such men only. The old story of Mark Hopkins on one end of the log and the student on the other has been proved many times.

Youth is imperious and positive; sees his own way, not comprehending that of others; unconsciously he fits in with a symbol. We perceive four main types as illustrated in his ambition. Aurelius said, "The value of a man is the value of the objects on which his heart is set."

Mayhap he desires a general field, to go to the bedside and home, there to practice the art and make a humble living. In this he is following the footsteps of Pythagoras, the earliest family physician.
Others with a conceit of their worth, without thought of their limitations, foresee their placement in hospital work. "They are going to be surgeons." They are restless of the older men who have earned the right. They do not comprehend the importance of large experience, and from the start would be Aesculapians.

A few, with warmer hearts and sympathy towards mankind, not thinking of gold, but more of social service and actuated by the spirit of brotherhood, take Saint Luke as their model.

Still fewer, minds of high mentality, men who follow the precepts of John Hunter, "do not think, but try." Those who are our students and research workers, imbued with high idealism, yet often poor in script, the ones whose names resound through the ages, are inspired by the heights of Apollo.

To some these remarks may seem irrelevant and fanciful, but by us the guiding spirit of the young man should be kept ever in mind and symbolized. "The true physician is one having the human body as a subject, not a mere money-maker."

These four types of mentality have been the grist of the college mill in the past and will be in the future. Flexner so pictured conditions that the general profession as well as the collegians were compelled to bring about a readjustment. The usual thing happened. The colleges which were honest in their motives, rapidly came into line. Those that were administered by men of commercial tendencies did much wobbling, but now we have the majority of colleges, taking the young men, crude, with diverse mentalities and ambitions, but with a stated preliminary education, using a popular term, and endeavoring to make doctors of them.

But several matters have developed in the interim and a number of viewpoints have been exploited. Never has there been so much public interest taken in education as at present, evidenced by numerous articles appearing in the different journals and lay press, and the papers read in our society meetings. It is very apparent that the present methods are not satisfactory. Yet we are accepting the product termed an education as a criterion, neglecting intelligence and cleverness of mind. Where are our applied psychologists?

It seems impossible to take the mind from the material. When Moses went up into the Mount for inspiration, he came back to find the people worshiping the golden calf. Every time we make an advance toward our ideals we discover only too large a number striving for the gold. This is an age of business and business principles. Largely unconscious to those now living, the trend is to develop the business aspects of the professions. The nursing profession is an evidence of this, as well as our own.

Flexner reduced the number of colleges, raised their "standards,"
diminished the number of students, but made it more difficult for the poor man’s son with intelligence and love for the calling to enter and become a physician. The internes tell us that medicine is the most expensive profession to enter. Hospitals that not so many years ago obtained internes without offering them a bonus, now are compelled to give a fairly substantial one. Many of the lads before they finish internship have invested their parents’ last penny in their education, and are obliged to obtain a salaried position before starting out in general practice and become self-supporting.

As a consequence, the prophecy made a dozen years ago seems to be coming true, that though we have fewer and better colleges and the minds of the young man more broadly learned, there is an empty space in life which is being filled by the pathies, being an evidence of how we fall to magic and mysteries.

It seems to be forgotten that “a physician is one who satisfies the longings and yearnings of the body and soul, as well as one who understands disease and its treatment.” Are we nowadays making physicians? Is not Plato correct, and should we not ever keep in mind his noble definition?

Much in medicine tends to negative education, for instance, the x-ray. Nothing catches the ordinary mind so firmly as that which appeals to the eye, for the average man dislikes to think and is soon fatigued by thinking. Has it not become a habit for the public to ask for an x-ray? Has it not become the path of least resistance for the physician to request them and accept the opinion as given of the shadow for a diagnosis? A recent work makes the statement that “without the aid of the x-ray, diagnosis is not possible for the careless, inexperienced and incompetent,” and, again, “the laboratory is the scientific gold brick.”

Not for a moment do we decry the immense value of the x-rays and laboratory helps, but what we must develop in the young student is judgment and sense of proportion, and that can be done only at the bedside. The true physician should have the intelligence and conscience to get away from this encumbrance.

Franklin Martin conceived a great thought in his endeavor to raise the status of the hospital. He gives his life, time and the best that is in him for this purpose. The movement was so needed and his work so thorough, that many hospitals have been greatly benefited. The lack of knowledge of what a hospital should be has been followed by a better understanding, because at every meeting he is telling the story over and over again. It may be tiresome to the profession, but it is valuable to the public. But hospitals are as human beings; the innovation does not last. Idealism is tiring and hospitals begin to slide back. The patient is studied less and the laboratory more.
Medicine has grown so rapidly that unconsciously it became necessary to develop many specialties. No one man has the brain or the length of life to cover all the branches with their rapid accumulation of data, but the more specialties grew, the more evident was it that each interlocked. Biologically or physiologically speaking there are no specialties. The body acts as a unit, connection by both spinal and sympathetic nerves, and general interaction through the endocrines leads to a harmony of body action.

The obstetrician, the gynecologist, or the surgeon, to be successful in his care must be a good diagnostician and therapist of every organ in the body. He must know pathology and physiology in the broad sense. No matter what our specialties are we cannot escape the responsibility of broad general knowledge. To specialize narrows the mental horizon and limits meditation, so that except for technic, whether it be pill, powder or lancet, we should know all things.

What are our colleges doing today? In my opinion they are making one great mistake. They are putting the law on the young man. They are dictating what instruction he shall have before he will be accepted as a student in medicine. A lad with money may manage to go through college and the requisite number of years of hospital training, but the bright man with intelligence may be barred because his parents could not afford the game.

The stars that shine the brightest in the history of the past were the poor men, the self-made. We could name many who have made medicine what it is, but whom the law today would not allow to study. It is said that if the Lord came back to earth He could not find a church which would accept Him. This regulation seemingly cuts out the most desirable.

Another misfortune is the long deferred entrance into active practice. So much time is spent as a student in the colleges and in hospitals that a young man cannot become self-supporting until into the thirties. This is the time of life when his brain and body are most active and pliable. It is now that he shows his individuality. Big thoughts and high ambitions stir his soul. It is at this period that the body yearns for matrimony and home life. To be handicapped by long suppression of normal instincts but subverts the future.

The spirit of America is opening the door in a most democratic way to the clever, which means, to those who have minds and are willing to use them. Intelligence and determination are the criteria. Aristocracy worships capital and that which is its corollary, social position, but progress comes through the man who in his shirt sleeves reaches up from the bottom, who has to strive to succeed and through striving trains his mind. To suppress efficient mentality by putting a tax on
the beginner will eventually not only obscure many a shining light, but weaken the profession as a whole.

It seems as if some of the specialties might be postponed to a post-graduate period. Valuable as general knowledge may be, it cannot be acquired in the ordinary time devoted to college instruction. Then much of it is too material. Give one a start on a few things and he will do the rest by the bedside and in his study. Should we not substitute for some a lucid stimulating course on the lives of leading minds and those who have made medicine what it is, associated with the philosophy of medicine and applied ethics? Nothing makes for culture more than the knowledge of our forebears, their times, what they did, how they succeeded, and the difficulties besetting their paths.

Naturally, each thinker feels his branch is the most important. Four years of study, and during these four years is anything made of the humanities? Are we trying to make doctors or mechanicians? Are we trying to make healers of the soul and body, or are we simply giving instruction?

We find from the many internes we have met and talked with that that which their professors have told them is final. Any different opinion is heresy. These men have not been taught to think. They have not been made to understand that truth is but a fragment, that during their whole life they must be searching for it, and will only find it piece by piece. They are sowing weeds as well as fruitful seeds, and when college is finished and practice begun, they will discover that they must forget much they were taught and learn medicine all over again at the bedside. This is what we call "weeding the garden," for, as Sydenham says, "True practice consists in observations of Nature."

Ten or more years ago I wrote to the deans of the New York colleges, asking for a conference in order that a notion of mine might be discussed. Dean Brown replied, and, after a delightful dinner, over our cigars I talked with him of the plan that no man leaving college should obtain his diploma until he had served a specified time in some hospital, that the college should select among the hospitals of the community those with which it can work, and stated the proposition thus:

"We will provide you with internes, you need not worry about this matter in the future. Two score cards will be sent out, one for the hospital authorities and one for the interne. The hospital authorities shall report whether the interne proves acceptable on different points—industry, kindliness, promptness, carefulness in making histories and physical examinations, presenting a proper personal appearance, etc. The interne shall report whether the doctors individually are giving proper instruction and whether the medical, surgical, or other departments are teaching him as they should. He is to report defects in his bedside instruction. He is there as a student, not as a servant or high-class orderly. If the dean of the college finds that the instruction is
poor, word will go to the board of managers, that Dr. So-and-So is falling behind in fulfilling an obligation. If this incompetence continues, the hospital’s attention will be called to the neglect, and perhaps that particular attendant may be asked to resign. If, on the other hand, complaints are made of the lad, he will be ‘jogged’ up. Should he fail to improve, he will be removed and receive no diploma.”

In this way, instruction at the bedside will be obtained for the student intern. He will learn medicine, he will learn the personal touch, he will learn that each patient has a soul, home-ties and friends, as well as an illness, and he will be made a teacher of men.

The hospitals will be elevated, even more materially than by Franklin Martin’s method. This will be a slow process. There are too few hospitals that have a teaching staff, but if the plan be started and broadly utilized, it will not be many years before we will have better hospitals, better professors, and will be making doctors of “high-erected thoughts situated in a heart of courtesy.”

280 Montgomery Street.
REPORT OF THE COMMITTEE ON MATERNAL WELFARE TO
THE AMERICAN ASSOCIATION OF OBSTETRICIANS,
GYNECOLOGISTS AND ABDOMINAL SURGEONS, 1923

IN 1921, at the St. Louis meeting of our Association, a resolution was offered
for the appointment of a Committee on Maternal Welfare, and in 1922, at
Albany, the first report of the Committee was presented, formulating the gen-
eral scope of the work to be accomplished. This included a comprehensive
scheme of propaganda to be carried on in conjunction with a similar committee
of the American Gynecological Society, under the chairmanship of Dr. Fred
L. Adair, of Minneapolis, who has long been enthusiastic to improve obstetric
conditions. His efforts, together with those of the late lamented Dr. Sedgwick,
have given to Minneapolis a conspicuous place in regard to improved statistics
in both maternal and infant welfare.

Our report for 1922 was printed in the AMERICAN JOURNAL OF OBSTETRICS AND
GYNECOLOGY, for June, 1923.

A conference of the Committee, consisting of Dr. Henry Schwarz, of Wash-
ington University, St. Louis; Dr. George W. Kosmak, Editor of the AMERICAN
JOURNAL OF OBSTETRICS AND GYNECOLOGY, New York, and the Chairman, concluded
that the report for this year should consist of a questionnaire survey of the
work already done in various centers of population, both urban and rural, in
prenatal care, in improved technic and in follow-up work. In this way, we
shall determine if any substantial improvement can be appreciated in statistics
of maternal morbidity and mortality.

It was further suggested that next year the Committee, in joint action with
that of the American Gynecological Society, take up the question of uniform
omenclature in obstetrics; also a discussion of the proposition, which is now
being agitated in several states, as to the advisability of the movement to sub-
stitute graduate nurses for midwives to attend cases of confinement, in such
communities as are not provided with physicians.

An undertaking so vast in its possibilities, as this inquiry into maternal wel-
fare, is appreciated as a most difficult and delicate one. The opportunity to
improve conditions must be grasped as a constructive and helpful program, and
not as destructive criticism. The aim of the Committee is to lay before the
Association the assembled facts, in a purely impersonal and instructive manner.

The remedy of conditions must be applied according to the value of these
facts, and their adaptability by the individual physician to his community.

To this end the records of work, the experience and the opinions of obstet-
ricians, health authorities and welfare workers were sought. Five hundred
letters, in addition to those sent to our own fellows, were mailed to Boards of
Health of states and cities, to welfare organizations, to medical journals, and to
individuals supposedly interested in maternal welfare. A comparatively small
number of replies was received.

Those who have been willing and able to assist the Committee have our
grateful thanks, and to them we make acknowledgment. To the others, the
hope is expressed that they will join future committees in the endeavor to ex-
tend the work of publicity, which is so essential in this field.

Insofar as possible, throughout the report, all deaths from puerperal causes
are classified under the International List of Causes of Death (Second Revision, 1909). All puerperal causes comprise the causes of death classified under International List Titles, 134 to 141 inclusive, and puerperal septicemia comprises the cause of death under the List Title 137. Other puerperal causes comprise those classified under Titles 134 to 141, excluding puerperal septicemia. However, since the great majority of statistics in this country are based on the rate per 1,000 live births, a part of the figures quoted are on that ratio, instead of the 10,000 ratio.

Many of the statistics herewith quoted are from the tables and charts furnished by Dr. Anna E. Rude, of the Children’s Bureau, Department of Labor, and the Committee expresses its appreciation of her repeated courtesies.

In order to have an intelligent method of comparison of the relative position of our states and cities, the records of Birmingham, England, are taken as a standard. Due to long and active efforts at prevention, Birmingham has the lowest rate of morbidity and mortality of any large city in the world. That city, according to the Bulletin, Department of Health, New York City, May 1921, during the years 1915 to 1921 shows a death rate from puerperal causes averaging 31.94 per 10,000. These figures should be kept in mind.

One of the first publicly analyzed experiments in prenatal care was begun in Boston, in 1909, with the House Cases of the Boston Lying-In Hospital, and continued during the five years before that institution opened its own prenatal clinic.

In that year there were carried to the onset of labor 1,512 patients without a death, and in the first year only two miscarriages; in the first half of the second year one miscarriage, and never another. The rate of stillbirths was about half of that of the city at large. The rate of premature births was reduced to 0.7 of 1 per cent, and the neonatal deaths were from one-half to one-third of the death rate of the city at large.

Dr. Franklin S. Newell sends the figures covering the prenatal work of the same clinic for another five years’ period, 1917 to 1921 inclusive, and also the figures for another of the larger maternity hospitals in Boston for the same period. These are in regard to eclampsia, and show the value of prenatal care.

<table>
<thead>
<tr>
<th>BOSTON LYING-IN</th>
<th>MASSACHUSETTS HOMEOPATHIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of confinements</td>
<td>11,180</td>
</tr>
<tr>
<td>Number of cases of eclampsia</td>
<td>43</td>
</tr>
<tr>
<td>Number of cases developing eclampsia who received care in hospital clinic</td>
<td>7</td>
</tr>
<tr>
<td>Number of deaths from eclampsia</td>
<td>11</td>
</tr>
</tbody>
</table>

Of the 11 who died in the Lying-In, only one had received prenatal care; and of the 19 who died in the Homeopathic clinic, only two had received prenatal care.

The City of Boston has had a high maternal mortality rate. In 1921 one mother died in every 130 births. This is the third highest rate in the 15 largest cities in the United States, being exceeded only by New Orleans and Cincinnati, as stated by Dr. Julius Levy in the American Journal of Health, February, 1923.

The maternal death rate in Boston has been continuously decreasing during the last five years, except in 1918.

The report of the instructive nurse association shows that prenatal care lowered the infant mortality 60 per cent and the stillbirth rate 44.5 per cent in the cases that came under their observation, in comparison with those that did not have such care.
Dr. Charles A. Pratt, New Bedford, Massachusetts, reports from a smaller center, showing the universal result of prenatal care, that in the New Bedford Hospital, 1922, there were 534 births with only one case of puerperal sepsis, which recovered; one death from placenta previa and two from cesarean section. In St. Luke's Hospital, with the private obstetric patients of 80 men who constitute the associate staff, no sepsis occurred in 1922. Dr. Pratt says: "Since the advent of rubber gloves, I do not again expect to see a temperature go above 100.''

Dr. G. H. Noyes, Providence, Rhode Island, reports that Rhode Island, as a State, is conducting no program of maternal welfare work; that the City of Providence is doing nothing directly to educate its women regarding the importance of prenatal and skilled obstetric care.

Providence, in 1922, recorded 6,617 births, with only 34 maternal deaths, 0.5 of 1 per cent; stillbirths, 3.7 per cent; of the deliveries 19 per cent were conducted by midwives, with 10 stillbirths and 4 cases of sepsis. No death rate is given.

Bristol, Rhode Island, reported 178 births in the first half of 1923, of which 37 per cent were conducted by midwives, or had no attendant. In this group there were no maternal deaths and 3 stillbirths.

The State of New York, 1915 to 1921 inclusive, shows a death rate from all puerperal causes averaging 54.9. In New York City the rate was 46.1. Puerperal septicemia mortality in New York City, for the same period, was 80 per cent of the total mortality. Maternal mortality from all causes varies but little in New York State; while there was an increase in 1918, due doubtless to the prevalence of influenza, the average for the five years was 14.4.

In puerperal sepsis in 1919 New York City showed the world's low record of 11.4 per 10,000; in this being conspicuously under Birmingham with 15.9 per 10,000.

In 1922 the new Division of Maternity, Infancy and Child Hygiene, established by the Legislature of New York State, began its activities. We are favored with a copy of the recent letter of transmittal by Dr. Otto R. Eichel, Director, to the late Dr. Hermann Biggs, Health Commissioner of the State, under whose auspices the Division was developed. The report includes an analysis of the five years, 1916 to 1920 inclusive, and comprises the record of 1,191,150 live births and 50,552 stillbirths, of which 680,130 live and 31,352 stillbirths occurred in New York City. Maternal and infant mortality include statistics based on live births and stillbirths combined, and must be taken as the ratio of death from all puerperal causes, per 10,000.

New York City occupies a position which is unique in regard to maternal and infant welfare. By its elaborate system of development of Health Centers, under the Department of Health, results commensurate with the outlay of endeavor and money are at once apparent.

The Clearing House of the Maternity Centers of the City is one of the economic factors in keeping the work organized, and the records uniform. It affords an agency of dissemination of information under a single control. This feature has doubtless aided the constituent members of the organization to simplify their work. Up to December, 1919, it was found that 21,014 cases had been cleared, and that 3,210 of these had been reported by two different bodies. In other words, duplication has now been prevented.

The Clearing House offers its services to the population at large, both to those who can afford to pay and to those that cannot following the same methods of reducing maternal and infant mortality that the leading obstetricians observe among their private patients. It was not organized primarily to collect statistics proving the value of prenatal care, but to carry on an experiment in preventive
medicine, differing from hospital administration, in that the cases are not actually handled through the pregnancy and puerperium. Maternal mortality of 40 per 10,000 is evinced as an argument as to the results obtained, being about 10 better than the city rate.

Interesting results are reported from Brooklyn. In a "Study of 2,000 Cases," 1922, the Prenatal Supervisor of the Visiting Nurse Association of that city, finds that among the 1,002 babies whose mothers had received prenatal care, there were 22 neonatal deaths and 25 stillbirths. Among the 1,001 cases that had no prenatal care, the number rose to 41 neonatal deaths and 35 stillbirths. Here prenatal care saved over one-half the babies, as compared with Brooklyn's mortality in general.

The report of Dr. Alfred C. Beck, of Brooklyn, in a paper, "End Results of Prenatal Care," gives a table of comparisons of three series of 1,000 cases each, with the following results:

Series 1. No prenatal care—stillbirths 35; infant deaths 41; total 76.
Series 2. Visiting nurse, but no physician—stillbirths 25; infant deaths 22; total 47.
Series 3. Prenatal care throughout, under medical supervision—stillbirths 19; infant deaths 6; total 25.

In other words, in the last series 1.9 per cent of cases ended in stillbirths and 0.6 per cent died under 14 days, a total of 2.5 per cent. These records are from the Long Island Hospital Clinic. They were under the control of Dr. Beck and Dr. Polak, with a corps of the Visiting Nurse Association, who made home visits.

From the Department of Health, Connecticut, Dr. A. E. Ingraham writes, (August 14, 1923) that the organization of maternal and infant welfare will be completed and a report made next year. The Children's Bureau, Connecticut, gives a mortality of 68 per 10,000 in 1921.

Michigan reports for 1922 a maternal mortality of 67 per 10,000, and infant mortality of 74.7 per 10,000, as compared with 63 maternal and 79 infant mortality in 1921.

Detroit reports, through the epidemiologist of the Detroit Department of Health, that, "It is humanly possible to cut down the deaths in early infancy. The results of our prenatal work in Detroit indicate what it is possible to accomplish. Catering to people in the less well-to-do sections of the city, and among whom unfavorable complications were only too frequent, it was possible to keep the infant mortality rate during 1919 and 1920 down to 78. (The infant mortality rate in the city of Detroit, as a whole, was 96.7 in 1919, and 104 in 1920, while it dropped to 83 in 1921.) By extending the privilege of physical examination and advice to the prospective mother, it is felt that many unnecessary deaths of babies during the first month of existence may be avoided.''

Michigan has only begun to be organized under the Sheppard-Towner Act.

A graphic chart of Milwaukee's report for 1922, compiled for the Committee, by the courtesy of Dr. Thompson, Secretary of the Health Department, at the request of Dr. Henry C. Davis, Secretary of the Obstetrical Section of the American Medical Association, shows that while Milwaukee's increase in population in ten years was 100,000, the birth rate in 1922 was the lowest since 1910; that while the percentage of cases delivered by physicians increased from 39 to 84 per cent, and those delivered by midwives decreased from 39 to 13 per cent, and that while hospital deliveries increased from 2 to 25 per cent, there was no lessening in the maternal death rate in the period 1912 to 1922. Maternal mortality averaged for the ten years 39.8, being 39 in 1912 and 39 in 1922.

In a recent experiment in Minneapolis, covering 20 months, in a section of the city "where the midwife had previously held full authority," a group of women
were supervised during pregnancy by the Infant Welfare Society and its attending physicians. "Out of 1,545 births in the northeast section during that period, 32 died in the first two weeks; but out of 157 prenatal cases cared for in the clinic none died in the first two weeks. The stillbirths in the group attended were 50 per cent less than were reported in the city at large."

An advance information manuscript chart, prepared by the Councilor of the 10th District of Maternal and Child Hygiene of Ohio, Dr. Sylvester J. Goodman, Columbus, and received through his courtesy, gives the statistics relative to maternal mortality, from all causes, in the 48 cities of Ohio having a population of 10,000 or over. The figures on the 5 largest cities follow:

<table>
<thead>
<tr>
<th></th>
<th>Puerperal Sepsis 1920-1921-1922</th>
<th>Eclampsia 1920-1921-1922</th>
<th>Accidents of Labor 1920-1921-1922</th>
<th>Cesarean Section 1920-1921-1922</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland</td>
<td>34 65 28</td>
<td>25 24 24</td>
<td>25 21 15</td>
<td>14 3</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>36 24 13</td>
<td>14 11 10</td>
<td>9 5 10</td>
<td>2 3</td>
</tr>
<tr>
<td>Toledo</td>
<td>22 28 11</td>
<td>7 11 9</td>
<td>11 5 9</td>
<td>2 3</td>
</tr>
<tr>
<td>Columbus</td>
<td>16 16 12</td>
<td>9 10 5</td>
<td>13 2 6</td>
<td>3 5</td>
</tr>
<tr>
<td>Dayton</td>
<td>10 12 9</td>
<td>5 5</td>
<td>13 2 6</td>
<td>3</td>
</tr>
<tr>
<td>Total for State</td>
<td>279 259 111</td>
<td>106 107 105</td>
<td>127 67 78</td>
<td>36 8 25</td>
</tr>
</tbody>
</table>

A gratifying decrease in puerperal septicemia will be noted, while no improvement in toxemia nor the accidents of labor are recorded.

Dr. A. J. Skeel, one of our Fellows in Cleveland, is in charge of a large welfare district in Ohio, and gives a vivid report of its activities. Then branches of the University Medical School Dispensary, in cooperation with the Public Health Bureau, have been set to work in prenatal care and follow-up work.

This is in conjunction with the extension organization of the state, through the Advisory Committee of the State Department of Health. This committee appointed by the Director of Health, includes a prominent obstetrician for each of the large cities, Cleveland, Cincinnati, Toledo, Columbus and Dayton; also representatives of the Graduate Nurse Association, the Public Health Society, the Ohio Hospital Association and other organizations interested in public health.

A conference, held May 11, 1923, under the State Director of Health, Dr. John E. Monger, at Columbus, laid plans for the operation of the Sheppard-Towner Act in Ohio. It was definitely stated that the intention of the Public Health officials was to carry out the provisions of the law, in such manner, that the personal relation of the practitioner and his patient should be preserved, and in no wise disturbed.

A series of demonstrations are being held under the auspices of the Bureau of Child Hygiene, of the State Department of Health, cooperating with local health authorities, in communities where desired, and special consideration is given to hygiene of maternity and infancy. These demonstrations are to be continued for sufficient time to determine their efficacy, and then it will be decided if they be made a permanent work. Before actual proceedings were begun, it was considered advisable to call conferences of County Medical and County Dental Societies, to present the object and scope of the proposed demonstration; to make a preliminary survey of each community as to its local problems and facilities; to arrange for central office space for cooperative assistance from professional and social groups; to arrange for meetings at various times, of public officials and volunteer organizations, in order to adopt plans for permanent work.

Indiana shows a dearth of maternal welfare work, since the prenatal program has been but recently laid out.
From Ft. Wayne, Dr. L. P. Draper, Department of Health, reports that maternal mortality fell from 87 in 1920 to 63 in 1923.

Dr. A. M. Mendenhall, Indianapolis, writes that the adoption of the Sheppard-Towner Act by the Legislature, in 1923, will be followed by an administration that will be under the Division of Infant Hygiene, of the Public Health Department. The $50,000 available in the state is to be spent in education.

The Illinois Department of Public Health reports through its Director, Dr. Isaac D. Rawlings, who, writing July 30, 1923, says that while $19,000 was received by the Department in June, 1922, as a three months’ payment on the contemplated work of the state under the Sheppard-Towner Act, that the Attorney General ruled that the money could not be accepted, except by the action of the Legislature. The Legislature refused to authorize the acceptance, so that it has been impossible to undertake maternal and infant welfare work in the state under the Act during the present biennium.

In a service comprising 40,000 cases in the Chicago Lying-In Hospital, there has been no death from eclampsia of any woman who attended the prenatal clinic, and Dr. DeLee writes the Committee that very few patients developed eclampsia.

A survey of welfare conditions in Chicago was published by the Chicago Community Trust in 1922, showing some improvement in prenatal statistics, which will doubtless be further developed.

Chicago has organized the Infant Welfare Society with 28 stations. This Society by its 1923 report shows that 99,491 visits were made by its nurses in 1922. It spent $116,000 in welfare work.

A reduction in maternal mortality from 70 to 63, from the years 1920 to 1922 is recorded for the city.

The State of Missouri is not in the Birth Registration Area, and the efforts to improve conditions have been sporadic. In spite of the object lessons of clinics and welfare agencies in lessening morbidity and mortality, little change in statistics is to be noted. The cities are developing some organized efforts and these show a more hopeful outlook.

In St. Louis, an investigation as to the effect of prenatal care, supervised by Barnes Hospital of Washington University, was made under the auspices of Dr. Henry Schwarz and his associates. Of the 334 women applying for free medical attention to be given them during the periods of pregnancy and confinement, 46 received dispensary care only; the other 288 were visited in their homes. Most of the women registered between the fifth and eighth months of pregnancy. A few came to the dispensary as early as the second month. They were instructed in personal and home hygiene, and routine methods were used. The results showed the value of prenatal care. The neonatal rate for the clinic was 3.17 per 1,000 live births. In the City of St. Louis, as a whole the rate was 3.8. The rate of stillbirths was 20 per cent greater in the city than in the clinic.

From a report on Maternal Risk Rate in Kansas City, compiled by Dr. Ralph Wilson, June, 1923, it appears that the total maternal deaths from all puerperal causes in 1922, as given by the Vital Statistics Bureau of the Board of Health, was 73 per 10,000. This is exceeded by Boston having 77, with this remarkable coincidence that these two cities, which have the lowest percentages of births attended by midwives, 2.5 in Boston and 1.6 in Kansas City, are among the four cities with the highest rate of deaths from puerperal sepsis.

At Christian Church Hospital, where all the patients, except emergencies, were under prenatal care through pregnancy, the results of three years’ service, as compiled by Dr. C. A. Ritter, were as follows: all puerperal mortality 2.6 per 1,000; no deaths from sepsis; stillbirths at term, all causes, 3.6 per cent; an incidence of cesarean section 2.7, no deaths; premature births, 1.4 per cent. This
record shows a reduction over the annual report of Kansas City in general of 65 per cent maternal mortality, and 40 per cent infant mortality.

Two prenatal clinics, that of the Junior League, now in its third year, and that of the Out-Patient Department of the Kansas City General Hospital, both under the supervision of the Chairman of this Committee, give these results: No maternal mortality is shown in the records of the Junior League, and an infant mortality of 3.1 per cent, the General Hospital’s records give a maternal mortality of 4.2 and infant death rate of 59.5, with 11.9 per cent of stillbirths.

It is to be noted that since 1918, the puerperal mortality in the limits of Kansas City has been reduced 40 per cent and the infant mortality 25 per cent.

The report of the maternity service at Stanford University, San Francisco, under Dr. Alfred Baker Spalding, Chief of the Division of Obstetrics and Gynecology, received August 1923, gives a comparison of the results of their supervised clinic with those of the city at large. The city shows 7.4 in 1919, 9.3 in 1920, 6.1 in 1921, of maternal mortality in 1,000 live births; the clinic shows an average for the three years of 4.8; the infant mortality was reduced in the same period from 63 to 47 in the city at large, with only 32 as an average for the clinic.

Dr. Frank C. Ainley, Obstetrician to the Hospital of the Good Samaritan in Los Angeles, reports, August 1923, that from January 1921 to July 1923, there were delivered in this hospital 1,177 patients with a mortality of 4 mothers, 22 stillborn infants and 17 neonatal deaths. He adds that the patients are almost entirely private, and have had some prenatal care under their own obstetricians. These figures include all cases of placenta previa, toxemia, lues, premature deliveries and congenital deformities.

Dr. Ainley, in the same hospital, in less than three years’ period, had 578 deliveries with no maternal mortality. His records show 9 stillborn infants and 9 infants died before leaving the hospital.

From Oklahoma comes a report, compiled by Dr. W. A. Fowler, Oklahoma City, in which that new state shows a maternal mortality of 61 per 1,000 births, from all puerperal causes; a stillbirth rate of 5 per cent and a fetal death rate of 93.

In the clinical service of the Oklahoma State University, extending over a period of ten years, there has been no maternal death from eclampsia and only one death from sepsis. Both epidemics of influenza were passed through with no abortion nor maternal deaths among supervised cases.

Fourteen of the States, including Alabama, Delaware, Kentucky, Florida, Michigan, Mississippi, New Jersey, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Utah and Virginia, have decided to include as a part of their program for maternal welfare in the near future, the licensing, supervising and instructing of midwives.

The marvelous achievement of the last decade in maternal welfare is that of the pioneers of better obstetrics in the South, in the men like Dr. Plecker of Virginia, Dr. Leathers of Mississippi, and of Dr. Weleh of Alabama, among the negro midwives; and of Dr. Rawlings of Texas among the Mexican midwives.

Through the efforts of Dr. Junius A. Rawlings, in 1920, El Paso, Texas, undertook an unusual piece of maternal welfare work. The population of that city is 40 per cent Mexican, and 65 per cent of the Mexican women are delivered by midwives. Supervision of midwives was instituted by a reorganized City Health Department, now under the direction of Major R. E. Tarbett, of the United States Public Health Service; this included literacy test, physical examination, and instruction in the usage of protective obstetrical methods. The requirement of the report of births to the Health Department is so rigid, that it is estimated that 90 per cent of the births attended are reported.
The city employs a supervising nurse and a corps of nurses to visit the homes in a follow-up work in connection with a prenatal clinic.

From Mississippi, the biennial report, dated June 30, 1923, has been received in advance, by courtesy of the Secretary of the State Board of Health, Dr. Leathers. It deals with the striking problem of the enormous proportion of births attended by negro midwives, and the difficulty of dealing with ignorant, illiterate and superstitious women. However, as the Commissioner states the facts: "There are not enough physicians in Mississippi to attend the maternity cases which develop, and because of the peculiar economic and living conditions the midwife is a necessity." A State Supervisor visited 71 counties in 1921 and investigated 154 white and 2,955 negro midwives. Permits to practice were refused to 55 negro and 6 white midwives. Lectures, demonstrations and conferences with public health officers were held at 110 different points.

The Board reports that 438 mothers died in Mississippi in 1912. Of the births in 1922, it is recorded that 22,741 were attended by physicians, and 22,703 by midwives; 600 had no attendant. Stillbirths numbering 4,670 were reported, which is suggested as one of the reasons that Mississippi has decreased in population, in the last decade. The report stresses the economic value of the state of the loss of these lives of mothers, and the potential citizenship thus lost to the state through the waste of infant lives.

Dr. W. A. Plecker, State Registrar of Vital Statistics, reports that the Commonwealth of Virginia shows some little reduction in septic deaths. Since 1918 the Legislature has placed under Dr. Plecker's supervision the 6,000 or more midwives who are permitted to practice in the State of Virginia. They are taught elementary rules of midwifery, which are printed in a booklet, "Helps for Midwives." A few simple rules are also printed on the back of their Practice Permit. Obedience to Rule 3, which forbids them to make inside examinations, is most strenuously emphasized.

Two booklets are sent to all newly married women whose marriages are reported to the Bureau, "The New Family" and "Feeding the New Family."

The chief part of the maternal and infant welfare work is now under the supervision of Dr. Mary Brydon, who has the dispensing of the Sheppard-Towner fund. This Department is working especially on the education of midwives and parents, in connection with the State Bureau of Vital Statistics, and following the lines laid down by Dr. Plecker.

A brief résumé of the present status of the Sheppard-Towner Act is herewith abstracted. Forty-two states have accepted the provisions of the Act; and forty-one are now developing a program of education in maternal and infant welfare.

The first money available under the appropriation was portioned among the states in April, 1922. Owing to some delay in decisions in the office of the Comptroller, the payments were generally made in June and July, 1922.

According to the report of Miss Grace Abbott, published in the American Journal of Health, September 1922, the Act intends that the plan of organization shall originate in the state, and shall be adapted to local needs, with the purpose:

1. To secure an appreciation among women of what constitutes good prenatal and obstetric care.

2. To make available the community resources, so that women may have this type of care.

The proposed program is based on a supposed knowledge of what skill is available in different parts of each state, and to what extent that skill is being utilized by the women of the state.

In many states the general lack of facilities is said to require that the Direc-
tor must, without the resources which the good city clinic offers, endeavor to create a system to fit the situation, working in virgin soil.

The Federal funds available for the states under the Act are:

1.—$5,000, with no cooperation on the part of the State.
2.—$5,000 to match each $5,000 put up by the State.

A deficiency Act passed by Congress, March, 1922, made available $490,000 for the remainder of the year, and for the year ending June 30, 1923, an additional appropriation of $1,240,000 was voted by Congress.

The states that have not availed themselves of the funds are Maine, Massachusetts, Rhode Island, New York, Louisiana, and Washington. Twelve of the acceptances are by State Legislatures, and thirty by Governors, pending the regular session of the Legislature.

Of the 41 states which accepted payments for 1922, 21 matched their full allotment; 5 matched in part and 11 accepted the $5,000 without matching.

No uniform action seems to have been taken regarding the expenditure of the money. Some states are trying to correlate the fund to the sections of the state where the largest maternal and infant death rate prevails. Eighteen of the states accepting the Act are not yet in the birth registration area, and maternal and infant mortality records are not complete.

Their plans of work, then have no definite, unified basis of procedure at present. One state, with $62,000 available, has selected two counties as training and demonstration centers, divided into: (1) City Problems; (2) Small Town Problems; (3) Rural Problems; (4) Mining Camp Problems.

Another state, spending $176,967, provides for two field physicians, six supervising nurses, four full time nurses and eighty nurses giving half time to maternity and infant field work.

In another state, with $10,000 of Federal funds unmatched, general education from a central office will be given, and two demonstrations, one in town and one in the country, of the work of a prenatal center, will be put on during the year.

One small eastern state has $76,808 and plans to reduce maternal mortality by:

1. Instruction of mothers.
2. Investigation of the deaths of mothers attended by midwives.
3. Supervision of midwives.

Forty-four nurses will visit the new born and do follow-up work.

Other states make their program more fully educational, employing school nurses during the summer months, for infant welfare work. These are usually those with unmatched Federal funds.

Sufficient data, relative to maternal welfare work through varying agencies, have been presented to demonstrate that prenatal care and hospitalization have invariably reduced the rate of maternal morbidity and mortality, wherever intelligently and persistently carried out.

Maternal welfare has become popular, through the activity of women's organizations, which carried on the propaganda that resulted in the Sheppard-Towner Act, and brought Federal aid to the states.

The enormous funds now available, and being utilized for educational work, along the lines already planned, must greatly augment the influence of the Bureau, and help to realize its purpose, defined in no uncertain terms: "To secure among women an appreciation of what constitutes good prenatal and obstetric care."

Dr. G. W. Kosmak, a member of this Committee, who took part in a symposium on maternal welfare, the report of which is published in the August, 1923, issue of the New York State Journal of Medicine, discusses the prenatal care of
women without hospital facilities. The conclusion of the paper, which, of necessity covers the problem of the great majority of all maternity cases, since only a comparatively small number of women can, with our present capacity of hospital beds and the high cost of hospitalization, be sent to a hospital, is as follows: 'Women will never escape what must be designated as the accidents of pregnancy and labor, but they may be spared much of the danger, which is now accepted as being of preventable origin. It is this phase of preventive obstetrics in which organizations, self-constituted and enthusiastic to do welfare work, can find a proper field for their activities. This cannot be successfully accomplished, however, in any community without a lay interest being manifested by persons who will, by a generous philanthropy, provide the means of financial support; and, also, by an interest on the part of semiprofessional organizations, such as associates of trained nurses, as well as women's clubs; and finally by an interested medical profession, willing and ready to lend its aid. All such elements of the lay, the semiprofessional and the professional people, if they cooperate, can bring about an organization powerful for good; and also elastic enough to recognize the responsibility of each class and to accept by agreement that each shall function as an entity, neither invading the prerogative of the other, and thus to impress upon the community its value as a factor in upholding the public health.'

Signed, HENRY SCHWARZ, M.D.
GEORGE W. KOSMAK, M.D.
GEORGE CLARK MOSHER, M.D., Chairman.

DISCUSSION

DR. G. W. KOSMAK, NEW YORK CITY.—I feel that this report should not be allowed to pass by without a word of commendation to Dr. Mosher for the excellent work he has done in connection with this committee. Although I am a member of the committee, it is entirely Dr. Mosher’s work and we owe a great debt of gratitude to him for it.

I should like to draw the attention of the members to the beginning of this movement. Dr. Mosher has kindly given me credit for introducing it before the American Gynecological Society. It seemed to me several years ago things had come to such a pass that the organized medical profession of the country was being more or less slighted in this important work, and that lay interests had largely superseded our efforts in the direction of what should be considered purely a medical problem.

As I stated in my paper before our State society last spring, these lay organizations should take up certain parts of the problem and carry them out, but remember, gentlemen, this in most of its essential features is a medical problem, and it is only through the insistence of organizations national in their scope, such as this one, that the public at large will appreciate that fact and will give us the credit for much of the pioneer work and insist on our participation in it. For instance, funds appropriated by the state and federal governments should not be spent in the collection of useless statistics which have no bearing on the subject. I have lived through several activities of that kind in my own city, and I find that money has actually been wasted in the collection of information with little or no bearing on the subject, money that should have been expended for visiting nurses, for doctors, for hospitals, to care for these women. By insisting as physicians on the proper conduct of these investigations and the proper expenditure of these moneys, real scientific progress can be made. I do not want to decry the possible future good effects of the Sheppard-Towner bill. That bill as first drafted left the medical profession entirely out of consideration. There were so many changes
made that the authors possibly did not recognize it at all when it came up for final passage. The bill was radically changed from the beginning to the end, and if it had gone through as first proposed the entire administration would have been in lay hands. Now, medical men have something to say.

The profession has been bombarded for the last ten or fifteen years by statements largely from lay sources, concerning the high morbidity and high mortality in pregnancy, due to the doctors in contrast with midwives. We should not put the midwife on a pedestal. There is probably some excuse for her, but there is no reason why we should continue to allow her to exist forever. In the course of the next fifty years we will find something that will displace her, but at present we have to put up with her. For the present she must be under the direction of medical men. In Pennsylvania Dr. Nicholson and his confreres are directing the midwives, with the result that they now have excellent statistics. Doctors have been blamed for the high death rate from sepsis. In New York City we have recently gone through an agitation of that kind. Let me call your attention to the fact that there is bound to be sepsis. It comes in waves. We get series of cases that resemble epidemics. Next year, without any great change in technic, these septic statistics disappear and there is no further cause for complaint, and when somebody simply says that doctors have more sepsis than midwives it is not necessarily true. You can make figures tell almost any story.

What shall we do in a practical way? There is no need of our Association blaming anybody for this state of affairs. Obstetric practice can, however, be improved, especially by the general practitioner who sees most of these women. He will not do it unless the economic factors are changed to pay him for so doing. The man in the country district, who has to travel miles to take an obstetric case for ten dollars, is not to blame if he cannot give proper attention to that case. It is up to us to propose something. Our committees on Maternal Welfare have been working for three years, and are now getting together material upon which to base recommendations that will in time, I hope, do some good. The Association can do something in a practical way; it can cooperate; it can show its readiness to associate its activities with any other organization that will agree to bring something forward of a practical character. It is a mistake to assume that the Sheppard-Towner bill will correct the situation. I do not believe it will. It will take more than that, and it will take community interest. The point I have tried to bring out repeatedly is that unless you develop community interest you will not get results. The fact that a state appropriates $100,000 to match the Federal government’s $100,000, will not accomplish much. The final result must be accomplished by members of this and other Associations and by local obstetricians who will enter their respective communities and develop this sense for the necessity of better obstetrics. That will do more good than large appropriations of money which I am afraid will, as in the past, be devoted largely to the collection of statistics by nonmedical people and nurses who ought to be better occupied. Unless we exert our own influence, that state of affairs will continue. It is with a plea for greater community effort manifested through the members of national bodies such as this one that I want to close my remarks, and finally to commend again Dr. Mosher for the excellent work he has done in bringing this matter before your attention.

DR. JAMES E. DAVIS, DETROIT, MICH.—I want to commend the work of Dr. Mosher. This is a remarkable report. It represents a great deal of careful work, and any of you who have had the work of collecting statistics know how difficult this undertaking is.
I am hardly as sanguine as the last speaker. I do not feel quite comfortable when laymen come to me and tell me what I should do professionally, especially if I know the things they tell me to do are the things I ought to do. I think I should have known these things before and have acted before they came with their suggestions.

I believe we are just about in the position stated by Dr. Kosmak, namely, we are not so much to blame as some of our critics have said we were, and yet there is something wrong, and I am quite sure that the statistics wherever these conditions exist can be greatly improved. I agree with the last speaker that a national body like this should deliver to the public information that should be considered authoritative, and we ought to be very careful in the collection of that material. I only wish we might have an endowment that will go beyond what we can give to this work from the funds of the Association. If we had an amount of money, say $5,000, I think part of it might be given to the expenses of collecting data and of making a statistical study, and when done by a committee such as we have we know that the data collected would be reliable. There would not be any bias in the report; it would be a scientific collection of facts from the best available sources. I believe there ought to be some clinical and laboratory research work done, as that would support the statistical report gathered. An appropriation might be administered so that in two or three different places we might have this clinical and laboratory research work carried on. At the end of the year all data would be assembled and could be issued in pamphlet form. This would constitute an authoritative statement.

DR. LIDA STEWART COGILL, PHILADELPHIA, PA. (by invitation).—I only emphasize what Dr. Kosmak has said. It has been said repeatedly that the public must demand better obstetrics, and I have always rather resented that remark. I feel that physicians should be the leading factors and directors in this work of creating the demand among the public for better obstetrics. It is rather humiliating to have lay organizations come to us and ask that we give this prenatal care. I feel that each physician should go out and organize this work in his own community and be responsible for the fact that it is possible for every woman in that community to receive prenatal care. There is a great deal of medical prenatal care that must be done. If we are going to have the dignity and high standard of obstetrics maintained, it will never be done by waiting for the public to demand better obstetrics from the physician. It must be the reverse. We have the cart before the horse when we have the laity demanding better obstetrics from us. How are we to know how much prenatal care and postnatal care is being done in our community? In Philadelphia, in one of the health organizations with which I am connected, we found in making a survey that there had been no effort made in this city to find the type and amount of prenatal care being given. We tried to find this out by sending an annual questionnaire to each organization doing so-called prenatal care work, asking just how much prenatal care was given to patients and what were the results; how many were taking routine blood pressures, making routine Wassermann examinations, and securing vaginal secretions for microscopical examinations. It was surprising to find how little of this information we could receive from institutions. At first, there was a feeling of resentment at our asking these questions, but when they found out what we were trying to secure, we received a few more replies. It was clearly pointed out that institutions must be provided with more social workers and physicians to enable us to get these statistics. I feel very keenly physicians must be the leaders in this cause. We all know it is the medical prenatal care we must ourselves direct, and when we have public meetings in health centers it is difficult at times to find a physician willing to speak. It is all in the hands of lay workers and this is a reflection upon us.
MATERNAL MORBIDITY AND MORTALITY IN THE UNITED STATES

By George Clark Mosher, M.D., Kansas City, Missouri

It is the individual who dies; there is no mass mortality in obstetrics until the records are filed.

The reiteration of statistics, in reference to facts with which we are all familiar, is wearisome and time consuming. The sins of omission and commission of all figures, which could be presented relative to maternal morbidity and mortality, are included in three sentences:

Maternal morbidity and mortality have not been reduced in the United States in the last twenty years; according to the census reports, 16,000 women die in labor annually.

In the loss of mothers, the United States stands fourteenth among the so-called civilized nations, only Spain and Belgium having a higher death rate.

Puerperal septicemia and eclampsia claim over one-half of all the patients who die. Oliver Wendell Holmes, in 1845, pronounced child-bed fever "a private pestilence," and showed that it is preventable. Joseph B. DeLee, in 1923, gives records of 40,000 cases of labor in the Chicago Lying-In Hospital without a death from eclampsia.

The questionnaire of the Committee on Maternal Welfare of this Association, which was sent to every section of the country, contained a request for the views of our correspondents regarding the causes of maternal morbidity and mortality, and for suggestions as to possible remedies for their improvement. Valuable expressions of opinion were received, which could not be embodied in the Committee's report for want of space. So, when our Secretary, Dr. James E. Davis, wrote requesting a paper on this subject, the assignment was considered opportune.

To paraphrase the famous question of one of our midwestern literary lights, "What is the matter with obstetrics?" The letters received are so much in accord concerning the reasons for the opprobrium of obstetrics, that extracts from these furnish a comprehensive answer.

Since we are meeting in the great medical center redolent of the memories of Hodge and Meigs and Theophilus Parvin, it seems fitting to have the opinion of one of the present generation upon whose shoulders the mantle of those great teachers has fallen, Dr. Edward P. Davis, who writes in part:
“In Philadelphia and vicinity, as far as I can observe, the condition of obstetric practice is essentially as follows: The rich obtain excellent medical care during pregnancy, parturition and recovery from labor. More of them go to hospitals for confinement than formerly. The interruption of pregnancy, accidents in labor, and bad recoveries, are more the result of dissipation, luxury and degeneration among these people than a lack of proper obstetric attention.

“The poor obtain excellent obstetric care if they enter hospitals. They have better attention than formerly in dispensaries, where a good deal of publicity is given to prenatal, so-called, care. . . . . Obstetric care is probably conducted among the poor with greater success than among any others, because they can be taken to a hospital more readily and are under better control. This results in the saving of lives, sometimes of doubtful value to the community. It does, however, secure a positive gain to the population by maintaining the health and working power of mothers, and by keeping the families together and helping the artisan in his domestic fortune.

“The population most in need of good obstetric care is the so-called middle class, with small and limited incomes but with sufficient intelligence, education and refinement to desire and appreciate good medical attention and privacy during illness. Such cannot afford expensive private rooms in hospitals nor the services of specialists, nor can they have high priced trained nurses. Our large hospitals lack greatly moderate priced accommodations for such patients. They are apt to consult general practitioners who undertake confinements in apartments or private houses, without proper facilities, with more or less bad results as regards the health and strength of the mother and child.

“On the side of the medical profession, the middle class medical man, or general practitioner, so-called, is the greatest danger in obstetrics. A midwife, under strict control, does comparatively little harm, but the doctor who does obstetric work to get the medical practice of the family, giving as little time and attention as possible, because it pays but little, is the one responsible for many obstetric disasters. . . . . From the standpoint of the medical profession, it must be remembered that the struggle for existence is a bitter one. The doctor must take all he can get and do with it his best. He does not dare refuse obstetric operations because his competitors do them, and yet he cannot do them well.

“On the side of the medical profession obstetrics must be considered a specialty of equal importance with surgery. Gynecology is naturally a department of surgery, and as obstetrics improves, the field of gynecology becomes a narrow one. The fact that large fees have been obtained by gynecological operations, and comparatively small fees are obtained in obstetric practice has resulted in the disproportionate importance placed upon gynecology.”

Another teacher and leader, Dr. Franklin S. Newell of Harvard, says, among other things: “I would say that conditions in Boston are not perfectly satisfactory, owing largely to the fact, in my opinion, that a considerable proportion of the obstetric consultation in the surrounding towns and cities is done by the younger surgeons who have had no obstetric training, and whose one idea in delivery is to do a cesarean section, irrespective of the conditions present, and the needs of the individual patient.

“Also, that it is very difficult to educate the older general practitioner to the advantages of prenatal care, but we can impress our younger men. Prenatal care is so comparatively recent that the general practitioner of over forty-five pays little or no attention to it.”

From the far south, Dr. C. R. Hannah, Professor of Obstetrics in Baylor University, Dallas, Texas, writes: “Too many of our medical men who do obstetrics
fail to comprehend and put into practice that which they know. Morbidity and mortality of mothers could be lowered if specialists in obstetrics were more frequently called. Surgeons are more often called than obstetricians. The lack of knowledge of obstetrics on the surgeon's part frequently leads to operations, rather than methods of obstetric procedure."

Dr. John E. Talbot, Worcester, Massachusetts, says in part: "I believe the public needs education on the value of good obstetric care. At present it is the least appreciated branch of medicine, even among the educated class. The fault of this situation is due partly to historical reasons, but mainly to the medical profession itself. The public has been educated to require special postgraduate training of the surgical and medical men it employs, and is willing to pay fees commensurate with such special training. In obstetrics, however, the medical school graduate, with experience in only six to twenty cases is expected to handle all the complications and operative procedures in obstetrics. The fees which the public expects to pay are in keeping with the low grade service which is given under these conditions. . . . . It seems to me that hospital experience is as essential to the proper practice of obstetrics as it is to the practice of surgery. I do not believe that the importance of proper obstetrical training is appreciated by the profession itself, outside of the list of those who are obstetrical specialists."

It has long been the popular opinion, in medical circles, that the midwife is answerable for the large percentage of maternal deaths, especially from sepsis.

Dr. Julius Levy, of the Bureau of Child Hygiene, Newark, New Jersey, published in the February, 1923, issue of the American Journal of Health, a paper, in which he discusses the comparative responsibility of physicians and midwives as to maternal mortality, and gives a new angle to this tradition, presenting tables and charts setting forth his observations. He shows that in the fifteen largest cities, except only Pittsburgh, there has been a decrease in the number of cases reported by midwives, and of midwives reporting cases; there has been no decrease, rather an upward tendency, in maternal mortality; the centers having the largest percentage of midwives have the smallest percentage of maternal deaths.

Dr. A. M. Mendenhall, Indianapolis, University of Indiana Medical School, commenting on Dr. Levy's paper, writes:

"As a result or rather an intensive investigation, I find that in Indiana, as a whole, the midwife is not a very considerable problem, there being only one locality, a group of four counties near Chicago, where the midwife is much of a factor. In these counties nearly one-half of the women are delivered by midwives, with maternal and fetal deaths considerably better than the State as a whole, especially there being less puerperal sepsis."

In a personal letter Dr. Levy says: "I am not holding a brief for the midwife, but feel very strongly that no progress will be made until we, as physicians, are willing to accept the facts, and then try to develop methods that will correct conditions. . . . . If you read my article closely, you will notice that I have been very careful not to use my figures to prove that the results from available data are no worse, even after we make allowance for the fact that their cases are foreign born mothers, who present a higher proportion of multipara and a smaller proportion of risk than our American born mothers."
The inevitable conclusion to be drawn from these expressions of opinion, which typify the feelings of a large number of the thoughtful and progressive leaders of the profession, may be summarized in the comprehensive statement that much of the responsibility for the untoward results of childbirth rests within our own ranks.

The rapid decrease in the number of midwives in practice; the more drastic supervision by Departments of Health over them in the regions where they are still popular, or indispensable because of the lack of physicians; the realization that their work, among the part of the population whom they serve, shows no higher percentage of bad results than the general average of the community; these considerations eliminate the midwife as a factor to be reckoned with in the solution of the question of the continued high rate of maternal mortality.

In the towns and rural districts, and very largely in the cities, the family physician, owing to tradition, sentiment, self-interest or convenience, will care for childbirth, and the average result of his work will represent the status from which statistics will be drawn.

This work will continue to be conducted in the home. The great majority of women who are serving to perpetuate the best elements of the human race belong to the class of intelligent, self-respecting families who are dependent on salaries or weekly wages.

The disproportionately small amount of space allotted to the wards of our hospitals, the high price of the rooms and the general coincident expense makes any but charity hospital service prohibitive to this class of women. Special nurses are equally prohibitive. Obviously home confinements involve much greater risk.

The causes operating to lower the standard of the work of the general practitioner have already been suggested. They may be summarized as follows: insufficient training in our medical schools; lack of hospital postgraduate training which will enable the physician, at least, to diagnose abnormal positions; lack of appreciation of the fact that the process of labor is not surgical; lack of dependence on the obstetric specialist for diagnostic counsel rather than on the young surgeon whose obstetrical experience and preparation may be even less extensive than his own.

It is the part of those of the profession who are fitted by education, by training and by experience to take the lead in instituting a program that will remedy these conditions, and thus raise the standard of the work of the general practitioner.

Obstetrics should be made a speciality of the same rank as surgery. As many hours of the college curriculum should be given to the drilling of the medical student in the principles of the one as of the other. In a larger degree he needs a familiar knowledge of the art of obstetrics, because, regardless of his training, he will, on entering practice be called upon to attend women in labor, long before he will be called to
do operative surgery. He hesitates to call counsel in labor regardless of the condition of the patient, because of the possible reflection on his ability. Without question he can call counsel in a surgical case without affecting his professional dignity because surgery has always, with the laity, been considered the part of the specialist. Not infrequently, when counsel is called, the young practitioner yields his own judgment of the need of obstetrical assistance to the demand of the family for the only generally known specialist, and summons the aid of the surgeon.

Several years ago Dr. J. Whitridge Williams wrote a paper on the teaching of obstetrics, in which some scathing comments were made on the methods which were then employed. There has been some improvement since 1910, but even today, with the enormous shrinking in the number of medical schools, and the practical elimination of privately owned medical colleges, the demand for competent instructors in obstetrics is great, while the quality of teaching is woefully inadequate.

In no other branch of medicine is there so much chaotic difference of viewpoint as in obstetrics; nor is there elsewhere such exhibition of diversified technic as there is in the management of labor. A recent editorial in the Journal of the American Medical Association, commenting on this radical divergence of opinion and its disastrous consequences, sums up the subject by maintaining that in obstetrics, individualization is absolutely the key word.

Among ourselves, as specialists, individualization is possible and desirable. Individualization, however, will not solve the problem for the general practitioner. He must be satisfied with a generalization of the minimum standard of obstetric management.

Certain procedures are now recognized as a part of the routine technic of good obstetrics, that a decade ago were certainly individual, especially those relating to diagnosis and asepsis. The general practitioner, who, as a medical student, failed to acquire the fundamentals of obstetrics, or if he acquired them, fails to apply them, accepts his morbidity and mortality as inevitable because he is callous to their significance.

If every general practitioner, nay, if every man who undertakes the care of a maternity case, could be compelled to take a short postgraduate course every five years, induced to occasionally attend one of the clinics now being held annually in many of the large centers, and be urged meantime to read the standard medical journals, the result would be quickly appreciable upon the statistics of maternal morbidity and mortality. These have been so long stationary that they seem, as it were, to have become a permanent reproach to the doctors of this country.

1100 Grand Avenue.
SEPTIC INFECTIONS FOLLOWING CHILDBIRTH, OR AN ANALYSIS OF MATERNITY MORTALITY CONSIDERED FROM THE STANDPOINT OF INCREASE OF DEATH AMONG MOTHERS

By Edgar A. Vander Veer, M.D., F.A.C.S., Albany, N. Y.
(Attending Surgeon Albany Hospital)

At a period of time, especially in the history of our Association, when such vast strides have been made in the treatment of disease, removal of pathologic conditions surgically, operations upon every organ of the body are performed successfully, and the prophylactic treatment of disease is carried to such a high plane, there still remains one department of medicine which, a study of statistics will show, has not kept pace with this wonderful development. I refer to the treatment and delivery of the expectant mother in the hands of the general practitioner. While I do not attend these cases personally, still, as a gynecologist, I am often called in consultation, when infection presents, to see some of the after-results. It seems to me that it becomes our duty to investigate and present the result of our studies in a way that will aid our public health officers in lessening the mortality percentage.

It is to a society such as ours that the general practitioner looks for guidance in his work, and I know of no more important task before us at the present time than in calling the attention, not only of the medical profession, but of the general public as well, to the fact that maternal mortality is not decreasing in a commensurate ratio with the mortality rate from other causes. In fact, I believe it is slightly increasing, and that measures should be adopted—are already being adopted—in order to investigate and report upon this condition. The public should be enlightened upon the facts in the case, and should be educated to cooperate with the medical profession in reducing maternal mortality to a minimum.

Midwives, as far as statistics are available, seem to make a better showing than the ordinary practitioner, which may be explained in two ways: first, the general practitioner is usually in a hurry when attending a confinement case, and makes frequent and unnecessary vaginal examinations with the resultant increase of the chances of infection, whereas, on the other hand, the midwife is content to sit patiently by and let Nature perform her part making few examinations, consequently with a good deal less chance of infecting the
woman in labor. Second, the midwife, in a great majority of the cases, attends only the normal confinement, sending for the doctor whenever anything abnormal presents, with the result that if anything goes wrong the physician is charged on the records with the maternal death, and not the midwife, to whom, in many cases, it should be properly attributed, thus, apparently giving the midwife a better record than she should have, and the physician a poorer one. I believe there should be a classification in which both the midwife and physician are in attendance and sharing the responsibility. Statistics do not, as yet, show how many of these fatal cases attended by a physician had first been in the hands of a midwife.

In January, 1923, the Department of Health of the state of New York issued a circular entitled "The Geographical Distribution of Maternal Mortality and Stillbirths in New York State," which gives us some very interesting information. The circular is edited by Dr. Otto R. Eichel, Director of the Division of Vital Statistics, Department of Health of the state of New York, and I am quoting very freely in the following pages from his letter of transmittal to the Commissioner of Health of the State of New York. He first compares the maternal mortality in the state, excluding New York City, for the years 1910 to 1921. The mortality rates are based upon the number of maternal deaths per 10,000 births, including stillbirths.

In 1910 the maternal mortality rate, outside of New York City, from all puerperal causes, was 78; in New York City 66 per 10,000 births. The mortality rate for puerperal septicemia was 28 and 18 respectively. The maternal death rate, from all puerperal causes, gradually dropped to the year 1916 when it was 54 and 46 respectively. The death rate from puerperal septicemia dropped to about 20 and 18, where it has practically remained ever since, showing some improvement in that direction.

In 1917 the maternal death rate from all puerperal causes gradually rose again, and reached its peak during the year 1918, when it was 82 and 70 respectively. This increase in the death rate was due to the influenza epidemic, and possibly also to the inability of the woman in labor in the rural district to receive proper medical attendance, as many physicians were away in service. That year the mortality rate, from puerperal septicemia—to which I have previously called attention—remained about the same.

For the year 1921 the mortality rate from all puerperal causes was 60 outside of New York City and 54 in New York City, respectively—not quite so good as in 1916. The mortality in 1921, from puerperal septicemia, was 21 and 12 per 10,000 births respectively, a little better
than the year 1916, and quite an improvement over the year 1910, and
is the most encouraging sign we have, as it is towards the stamping out
of puerperal septicemia that we must concentrate our efforts. Under
proper surgical technic puerperal septicemia should be practically abol-
ished. May the day soon come when the statement can be made that
puerperal septicemia will be as rare a complication of childbirth as
an infected wound following an aseptic abdominal operation is today.

In the year 1922 the legislature of the state of New York, recogni-
zizing the great importance of maternal mortality, passed an act
creating the Division of Maternity, Infancy and Child Hygiene in the
State Department of Health, and although this division has been
functioning only a little over a year, yet great good has come from it,
especially in collecting statistics in regard to maternal and infant
mortality, informing, not only the profession, but the public as well,
of the danger to the pregnant mother, and of some of the steps that
can be taken to improve the situation.

Study of the mortality rate in the state of New York shows wide
variations in different sections but as yet there has not been time
enough to investigate the causes and reasons why two communi-
ties of practically the same size, with the same industries, the
same competent obstetricians, and situated practically the same in
regard to health conditions, should differ so widely in their maternal
mortality rate. It will take further time and investigation to thor-
oughly ascertain the causes and apply the remedy.

Possibly the nationality of the inhabitants may have something to do
with the problem. It is very well known that women of foreign birth
are more prolific and resist infection better than the native born
woman, and therefore give a lower maternal mortality rate than in
those localities where the majority of the mothers are American born.

Another possible explanation is that in some localities the preg-
nant mother prefers the midwife, as those of German and Italian de-
scent, and the mortality rate may be increased in those localities
where they predominate, because of incompetent midwives; however,
whatever the explanation, the fact remains that statistics prove cer-
tain localities have a much higher maternal mortality than others.

Another interesting study in maternal mortality is the age of the
patient and the cause from which she died. The Monthly Vital Sta-
tistics Review, edited by the Dr. Eichel of the Department of Health
of New York, in the Bulletin for March, 1923, gives a very interesting
table on this phase of the subject. He places the maternal deaths in
two divisions,—those from puerperal septicemia, and those from other
puerperal causes. He finds that, beginning at the ages from 15 to 19
the deaths in the first division average about 20 per 10,000; it then
drops a trifle to 18 and stays there until about the age of 30, when it takes a sudden rise, and by the time the age of 49 is reached it is as high as 34.

In the other group the line for the ages 15 to 19 starts at about 24, then drops to 28, then gradually rises till at the age of 49 it reaches 110—a very high per cent. The figures for New York City are somewhat lower.

The figures which I have quoted are applicable only to observations made in the State of New York, but it is fair to assume that they hold good in about the same ratio in the other states.

In a period of about two decades many organizations, including this one, have greatly assisted Nature in the cure of many ailments at one time hidden and unknown to our older and able practitioners, and who, had they possessed our laboratory knowledge, would have done equally as good work as the surgeons and medical men of today. Notwithstanding our advances and victories, there are yet many serious manifestations of disease which require our patient investigation. Our laboratories of research, our philanthropists, even our state and national governments were never so thoroughly equipped, so willing to render assistance as at the present time. I am very much in earnest in calling your attention to this subject of maternal mortality, concerning which the general practitioner is appealing to us for aid in our outlying districts, where even midwives are seldom found, and where at certain times of the year, too often no physician can be secured to make the necessary visits required in an obstetric case. When the doctor makes the effort and reaches his patient after a perilous experience with auto, or sleigh, he has in mind other cases he ought to visit, and even contrary to his good judgment applies the long or short forceps rather early, a slight or more serious laceration occurs which Nature always resents, and which becomes the source of an infection which the system is unable to resist. If the laceration is severe the physician may make an effort at immediate repair. He is alone, too often no competent nurse at hand, he is frequently tired, and in a rather doubtful sterile condition he does his work. The building, the log house or the lumber camp, or at times mining district, is in itself a factor that lends aid to an infection. In a few days word comes to the anxious physician that Mrs. B. has had a chill, and that grandmother or a less available attendant says she has done everything she knows to do but the doctor must come at once, and now, the sympathetic physician makes one of his heroic efforts to reach his patient and after hours of struggling through rough and muddy roads, or fighting snow drifts and perhaps a far worse condition, melting snow, aided by one or more friends or faithful neighbors, he reaches the sick room. There is no chart to
give the history since he left the sick mother. He does his best to secure a history while warming himself or taking a bit of nourishment and finds, as he believes, an abscess from an infected suture disgusted at being placed in contact with tissue so unclean. Or he is positive a curettement is needed, and who can estimate the courage required now to aid the suffering one? He does the best he can under the circumstances, sometimes wins a victory, yet too often meets defeat. Is there any wonder that manufacturing interests such as the tanning of hides or leather, the cutting of lumber, have been known to offer a first-class physician and surgeon anywhere from fifteen to twenty-five thousand dollars a year to come and take charge of the employees and their families?

Another channel for relief which I believe should be adopted is the establishment of the small hospital of from ten to twenty beds, either at the village cross roads or larger mercantile centers. To this hospital could be brought, from a distance of ten to fifty miles, the patient who is about to pass through her accouchement, for the proper length of time and where she can receive the now often neglected prenatal treatment. These hospitals should be in charge of a competent graduate nurse, who is also able to make such bacteriologic examinations as may be necessary, and she should have one or two nurses to assist her.

I have talked with several of our best practitioners in these isolated rural districts, and have been much impressed with their views and approval of a medical center, with such a hospital, where they might be able to care for obstetric cases presented from the outside districts. I believe this would be an important factor in dealing with the situation.

In the New York State Journal of Medicine for August, 1923, is a symposium of papers that were presented and read at the meeting of the state society in New York City, May 23, 1923, on this subject. These papers are so complete that it is quite possible for one to make an exhaustive analysis. I believe they are worthy of being reprinted in pamphlet form, with extracts from other sources, together with the report of our committee, for general free distribution. I am quite certain that sufficient funds could be secured from some one of our educational foundations with which to meet this expense, and am inclined to believe it would be well to refer this idea to the committee of which Dr. Mosher is now chairman, and who is so thoroughly alert, and as desirous as are the other members of the committee to meet what the public, together with members of our profession, desire,—the lessening of maternal mortality.

It is not at all surprising that our Congress has seen fit to take up this subject and has passed a certain bill, which, although possessing
points of great value, has not commanded the endorsement of some of the states. This was particularly true regarding New York.

It is a source of great encouragement to us all that our Association some time ago appointed a committee to investigate this very important subject, and that they are making such excellent progress.

Taking all these factors into consideration, it would then appear that the maternal mortality rate is far too high, and that it is time for this and kindred associations to work out a solution of the problem.

28 Eagle Street.

DISCUSSION OF PAPERS OF DRs. MOSHER AND VANDER VEER

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—I would like to enter a protest against some of these statistics in regard to puerperal infection, as they are unreliable. Many cases of latent tubercular or gonorrheal infection become active after the birth of the child, and are inevitable. I make that statement because fully two-thirds of the cases of puerperal infection in our city hospital in Louisville on investigation have proved to be due to such causes, and statistics taken from the general reports of large cities include many cases of that kind and therefore create an erroneous impression. There is no doubt at all but that there is plenty of room for improved obstetrics, but obstetrics should not be charged with such improper death results.

Another thing; you cannot improve obstetrics as long as the general practitioner, who treats pneumonias, influenzas, scarlet fever, and other infectious diseases, and treats minor surgical suppurating wounds, does the majority of obstetric work in this country, with very poor pay and goes into surroundings in which asepsis is impossible. The difference in the death rate between midwives and such a general practitioner can be ascribed to the fact that the midwife does not come in contact with these infectious conditions. Until communities pay for good obstetric work and see that proper care is given the mothers, such as we now have in certain maternities, it is up to the women to provide better obstetric care for themselves.

DR. JAMES E. DAVIS, DETROIT, MICH.—Whether we believe the statistics or not, if we choose we can discount them somewhat, yet a very serious matter is before us. I have no doubt that the statistics are nearly correct. I do not think the last speaker (Dr. Speidel) has given sufficient reason for doubting these statistics. There is one point concerning which I wish to differ from him, and that is the importance of gonococcal infections. It has not been my experience that patients die very frequently from gonococcal infections. Those patients that die usually have multiple infections, streptococcal, staphylococcal, or colon contaminations with gonococcal infections, but with a single gonococcal infection I do not find there are many women who die therefrom.

I am very sure in our section of the country that the chief difficulty does not lie with the training of our young men in the undergraduate schools. The young men at the present time are exceedingly well trained. The great need today is for training of a postgraduate character, and just as soon as we remedy that part of our work I think our statistics will change. An association like this ought to be insistent in driving home such statistics as we are confronted with, and we ought to point out what are the reasons for these statistics.
Regarding the question of good obstetrics, I have in my laboratory five specimens of ruptured uteri which are distinct reflections upon men who are practising obstetrics, and I firmly believe that these accidents resulted because the men were in a great hurry. In one case the pelvis was fractured in three different places. There was no dystocia. Instruments were used too quickly and were used with too much force. Of these five ruptured uteri, one specimen showed that death was due to a tear in the cervix.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—There has been an attack made on the statistics presented, and perhaps it might be of interest in this connection to speak of some investigations that I made and were reported before the last meeting of the American Medical Association. These were obtained through the courtesy of the New York Lying-In Hospital, the Boston Lying-In, the Johns Hopkins Out-Patient Service, and our own clinic, and also through the courtesy of Dr. Nicholson, of Philadelphia. These statistics, I understand, were entirely reliable. In Philadelphia where midwives are under strict medical control there was one death in 904 cases. In the joint statistics of the New York Lying-In, the Boston Lying-In, the Johns Hopkins University and our own clinic, where the out-patient service is attended to by students under supervision, there was one death in 791 cases. Compare this with what happens in the City of New York, where there was one death in 174 cases, and you get exactly what is back of it. Our students are well prepared; their work is supervised, and the midwives whose work is supervised get good results, but the moment the general practitioner gets loose, his work is not supervised, and then there is trouble.

DR. ASA B. DAVIS, NEW YORK CITY.—If we give credence to statistics from fairly reliable sources we find that, next to tuberculosis, childbirth causes the greatest number of deaths in this country; that for the eighteen nations in which statistics of reasonable accuracy are available, this country ranks third from the worst on this list in the matter of maternal mortality caused by childbirth. This is a very dark picture for America. It is time something should be done about it. Something is being done—but we are moving too slowly, and much more should be done. The cause of tuberculosis is known. It is arrested, cured, or prevented in many cases. Nobody now doubts that, with enough public cooperation, education, money and work, it is possible to stamp out this disease. The cause of cancer, the third most fatal disease, is not known. Many of the best intellects and workers in the world, with the best known equipment and unlimited means, are urgently searching for this cause. Until it is found we cannot expect great progress in bringing this dreadful malady under control. It is largely a disease of middle or later life. Childbirth occurs in young and middle life. About ninety per cent of pregnancies, labors, and recoveries are nearly uneventful and without danger. The causes of danger, complications and death from this condition are known. There are dangers during pregnancy, but comparatively few women die during this stage of the process of reproduction. The majority of deaths occur in young healthy women, due to surgical uncleanliness on the part of the accoucheur or poor and untrained obstetric judgment as to the manner of delivery. Because of the comparative youth, and the need for the mother in the home with young children, the economic loss is far greater than from an equal number of deaths from cancer. The picture is not as dark as it has been. Vast improvement in obstetric results have taken place during the past thirty years. Education is going on in the case of both obstetric practitioners and the public. It is important in both. Now there are islands, as it were, which show excellent results as regards mother and child. These islands should be extended, expanded and coalesce until they cover our whole country, by a method of obstetric practice which has been success-
ful in the hands of some private physicians, and in the better maternity services. We need more specialization in obstetrics. Those who practice this branch of medicine should give it enough time and attention to do it well, or they should leave it alone. The adverse surroundings, lack of aid and suitable equipment found in private practice, is often given as an excuse for bad results. In Brooklyn, in New York, and, I doubt not in other cities the out-patient departments of maternity services are conducted under supervision, with little assistance, in surroundings so bad that none worse can be found, and yet with results, as to complications, morbidity, and mortality, so good, that they rival those of the best equipped maternity hospitals. In effect this sort of maternity work in the tenements is private practice under the most adverse conditions. If such results can be obtained by some private physicians and hospitals, this should be required from all. If I speak of the Lying-in Hospital, I mention it as a type and because I know its workings. Not long since, we completed four and a half years showing over ten thousand deliveries without a maternal death, in the tenements. During that time, however, of the cases who could be given better care by sending them from the Outdoor Department to the hospital twenty died. The Lying-in Hospital is not unique in this respect. Such results can be obtained in private homes, in the tenements, in the slums, in country districts, and in hospitals, if those who practice obstetrics will make use of the training which is available today, use surgical principles, not do too much, and yet interfere quickly when it is necessary. Then we will have better obstetric results. Another thing; we may rest assured that rapid progress will not come until the people themselves awaken to the situation and demand better results and cooperate in efforts to obtain them. Hospital populations are becoming well educated, they are willing and eager to follow instructions, to present themselves at regular intervals during pregnancy for observation, examination, and advice. In the Lying-in Hospital service, which delivers annually something over five thousand women, eclampsia was formerly a very common and much dreaded condition. Now we do not have enough cases of the eclamptic stage toxemia to provide our interne staff, pupils, and nurses, with an adequate idea of what eclampsia can do. This change has occurred within a few years. Eclampsia is treated before it occurs. It is but a stage in toxemia. If symptoms of toxemia begin to develop they are detected early, and treatment is begun right away, as though eclampsia were imminent. Bad as the situation undoubtedly is at present, improvement is coming much faster than we may realize. We have but to look back a generation and note the obstetric conditions and practices of that time. There were very few maternity departments and hospitals then. Training schools for nurses found difficulty in securing the required obstetric training for their pupils. We had only to select the training schools and indicate the number of pupil nurses we could utilize. It is far different now. Inconvenient as it sometimes is to feel the shortage of pupil nurses in this work, in a large sense it is well, because there are more places in which obstetric training is given. General hospitals are adding extensive maternity departments. Large maternity hospitals are springing up all over the country. In towns it was rare to find a hospital of any kind; now many of the small communities have some kind of a hospital, some of which are modern and well equipped. In practically all of them provision is made for the care of obstetric cases. Hospitals of themselves do not make competent obstetricians, but it means that more doctors and nurses—some of whom will later practice obstetrics—are given training in this branch of medicine, in hospitals large and small. At the Lying-in Hospital, our interne staff members serve for four months. It is about as long as they can endure the intensive training in simple and complicated obstetrics. We consider these men our most satisfactory postgraduate pupils.
DR. JOHN W. POUCHER, POUGHKEEPSIE, N. Y.—We have heard in the discussion of these papers about the statistics of puerperal mortality, these statistics being more favorable concerning cases in the large cities. I want to say a word or two for the rural districts. In the large cities we have the advantages of modern education of both medical students and attendants. We have efficient outdoor departments and up-to-date maternity hospitals. We have efficient doctors and health settlement workers. There is everything being done to educate not only the doctors and nurses but the people themselves. The rural districts, according to the statistics quoted this morning, are worse off than the large cities. I am speaking now of the rural parts of the country itself. For thirty-five years I have been doing consulting work through a section of New York state and during that time have run across a great many of these cases, and I think I can tell you something regarding the reasons for their frequent occurrence. In the days when I was a medical student our only obstetric work was a little manipulation with the manikin and a few didactic lectures. The only delivery I saw in my student days was when my old preceptor in the Berkshires went to sleep one night and refused to be awakened, and I was obliged to officiate at the delivery. He told me afterward, that was his object in going to sleep. I went through college and then out into the country where I practiced for two years and during that time I did considerable obstetric work. I do not remember having a fatality occur during that time, but that was more good luck than good management.

We are confronted in the country by two or three unfavorable conditions, one of which is the growing scarcity of practitioners. None of the young doctors who are educated today are going into the country to practice. There is no criticism about that if they can do better in the larger cities. We are depending upon the doctors who are educated as I was in my day, and who received a very meager education on this subject. Some of them have progressed rapidly since that time. There are men you can teach, and there are men you cannot teach. Some of these I would just as soon trust in a case of labor as any one I know. I would do cesarean section or any operation upon their patients who had been days in labor, and I have done it when they have made an attempt with forceps and failed, with universal success.

There are two things about technic, the preparation of the patient as well as the preparation of the doctor. All your rubber gloves, all your preparation will not avail you anything if you have a filthy, dirty patient to work with, and that is part of the conditions that we have to meet, especially in country practice.

There are in every section of the country medical men who have not progressed with the times, men whom you cannot reach with your literature. The medical society does not help them because they do not attend meetings, and it is from these men the consultant usually gets his cases, usually too late to do anything for them. We must direct our efforts toward education of the patient, if we want to reach these people. When prenatal clinics or the district nurse reaches the rural sections as they have the large cities, we shall have the same good results, and not before.

DR. O. M. GRUHZIT, DETROIT, MICH.—There are three main factors to be considered: the patient's economic condition, her intelligence and the medical care and skill available to her.

A patient with limited means in many cases cannot afford the same medical service as her wealthier sister. The call for physician is delayed at many times to the last minute to curtail the expense even in the face of somewhat alarming symptoms. In many communities the lying-in hospitals associated with civic administration do not fulfill their mission as many women hesitate to take advantage of them because of their false pride and fear. The degree of intelligence of a patient con-
cerning the puerperium to a large extent increases or decreases the dangers of infections, likewise the failure to observe hygienic methods coupled with ignorance as to the grave consequence from undue exposure to contamination.

To reduce the death rate among the childbearing women in this country from a high level of 20,000 per year, the economic condition will need improvement in many instances.

There is a fertile field for extensive education among a large class of pregnant women along the lines of personal hygiene.

DR. BURNLEY LANKFORD, NORFOLK, VA.—The men at fault at the present time are those who are not interested in obstetrics, but who think they have to do it to keep their family practices. If societies of this type and the various medical societies throughout the country would organize obstetric sections, and get those men who have to do obstetrics interested, and get them willing to take some time every few years for postgraduate instruction, much can be accomplished. If this body would enlarge its membership as much as possible, I think the day will be hastened when more people will put their trust in the doctor than in the midwife. I think this Association and kindred associations should propagate the value of rectal examinations. Of course, that is an old subject and more or less hackneyed. Men of this society do not fear vaginal examination as they know how to make it, and their patients do not need frequent vaginal examinations. It is surprising to know with what carelessness the average practitioner of forty-five and fifty years of age does vaginal examinations. I believe that is one of the chief reasons we have so much sepsis. If these practitioners can be trained to make rectal examinations and learn that in the average case they can make a complete diagnosis through the rectal touch and not make half a dozen vaginal examinations during labor, much good, in the aggregate, will result.
ANATOMICAL AND CLINICAL STUDIES UPON 875 PLACENTAE

(From the Department of Pathology, Detroit College of Medicine and Surgery.)

This study is a preliminary endeavor to ascertain data pertaining to maternal and fetal morbidity and mortality through routine and special methods for the examination of the placenta and umbilical cord; also by clinical controls to further accurate estimation of the significance in the histopathologic changes obtaining beyond the normal for a matured decidual organ.

Statistical estimates have assigned for United States a maternal mortality rate second highest of a large number of countries. Students of public welfare point to the fact that there has not been any noticeable decrease in this mortality for twenty-five years. In many cities, according to Levy, the percentages vary from 5.6 to 11.9 per 1000 births (1 in 178 to 1 in 84). The neonatal mortality has ranged from 23 per 1000 (1 in 43) to 49 per 1000 (1 in 20). The combined loss for mother and child in the first month reaches the appalling figure of 61 per thousand (1 in 17). It would seem urgent that all possible means from clinical and laboratory sources should be utilized and combined to further economy here in human lives.

COMPARATIVE ANATOMY

A review of the literature impresses the need of better dissemination of the knowledge concerning the evolution of the placenta if certain erroneous conclusions in clinical studies are to be avoided. The comparative anatomy of the placenta contributes well to the history of its evolution and to a clearer understanding of its physiology and pathology. In the lower forms of animals belonging to the phylum chordata, placental development is not the rule, for nutrition of the embryo is provided for by the elaborate development of the yolk sac. The genesis of placental formation, however, is established in some species by a vascular union between mother and offspring, but complete evolution is not observed until the Class Mammalia is reached; here the yolk sac becomes rudimentary and the highly specialized placenta is developed.

In the Salpa, one of the tunicates, the young are nourished in the maternal oviduct by interchange of maternal materials through a rather close union between fetal and maternal vascular systems (umbilical or omphalic placentation). This illustrates placentation in its
JAMES E. DAVIS, B. V. KELLOG, AND ARTHUR L. AMOLSC

most primitive form. Other examples are found in certain viviparous sharks, certain amphibia, alpine salamander, viviparous blennies, teleostean fishes, etc. In Seps Chaleides, one of the viviparous lizards, both allantoic and omphal connections formed and coexisting for some time in certain species.

In the aplacenta are included the monotremes and most marsupials. The ova of these forms have a large amount of yolk and there is intimate connection between the walls of the yolk sac and the uterine mucosa. There are then both umbilical and omphal placenta existing in this class.

In the placentalia most of the lower forms have the allantois much more highly developed than has man. The most primitive form of placenta has villi formed over the entire surface of the chorion—(diffuse type). This is seen in the pangolian, pig, hippopotamus, camel, chevrotian, horse, rhinoceros, tapir and whale.

Huxley divided the placentalian mammals into two primary subdivisions, named deciduata and the nondeciduata. In the first or deciduata, the uterine mucosa undergoes rapid evolution and modifications to form decidual tissue and the maternal and fetal parts become united. (Figs. 1 and 2.) In the nondeciduate forms the uterine mucosa does not undergo this evolution and consequently the union of fetal and maternal structures is less intimate. With a few animals classification is upset. This is true of the Sirenia, dugong, in which a nondeciduate zonary type of placenta exists. Birth does not release any of the maternal tissue, and in addition part of the fetal tissue is left in the uterus to be absorbed. The placenta of the mole is not shed at birth but becomes gradually absorbed by the mother. This type of placenta has been called contradeciduate. (Fig. 3 illustrates retained human placenta and disproportionate growth of the fetus, umbilical cord and placenta.) In the nondeciduate group of Ungulata such as the pig, the uterine epithelium undergoes an early degeneration but reappears in a short time, being formed of high columnar cells to which the trophoblast is closely applied. The trophoblast develops protoplasmic processes between the cells of the surface epithelium of the uterus which may reach the underlying capillaries and therefrom obtain nutrition. The trophoblast, which is at first single-layered,
after three weeks forms a syncytium. The trophoblast is vascularized through its mesothelium from the allantois which completely surrounds the embryo. There is no development of villi because the approximation surface has been increased through undulations or ridges upon the uterine mucosa, and into these the corresponding foldings of the

Fig. 1.—Sagittal section of uterus and placenta exhibiting fetus, (145 mm.) cord and placenta in situ at 4 months.

fetal saes are approximated. The uterine mucosa remains intact throughout pregnancy and probably continues an active secretion. The glandular orifices cover the domes of the trophoblasts and thereby transmit their secretion which is in turn carried by the allantoic vessels to the embryo.

In the mare, as in the pig, the blastodermic vesicle is attached to the
uterine mucosa by the trophoblast, but the ridges of the mucosa are very delicate and are nearly parallel, and villi are formed in the allantoic region to fit into crypts which are probably lined with maternal epithelium, for between the fetal and maternal tissues in the crypt is a space filled with secretion.

Fig. 2.—Uterus, placenta, cord, fetus and bisected myoma. Note decidua dissected free down to the cervix.

Fig. 3.—Placenta, amniotic sac and undeveloped fetus at ten months.

The placentae of the cow and sheep are similar in appearance, both being polycotyledonary in type. These cotyledons have prominences or localized proliferations of the trophoblast. The uterus is especially adapted to this type of placenta through a development of correspond-
ing prominences which project as little knobs from interglandular positions into the lumen of the uterus, being known as maternal cotyledons. The subepithelial tissues are highly vascularized and during the evolution of pregnancy deep folds or crypts are formed, giving a sponge-like appearance. Into these crypts the chorionic villi with their cores of mesoblast supplied by branched allantoic vessels extend. The intercotyledonary trophoblast is avillous in both sheep and cow.

The placenta in deciduates has three types of attachment between fetus and mother: (1) centric, in which the blastocyst rests in the cavity of the uterus and when large enough is in contact with the entire uterine surface; (2) excentric, (Figs. 4, 10) in which the blastocyst remains small and lodges in a furrow of the uterine mucosa and later forms a decidua reflexa; (3) interstitial, in which the small blastocyst attacks the mucosa at one point, and reaches the connective tissue. In this form, also, a decidua reflexa is formed. Near the attachment of the trophoblast the mucosa degenerates but the con-

Fig. 4.—Corrosion preparation of placenta showing marginal type of umbilical cord attachment. Note basket forms of assembled vessel radicles.
nective tissue cells enlarge to form decidual cells before degeneration begins. The maternal capillaries dilate and come into close contact with the trophoblast. The mucosa and fetal tissues intermesh so intimately that separation injures the tissue.

The carnivora have a zonal type of deciduate placenta. The blastocyst is covered early by a thick prochorion which delays adhesions for some time but later this layer is absorbed by the trophoblast. By the time this absorption process is completed the fetal ectoderm has proliferated over a broad zone of the ovum to form villosities which attack the surface of the uterine mucosa and obtain attachment to it. Vascular processes from the allantois grow into the center of the trophoblastic villi. The rudimentary placenta is first discoid, then zonary at completion. After destruction of the uterine epithelium, the villi penetrate into the deeper mucosa by gradually absorbing the early formed trophoblastic syncytium and then branch to form secondary and tertiary divisions. The trophoblast on the sides of the villi becomes syncytial but the villous tips retain their cellular character.

In the elephant (Proboscidea) the allantois is large and vesicular and short villi are developed over a large area of the blastodermic vesicle. These villi are lodged in preexisting depressions in the uterine wall. The trophoblast is inactive and does not attack the maternal tissues. In a zonary area, however, longer villi develop and penetrate deeply into the maternal tissues, forming a mass of meshed tissues, and through these meshes maternal blood circulates through the maternal vessels. When the placenta is separated, villi are left in situ for absorption by the maternal tissues.

In rodentia the placental attachment has numerous variations, for in the rabbit it is centric, in the mouse and rat excentric, and in the guinea pig interstitial. The ultimate form of placenta in these types is discoid.

In primates—monkeys, apes and man—the placenta is essentially the same, except for differences in size and form of villi and the structure of the decidua. The primates are distinguished from all other placental mammals in that they do not form an allantoic placenta. The placenta of the monkey, as in man, is discoid.

**SPECIMENS STUDIED**

The materials necessary to carry on this investigation were generously placed at our command by the Detroit College of Medicine and Surgery, Providence, Herman Kiefer, Woman's and St. Mary's Hospitals of Detroit. It was found convenient and practical to divide this material into three groups: one, for miscellaneous trials and observations; here 200 placentae of various ages, conditions of preservation, pathology, types, attachment, detachment, etc., were utilized.
The second series, numbering 175, was studied by using three procedures: first, the venous and arterial circuits of the organ were freed from blood by means of water under ordinary hydrant pressure connected with the placental vessels, first in the vein, then with each of the arteries, then aided by propelling massage with the hand. The second endeavor aimed to inject the venous and arterial divisions of the placental circuit with contrast dyes suspended in a medium solidifying at room temperature, or by a suspension of barium after which x-ray pictures were taken to delineate the vessels and demarkate places of obstruction to complete dissemination of the injected opaque material. The third procedure was to make use of a corrosion fluid after the blood circuit had been filled by a dye preparation insoluble to the corrosive action.

The third division of placentae, 500 in number, was studied microscopically, grossly and clinically by utilization of any or all special procedures deemed applicable.

**TECHNIC**

In the injection work difficulties were encountered because the placenta, when detached, had no longer a closed blood circuit and because it had always been subjected to more or less traumatism and its decidual nature provided irregular degenerative changes. Further it was observed that the almost constant practice of aiding placental expulsion by the Crede manipulation added markedly to the circuit blocking. After trials with warm normal salt solution at 40° C. under gas pressure of 150 to 175 mm. of mercury for washing the placenta outside and also within its blood vessels, it was found that better results were obtained with tap water at 40° C. without additional pressure to that supplied by the city pumping station. The flow of washing fluid could be kept going as long as desired and when combined with propelling massage proved quite satisfactory. The result of this simple procedure gave a pale, bleached-out appearance to the organ, excepting in the areas of tissue change and circuit blocking. These areas were sharply contrasted in pink or red from the straw color of the parts which washed free of blood.

An ideal preparation of the placenta for its gross examination can be made if the washing is done as above suggested, followed by fixation in 10 per cent formalin for a few days. Then thin sections can be easily made with a long knife and, if desired, selected areas for microscopic study are taken—thereby a very satisfactory complete examination is finished—providing valuable data applicable to both mother and child.

The following factors were found to hinder or make impossible complete washings:
1. Failure to begin washing immediately after delivery.
2. Marked spiral winding of the cord vessels or true and false knots.
3. Inability to quickly overcome the vessel wall contractions.
4. Lacerations of the maternal surface.
5. Degenerative and edematous changes in the vessel walls and placenta.
6. Recent and old infarctions prevent washing of the respective involved areas.

The technic for washing may be outlined as follows: The cord is cut six inches from the placenta and placed in potassium oxalate solution to retard clotting on the maternal surface. The washing is commenced within five minutes after delivery, using warmed tap water to 40° C. at hydrant pressure, connecting first with the vein, then each artery as soon as possible to get rid of the greater mass of blood. The blood in the larger vessels is expressed by pressure of the hand upon the cord vessels.

The walls of the placental vessels do not have a high degree of irritability and are easily distended, but the arteries of the cord have very irritable muscle tissue which usually shows marked contraction changes, and dilatation is consequently often slow. If clotting is to be prevented and thorough washing accomplished, the tendency to contraction must be quickly overcome. Advancing pressure with the fingers as the water enters the vessels will hasten dilatation. The use of potassium ferrocyanide as an aid to dilation is of little value. The completely washed normal placenta is colorless or a pale straw color throughout.

The injection masses used consist of a water suspension of barium sulphate 100 gm. to 500 e.e. or barium sulphate in colored gelatin in the same proportions. (Figs. 10, 11.) The colored celloidin is prepared with acetone 100 e.e., celloidin 2 gm., camphor 8 gm. Alkanin and crystal violet-brilliant green are used as coloring materials. The barium requires a pressure of 175 to 200 mm. of mercury. Colored gelatin masses required 150 to 175 mm. Celloidin masses require 250 to 300 mm.

Corrosion is accomplished with 75 per cent HCl in from 12 to 20 hours. Hardening is done with neutral formaldehyde solution and by graded increasing concentrations of alcohol. Clearing is completed in oil of wintergreen. (Fig. 4.)

VALUE OF THE PREPARATION

The preparations obtainable are distinctly valuable in setting forth the more interesting anatomic features of the placenta and also in demarkating many pathologic changes in the gross specimens. (Figs. 12, 13.) Persistent obstructions within the venous and arterial blood
beds are definitely visualized. Abnormal arborizations are plainly defined. The amount of functioning placental parenchyma is quite accurately shown. (Fig. 13.) The bursting pressure or canalization wall resistance can be relatively standardized.

The two arteries and one vein with the arteries usually coursing in a spiral manner about the cord to the point of insertion where there occurs an anastomosis between the two, is clearly shown. The cord arteries are distinctly thick-walled and of relatively small diameter; the musculature retains a high degree of irritability for several hours after placental separation. The vein of the cord is thin-walled and of large caliber, the musculature of the wall being thin and lacking in muscle irritability.

The arteries, after the first anastomosis (which may occur in the cord but is usually at the level with its insertion) divide dichotomously into radiating series of vessels, at first three or four large branches, situated immediately beneath the amnion (radiating basal arteries), (Fig. 5) and pursue a sinuous course to points not closer than 2 cm. from the placental margin where they turn abruptly into the placenta as perforating arteries and there divide into a large number of capillaries, forming an intricate "whirl," having the ap-
pearance of a tuft of hair (Figs. 4, 6, 7). These tufts, which form the
basic supply of each cotyledon provide a large number of fine capil-
laries which penetrate the branching villous tree of which the mater-
nal surface of the cotyledon is constructed. The arteries are more
superficial than the veins and appear somewhat like the spokes of a
wheel extending in a tortuous and undulating course similar to that
observed in the umbilical cord (Fig. 7). Certain basal arteries form

Fig. 6.—Barium injection showing walking stick marginal vessel forms and distinct
basket arrangement of cotyledon vessels.

a bent handle-like convexity which show plainly at the margin of the
placenta bounding the chorion frondosic zone (Fig. 6). The accom-
panying veins show a similarly constructed and arranged division of
tributaries which follow the arteries, only a few millimeters apart.
The basal veins are larger and deeper than basal arteries. At the
placental margin they form a series of festoons (Fig. 7).

It is our impression that there is an anastomosis between the arteri-
oles and venules of the cotyledal tuft before the villi are reached,
since a return flow of color injection masses is seen in the venous sys-
tem before the villous vessels show injection.

The vascular tuft in each cotyledon is separate and distinct from
the neighboring tufts since injection of barium sulphate into the
perforating arteries does not produce injection of the vessels of cotyle-
dons supplied by neighboring radiating arteries. When the umbilical cord has the excentric type of insertion, one artery is larger than the other and usually divides into two branches of large size distributing to the larger part of the placenta, but the second artery which is smaller than the first has very small branches that distribute to the smaller zone. If the cord insertion is marginal a crow's foot divergence of vessels is seen upon the fetal surface (Fig. 4). In the

velamentous type of cord insertion the vessels course very directly through the velamentous portion to the fetal surface of the placenta.

**TYPES OF PLACENTAE**

In placentae with centrally inserted cords each artery supplies approximately half of the placenta (Fig. 7).

In placentae with ecentrically inserted cords one artery usually supplies two-thirds to three-fourths of the placenta, while the other artery supplies the remainder (Figs. 4, 5).

In placentae with marginal insertion and those with velamentous insertion, the distribution may be approximately equal or one artery may supply but a small area (Figs. 4, 5).
In twin placentae of uni-oval type there is a direct anastomosis on the fetal surface between the arteries of both cords but no evident anastomosis between individual cotyledons (Fig. 5).

In twin placentae of bi-oval type there is no anastomosis between the vessels on the fetal surface nor between adjacent cotyledons along the line of placental union (Fig. 8).

The types of placental vascular distribution are revealed by maceration preparations of the small, thick types of placentae which show closely assembled and densely matted arrangement of cotyledal "whirls" without distinct lines of demarkation (Fig. 9). The large, flat placentae, and especially the placenta membranacea, exhibit cotyle-

![Image](image_url)

**Fig. 8.—Bioval twin placenta. Normal pregnancy. Barium sulphate injection of one placenta to demonstrate the absence of anastomosis.**

dal vascular tufts which are distinctly isolated from one another by wide spaces. The areas with atrophied cotyledons are represented only by larger veins and arteries without the whirl of capillaries. The two types show a relatively equal capacity.

In the canine type of placenta there are multiple and isolated organs arranged in paired annular flat discs which divide the bicornate uterus into a series of compartments, each occupied by two fetuses in separate sacs and of opposite polarity. Each placenta exhibits a cylindrical maternal attachment surface about 1.5 cm. wide. It is united to its neighbor by the truncated end so that each pair of pups with placentae constitutes a nutritive unit. The umbilical cords are very short and are inserted in a velamentous fashion, there being two
large veins and two arteries transversing the velamentous tissue. Each pair of placentae is attached to the decidua where the larger uterine segmental arteries have their distribution.

Fig. 9.—Barium injection of arteries and veins of syphilitic placenta.

Fig. 10.—Succenturile type of placenta. Barium sulphate injection, moderate excentric cord attachment.
Fig. 11.—Bloval twin placenta with complete barium sulphate injection. Note basket arrangement of cotyledon blood supply.

Fig. 12.—Placenta from a case of eclampsia, demonstrating cotyledons which are totally or in part infarcted. Barium sulphate injection.
The simple preparation of the placenta by washing and formaldehyde fixation could be easily done by a nurse in a short space of time and is of practical clinical value as is also the simple opaque mass injection for x-ray records. The gelatin and eeloidin colored mass injection followed by corrosion requires careful and patient technic but is of marked value for teaching purposes (Fig. 4).

GROSS EXAMINATION

The gross examination of unwashed placentae has not been satisfactory. When the cord has been ligated promptly after birth the weight is increased and the general appearance suggests congestion. The degenerative decidual changes are quite variable. Not infre-

Fig. 13.—Placenta of interstitial nephritis. Note the extensive atrophy of placental parenchyma and outline of preserved atrophic vessels.

quently a placenta at six months may be as extensively degenerated as another at nine months. Fusion of cotyledons should be discriminat-
ingly judged as to its pathologic significance. A thin maternal surface fusing is of no significance, except to indicate rapid ageing and rapid calcification, but firm lateral cleavages with contraction, atrophy and contiguous blood vessel changes are significant. Degenerative changes in the amnion are commonly recognized by a loss of flexibility which imparts a parchment-like character to the membrane. Adhesions of the amnion are quite certainly indicative of inflammatory changes. Pigmentation of the membrane, particularly when of a muddy green-
ish character, is usually indicative of infection. Calcification may signify previous hemorrhage, infection, rapid ageing, or a combination of all of these conditions. Necrotic areas may be interpreted as a result of infarction, infection, or as a feature in ageing changes (Plate A). Infarction changes are the most frequent of all lesions in the placenta and are to be regarded as both physiologic and pathologic. Their size, age, position and duration are of importance. When situated centrally and disturbing a large area of blood supply the result is disastrous to the fetus (Plate B, Fig. 14). Cysts are not of great

Plate A.—Section of fetal and maternal placenta. 1, Zone of chorionic villi; 2, zone of chorionic membrane; 3, zone showing decidual reaction of myometrium; 4, area of necrosis; 5, attached fibrin mass within decidual space.

significance unless quite large. They usually form in the areas of infarction or hemorrhage (Fig. 14, Plate A). Cystic degeneration of the chorionic villi distributed quite uniformly over the branches of the chorionic stems is to be recognized as a choriomatous tumor mass (chorioepithelioma benignum).

The third and largest group of placentae was used for a combined
ANATOMICAL AND CLINICAL STUDIES ON 875 PLACENTAE

clinical, gross and microscopic study and features of interest for each have been arranged in Tables I, II and III. (See page 55.)

ANALYSIS OF TABLES

Table I has been assembled from the records of 424 cases with available histories, while the gross and microscopic tables include the placentae from the foregoing group with 76 additional cases, making a total consecutive number of 500. In the clinical table it is shown that 19.60 per cent of the cases gave no evidence of general pathology while in the hospital for confinement, nor had they any record of abortions, miscarriages, stillbirths, neonatal deaths or previous puerperal pathology. The entire group of 500 cases was material from Providence Hospital where the patients were mostly of the self-supporting, intelligent urban type. A small number, however, were young illegitimate primiparas. Yet, judged by rigid microscopic

Plate B.—Blood stasis in enlarged decidual spaces. Clotting and infarction may follow.
standards, 33.6 per cent of the group of 500 gave evidence of reaction to infection in the placenta amnion or umbilical cord. Only 1.2 per

Fig. 14.—A large placental hemorrhage exactly simulating the more frequently observed small hemorrhages which are often mistaken for red infarctions.

Fig. 15.—Apparatus used for injecting placenta.

cent of these gave histologic or serologic evidence of syphilitic infection.

The gross appearances of the cord and placenta gave conclusive
### Table I
**Clinical Data—424 Cases**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>19.60%</td>
</tr>
<tr>
<td>Abnormal</td>
<td>80.40%</td>
</tr>
<tr>
<td>Carious teeth</td>
<td>37.02%</td>
</tr>
<tr>
<td>Antrum infection</td>
<td>0.235%</td>
</tr>
<tr>
<td>Puerperal sepsis</td>
<td>2.12%</td>
</tr>
<tr>
<td>Luetic infection (positive Wassermann)</td>
<td>0.40%</td>
</tr>
<tr>
<td>Lung infection (during pregnancy)</td>
<td>4.95%</td>
</tr>
<tr>
<td>Ophthalmia (baby)</td>
<td>1.65%</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>0.97%</td>
</tr>
<tr>
<td>Eclampsia</td>
<td>1.18%</td>
</tr>
<tr>
<td>Albuminuria</td>
<td>28.25%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>36.55%</td>
</tr>
<tr>
<td>Edema</td>
<td>34.67%</td>
</tr>
<tr>
<td>Thyroid hypertrophy</td>
<td>16.27%</td>
</tr>
<tr>
<td>Placenta previa</td>
<td>1.18%</td>
</tr>
<tr>
<td>Abortions (Previous Abortions 10.8%)</td>
<td>1.18%</td>
</tr>
<tr>
<td>Premature childbirth (previous premature labor 2.59)</td>
<td>16.5%</td>
</tr>
<tr>
<td>Stillbirths</td>
<td>5.66%</td>
</tr>
<tr>
<td>Puerperal insanity</td>
<td>0.47%</td>
</tr>
<tr>
<td>Mortality of mothers (during puerperium)</td>
<td>0.707%</td>
</tr>
<tr>
<td>Morbidity of infants</td>
<td>35.61%</td>
</tr>
<tr>
<td>Mortality of infants during puerperium</td>
<td>4.00%</td>
</tr>
<tr>
<td>Nephritis</td>
<td>1.65%</td>
</tr>
<tr>
<td>Pyelitis</td>
<td>0.47%</td>
</tr>
</tbody>
</table>

### Table II
**Gross Pathology—500 Cases**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>79.6%</td>
</tr>
<tr>
<td>Infarction—white</td>
<td>72.4%</td>
</tr>
<tr>
<td>Abnormal</td>
<td>20.4%</td>
</tr>
<tr>
<td>Infarction—undifferentiated</td>
<td>2.6%</td>
</tr>
<tr>
<td>Greenish discoloration of membranes</td>
<td>2.6%</td>
</tr>
<tr>
<td>Amnion-Adherent</td>
<td>1.0%</td>
</tr>
<tr>
<td>Edema</td>
<td>1.6%</td>
</tr>
<tr>
<td>Calcification apparently excessive</td>
<td>10.8%</td>
</tr>
<tr>
<td>Cotyledons fused (Fig. 9.)</td>
<td>10.2%</td>
</tr>
<tr>
<td>Adherent blood clots, large size (Fig. 14)</td>
<td>7.0%</td>
</tr>
<tr>
<td>Cysts (Total number 24, 4 mm. to 6 x 4 cm. in size)</td>
<td>2.8%</td>
</tr>
<tr>
<td>Battledore type placenta</td>
<td>15.4%</td>
</tr>
<tr>
<td>Succenturiata placenta (Fig. 10)</td>
<td>1.2%</td>
</tr>
<tr>
<td>Placenta previa</td>
<td>1.0%</td>
</tr>
<tr>
<td>Excessive laceration of placenta</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

### Table III
**Microscopic Pathology—500 Cases**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>58.40%</td>
</tr>
<tr>
<td>Abnormal</td>
<td>41.60%</td>
</tr>
<tr>
<td>Infection (including deciduitis, and omphalitis) (Fig. 2)</td>
<td>32.00%</td>
</tr>
<tr>
<td>Lues (6 cases or 1.2% histologically characteristic) (Fig. 9)</td>
<td>1.6%</td>
</tr>
<tr>
<td>Blood vessel changes (extreme) (Fig. 13)</td>
<td>0.4%</td>
</tr>
<tr>
<td>Edema (marked)</td>
<td>3.6%</td>
</tr>
<tr>
<td>Congestion (extreme)</td>
<td>0.8%</td>
</tr>
<tr>
<td>Degeneration (marked)</td>
<td>4.2%</td>
</tr>
<tr>
<td>Fibrosis (excessive)</td>
<td>0.6%</td>
</tr>
<tr>
<td>Calcification (excessive)</td>
<td>2.4%</td>
</tr>
<tr>
<td>Hyalinization (excessive)</td>
<td>3.8%</td>
</tr>
<tr>
<td>Atrophic and ageing changes (marked) (Fig. 13)</td>
<td>1.0%</td>
</tr>
<tr>
<td>Necrosis (marked)</td>
<td>2.8%</td>
</tr>
<tr>
<td>Infarction, excessive, white (Fig. 12)</td>
<td>12.0%</td>
</tr>
</tbody>
</table>
evidence of abnormalities in but 20.4 per cent of the 500 specimens. White infarction was observed in 72.4 per cent, but when checked with microscopic and arbitrary criteria for normality, it was found that only 12 per cent showed this condition present to an excessive degree (Fig. 12). Edema of cord and placenta in most instances should be interpreted as only one sign indicative of syphilis. This holds true in certain cases where the Wassermann reaction is negative and the histopathologic changes are not confirmative. There are examples of hereditary maternal lues and also of salvarsan treated mothers that are at times exceedingly difficult to diagnose. The diagnostic criteria for the recognition of spirochetal infection by the placenta when the cases are vigorously treated are unsatisfactory, excepting as one succeeds in finding the organism. The gross appearance of placental pathology is suggestive (Fig. 15) and when considered with the clinical history and followed by a microscopic examination diagnosis can be satisfactorily made. Deformity, discolorization, laceration, premature maturation, irregular density, fibrosis, excessive calcification, hemorrhage, and localized tissue increase or decrease are guides for the gross diagnosis.

In Table I, it is shown that albuminuria was observed in 28.25 per cent and hypertension in 36.55 per cent of the cases. The mothers who had had previous abortions and previous premature labors constituted 17.68 per cent. The combined morbidity and mortality of infants was 39.61 per cent, mortality during the puerperium being 4 per cent. In Table III, the total percentage of infection is 33.6 per cent, which at first thought appears unreasonably high, but it will be observed that this corresponds quite closely with the clinical data indicative of pathology.

A careful standardization of the microscopic pathology in the placentae has not yet been made. A painstaking study of thousands of specimens would be required to safely guard against misinterpretations.

From this series a comparison of changes obtaining in cases of positive syphilis, interstitial nephritis and nephritic toxemias will exhibit that certain data obtained have only relative diagnostic values.

<table>
<thead>
<tr>
<th>Obliteration of blood vessels</th>
<th>Syphilis</th>
<th>6</th>
<th>(3 very marked)</th>
<th>6 cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interstitial nephritis</td>
<td>1</td>
<td>(not marked)</td>
<td>3 cases</td>
</tr>
<tr>
<td></td>
<td>Nephritic toxemia</td>
<td>2</td>
<td>(not marked)</td>
<td>2 cases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endarteritis</th>
<th>Syphilis</th>
<th>4</th>
<th>6 cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interstitial nephritis</td>
<td>0</td>
<td>0 cases</td>
</tr>
<tr>
<td></td>
<td>Nephritic toxemia</td>
<td>0</td>
<td>0 cases</td>
</tr>
</tbody>
</table>
Edema
Syphilis 4 6 cases
Interstitial nephritis 0 0 cases
Nephritie toxemia 0 0 cases

Close assembling of villi
Syphilis 4 6 cases
Interstitial nephritis 1 0 cases
Nephritic toxemia 1 0 cases

Increased cellularity
Syphilis 5 6 cases
Interstitial nephritis 3 0 cases
Nephritic toxemia 0 0 cases

Inflammatory changes
(Chorionitis (3) Deciduitis
(3) omphalmitis, fibrosis (3))
Syphilis 3 6 cases
Interstitial nephritis 1 0 cases
Nephritic toxemia 1 0 cases

CONCLUSIONS

1. A knowledge of the comparative anatomy of the placenta will prevent certain misinterpretations of its pathology.

2. Simple washing of the venous and arterial blood circuits by water at hydrant pressure with the addition of gentle hand massage will prepare the tissue for a more satisfactory gross examination and will also provide for the selection of better sections for microscopic study.

3. Placentae that have been washed free of blood and then injected with a simple opaque material like barium sulphate, and then photographed from x-ray negatives provide very satisfactory preparations for the detection of obstructive areas in the blood circuit, as well as atrophic changes in the parenchyma.

4. Injection of the cleared blood circuits of the placenta by colored gelatin preparations and corrosion of the tissue outside the circuits prepares excellent specimens for anatomic study of the canalization architecture.

5. Careful gross and microscopic examinations of the placenta with clinical correlation will provide excellent and quite reliable data for prognostications upon the immediate and ultimate health of both mother and child.

REFERENCES


111 JOSEPHINE AVENUE.
DISCUSSION

DR. JOHN O. POLAK, BROOKLYN.—Any one who has looked over this array of material, so beautifully injected, cannot help but appreciate the earnestness and persistence of the man who can do this sort of work, and whether he thinks it is necessary to have 50,000 cases to form any opinion or not is irrelevant. He has done something that has not been done so carefully before.

The point that interested me particularly was that in this study of the placenta and its infections, outside of luetic infections, was to be found the cause of many changes we find in the development of the fetus.

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—We have been studying routinely 1300 placentae in our department for the last two years. We, however, have not classified the lesions in this manner. We have sectioned the placenta throughout and have been looking for microscopic lesions. Dr. McNalley, who has been in charge of this work, has been able to classify the various lesions of the placenta, particularly those lesions which are commonly known as white infarcts. I noticed that Dr. Davis has had a considerable number of white infarcts, but he did not differentiate just what he meant. Primarily, every white infarct at first is the red infarct of Young, in which the individual chorionic villi show markedly dilated blood vessels. Immediately surrounding this area there develops a stagnation of blood and fibrin formation with subsequent loss of chorionic epithelium. We believe this lesion is due to the interference of the maternal blood supply, and in a recent study we have been able to demonstrate in almost every uterus that has been removed before involution has begun, characteristic changes. We feel that these changes in the vessels may play a part in the early formation of these red infarcts which subsequently become true white infarcts. The changes in the vessels cause other lesions which appear in the gross as white infarcts, but whose structure is different. This lesion is a hematoma originally. We believe if a small vessel is involved, the hematoma may be small, but if in a large vessel we may get a hematoma of considerable size. This hematoma undergoes organization like blood clot does anywhere. With complete organization we have a lesion which does not differ from the ordinary white infarct in the gross. However, it is an entirely different lesion and is readily differentiated by microscopic examination.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—I would like to ask Dr. Davis whether in his analysis of these cases he noticed how the placenta was expelled, whether by the uterine or fetal surface.

DR. DAVIS (closing).—In regard to red and white infarcts, I cannot help but believe that a white infarct is only an aged red infarct, and in regard to the term infarction, if we consider a distinctly specific and primary placental type of infarction, we ought to limit the term usually to the process occurring and originating in decidual spaces. All know infarction occurs in any part of the body where there are blood vessels, but so far as applying the term infarction in a specific or definite way to the placenta it should be limited to the decidual spaces, and if one will take sections from the maternal surface well within the center of the placenta, that is, getting well in beyond the zone of the chorion laeve, he will be able, if a sufficient number of sections are secured to have the proof that infarction usually takes place in these positions. There may be infarction elsewhere, and one will find that the epithelial cells will form the outer border of the infarcted area.

In regard to Dr. Rongy’s question, we did not include the clinical side of cases other than the record upon the chart which had been prepared in the usual way. So, of course, there was nothing concerning the manner of delivery of the placenta. There are some pictures all are familiar with, namely, the white areas that ap-
pear upon the surface of the placenta. These are quite generally not infarction areas. They represent necrotic changes in the amnion and chorionic membranes.

Another point of value is the appearance of the membranes. Membranes of a muddy greenish color, usually signify infection. The ordinary examination of the placenta just after delivery is of little value. The fusing of the cotyledons is not of much importance unless one finds the limiting membrane in each individual cotyledon definitely fused on the maternal surface, and extending well down in the intervening position between the cotyledons. If there is definite fusing, an attempt to pull apart the cotyledons tears the two surfaces. If the placenta is prepared and sectioned with a long knife, one is able to pick areas that are thrombosed, and if the washing method we have described is used all of the pathological areas can be selected with the utmost ease.
TREATMENT OF PLACENTA PREVIA

BY ROSS MCPHERSON, M.D., F.A.C.S., NEW YORK CITY
(Attending Surgeon, New York Lying-In Hospital)

So much has been written, especially in the last few years, regarding the etiology, anatomy and pathology of this condition, and so many figures have been brought to our notice, that it seems hardly worth while, in presenting this subject to an audience composed of specialists, to use up the time which is necessarily short in discussing these phases of the complication.

I wish, therefore, today to present very briefly the problem of the treatment of placenta previa by the methods commonly in vogue and to see if we cannot bring out in the discussion, the ideas of the men who are seeing these cases, and by the results of their experience put the management on a more fixed basis.

In the first place, for the purpose of studying results, it seems to me that the cases should be divided in two groups: the first, those in which there is a viable child; and the second, those in which the previa is discovered so early that the possibility of a living child is not to be considered, or only secondarily.

With this broad classification approved the methods of treatment generally in vogue may be considered. The diagnosis being established by the ordinary signs and symptoms, familiar to all, the methods presenting are:—packing the lower uterine segment, cervix and vagina with gauze, leaving it in situ sufficiently long to cause active labor pains and dilatation of the cervix, at the same time controlling the hemorrhage; introduction of a Voorhees bag designed to accomplish the same purpose; where sufficient dilatation already exists, rupturing the membranes, followed or not as the case may warrant, by the bringing down of the leg and allowing the labor to proceed; lastly the method of abdominal section.

All of these procedures have their advocates and undoubtedly all of them have their place, but which method is to be applied to the individual case, is the problem which demands attention. A careful survey of the published figures of various authors, shows that there is a maternal mortality of from 5 to 20 per cent, with a fetal mortality ranging from 20 to 80 per cent.

In December, 1907, I presented a series of two hundred and fifty cases from the wards of the New York Lying-In Hospital in which the maternal mortality was 18 per cent and the stillbirth mortality was 44.4 per cent. In the last five hundred and ninety-one cases on the same service, seventy mothers died, a mortality of 12.1 per cent, with a still-
birth mortality of about 42 per cent. A considerable improvement in
the maternal mortality, but only a very slight one in that of children.
Again many of the children died within the first few days, due to pre-
maturity, for in the five hundred and ninety-one cases three hundred
and seven or more than half the total, were premature.

Armin Waechter\textsuperscript{1} quotes a maternal mortality ranging from 7.6 per cent in
1885-1907 down to 3 per cent from 1914-1918, but gives a fetal mortality of
74.8 per cent and is inclined to favor packing followed by version.

Hannal\textsuperscript{2} favors rupturing membranes early and either allowing the head to
control the hemorrhage, or doing bipolar version. He also favors cesarean sec-
tion in the latter months of pregnancy.

Brodhead\textsuperscript{3} believes that cesarean section should be done in all patients hav-
ing a central previa near term where the child is viable, or in the same case even
with a partial previa if no dilatation be present, quoting a maternal mortality
of 15 per cent.

Boyd,\textsuperscript{4} on the other hand, reports a series of fifty-nine cases with a mortality
ranging from 7 per cent to 11.8 per cent, a fetal mortality of 79 per cent in
which cesarean section was done, and therefore concludes that cesarean section
should not be performed.

Hirst\textsuperscript{5} goes into the treatment in great detail, and favors the bag and in-
ternal podalic version. He quotes a maternal mortality of 7 per cent with a
fetal mortality of 60 per cent. He favors cesarean section done in the interest of
the mother.

In my recent series already mentioned, the preference in treatment
was given to gauze packing, followed in most instances by an internal
podalic version, this being done in 354 out of 591 cases. There were
34 abdominal cesarean sections, two extraperitoneal cesarean sections,
three vaginal hysterotomies, 20 Braxton-Hicks operations, 43 breech
extractions and 22 craniotomies on dead children, the rest being made up
of forceps and normal deliveries. The resultant mortality to the mother,
as already stated, was 12.1 per cent with a stillbirth mortality of 42
per cent. One hundred and seven children, born alive, died before
leaving the hospital, or about 18 per cent, a total fetal mortality of
slightly over 60 per cent.

Granting that in many instances, perhaps in the greater proportion,
the mothers were greatly exsanguinated on entrance to the hospital, that
the children were premature or not alive when first seen, all of which
conditions must necessarily prevail in a service as acute as ours, it will
be well to observe from experience what seems to be the most satisfactory
way of handling these cases.

No one thing has contributed more to the successful issue in placenta
previa, as far as the mother is concerned, than the practice of blood
transfusion, so that in all cases as soon as the diagnosis is established,
the mother should be grouped as to her blood and a satisfactory donor
obtained whose presence should be maintained within easy reaching dis-
tance until the necessity for his or her services is no longer needed for
the patient. The factor of time in giving a transfusion is of the utmost
importance, as well as that of proper technic, and it follows then, as a matter of course, that the patient should be in a well equipped hospital which in these days is practically always available.

Having made the diagnosis, immediate treatment should be instituted without procrastination, and one of the recognized methods of operation employed. From my experience and the reports of others, it would seem that if the patient has an undilated or slightly dilated cervix, is at term or nearly so and has a living child, that an abdominal cesarean section rapidly performed by a competent operator offers the best solution for mother and child, this applying to primipara and multipara alike. If the patient is in fair condition when first seen, and has not been infected by injudicious manipulation, the ensuing result should vary little from that of similar operation done for some other indication. If, on the other hand, the child be dead or nonviable, one of the other less drastic means of delivery may be employed, and of these in general I am inclined to favor tamponade with iodoform gauze strips. This will, in practically all instances, control the hemorrhage, especially if the membranes are first ruptured; it stimulates labor pains, causing dilatation of the cervix, stays where it is put until removed by the operator, which is not always the case with hydrostatic bags, and if applied under aseptic conditions, is, in my opinion, not as potent a source of infection as commonly believed. Iodoform is used in preference to plain gauze because it resists putrefaction longer than plain gauze, and if packed tightly rarely gives rise to iodine poisoning. The gauze should be firmly packed as far up as it will go into the uterine cavity, the cervix filled, as well as the vaginal fornices, and the vagina. Such a pack in nearly every instance thoroughly controls hemorrhage and may be left in situ for a considerable time without cause for worry.

When the patient has had hard contractions for some time and it is judged that the cervix is sufficiently dilated to allow the extraction of the child, she may be placed on the operating table, an anesthetic administered, under the best aseptic precautions, the packing removed and the extraction proceeded with in the manner chosen by the operator. I usually remove the placenta manually and repack the uterus. Care should be taken not to handle the cervix more roughly than necessary, as in these cases it is very friable and more apt to tear, thus promoting hemorrhage and subsequent infection. A transfusion should be ready at the time of delivery and if there is any doubt at all of its necessity, it should be given without delay. Pituitrin and ergot may be used after delivery and uterine packing to aid in contracting the uterus.

I believe that most of the maternal mortality in placenta previa is due to delay in diagnosis of the condition, accompanied by tardiness in treatment, combined with careless manipulation and resultant in-
fection, all of which are preventable and inexpusable. If these factors
are eliminated, as they can be, the results for the mother should be
much improved and a patient will rarely be lost. Regarding the fetal
mortality, so much cannot be said, as the greater majority of the chil-
dren are so premature that little can be done to save them even if born
alive. Cesarean section on the viable fetus, does offer a means of lower-
ing this mortality to an appreciable degree and should be employed in
this class of cases more frequently.

REFERENCES
(1) Wachter, Armin: Schweiz. med. Wehnschr., 1920, 1, 618. (2) Hannal,
Colvein B.: Texas State Jour. Med., 1921, xxvi, 439. (3) Brodhead, George L.: 

125 East Thirty-Ninth Street.

DISCUSSION

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—The subdivision of these cases into
the two classes given by the author of the paper is an excellent one. It is surely
more rational than attempts at vaginal examination to determine the extent of
encroachment of the placenta on the internal os, thereby starting a new hemorrhage
and very likely infecting the patient.

The treatment of the condition should be based on this subdivision also, and pre-
liminary to the treatment we should try to prevent infection by simply cleansing
and carefully scrubbing the vagina with soap and water and use irrigation after-
ward. With such a preliminary cleansing I have never seen infection follow vaginal
delivery of placenta previa. The course we follow is according to this subdivision.
If the child is nonviable the membranes are ruptured and a considerable quantity
of the waters allowed to escape; a No. 2 Voorhees bag is then inserted through the
cervix, and when expelled the cervix is sufficiently dilated to bring down a leg and
allow the woman to deliver the nonviable fetus. In a case further advanced a No. 3
bag is introduced without rupturing the membranes; the woman will have sufficient
labor pains to force the fetal head through when the bag is expelled, if not, then
the gloved hand is inserted, a foot brought down, and the child carefully delivered
in order that it may live. In a case of central placenta previa, if the patient is not
near term, say seven and a half or eight months, vaginal delivery can be effected.

DR. ABRAHAM J. RONGY, NEW YORK CITY.—The cases of placenta previa
that present themselves during the period of viability of the child, should be divided
into two general groups;—those patients that are in labor, and those that are not.
In cases of bleeding in the eighth or ninth month, when the cervix is not dilated
and rigid, we have no means of ascertaining whether the placenta previa is marginal
or central. In other words, we are groping in the dark, and in these cases I agree
with Dr. McPherson that cesarean section is the only operation of choice and by so
doing we save the greatest number of mothers and a great number of babies. In
addition, I think, every time we do cesarean section for placenta previa the uterus
should be packed for possible hemorrhage, particularly the lower segment. In
patients, who are two or three fingers’ dilated, we can differentiate whether the
case is one of placenta previa centralis or one of placenta previa lateralis, and we
can select the method of interference. Patients, whose hemoglobin goes down to 70
or 60, due to bleeding, should not be meddled with, and the sooner such patients
are delivered the better for the mother and baby. Once a woman has a hemoglobin
of 60 or 65, due primarily to bleeding, a second hemorrhage may kill her, even if she loses only a small quantity of blood.

DR. OTTO H. SCHWARZ, St. Louis, Mo.—I would like to ask Dr. McPherson whether in cases in which he does cesarean section he always transfuses before doing that operation and the use of the bag for the control of hemorrhage?

DR. McPHerson (closing).—In regard to Dr. Speidel's remarks about the Voorhees bag, I will say that the use of the Voorhees bag is a well recognized method of treating these cases. The only objection to it is the danger of its being suddenly expelled with resultant hemorrhage. Theoretically it is cleaner. I have twice had the Voorhees bag expelled before I was able to do anything. The woman had a good hard pain and bled to death before anything could be done. Packing controls hemorrhage until you take it out; if you have such an accident once it is excusable, but if you have the same accident happen twice, it is not so excusable, and that is the reason I prefer packing to the use of the bag.

In answer to Dr. Schwarz about transfusing before doing cesarean section, I do not think it is necessary to resort to transfusion unless there are indications for it. If the patient needs transfusion, I have things ready so that it can be given immediately. If she comes into the hospital exsanguinated, it is necessary to transfuse her before operation. I have seen cases that bled straight through, the blood coming out at the other end; in other words, it went into the vein and came out of the vagina.

I have not made a practice of packing these cases after operation, and I believe that the suturing of the incision is sufficient irritation to cause contraction of the uterus. Dr. Rongy is theoretically correct, but these patients have not bled to death after they were operated on. I would rather not pack them after opening the uterus.
IS CESAREAN SECTION JUSTIFIABLE IN ABLATIO PLACENTAE?


(From the Clinic of the Long Island College Hospital, Department of Obstetrics and Gynecology)

Premature separation or ablato placentae (Holmes) is the partial or complete separation of the placenta from the upper segment of the uterus during pregnancy or during labor, before completion of the second stage, due to some pathologic state of the uteroplacental union, or to violence done to the organ.

In my experience, premature separation of the normally implanted placenta is perhaps the most frequent cause of antepartum bleeding at or near term; and it is an accident which all of us should be prepared to recognize and treat along rational lines; for but few cases require radical interference, but all need intelligent supervision.

The frequency of ablatio has been estimated as about 1 in 200 labors; however, I am under the impression that many cases of partial separation with concealed hemorrhage are missed, owing to careless observation, and that many of the cases that are diagnosed as partial placenta previa, because of the occurrence of bleeding, near term or during labor, are really premature separation.

In our clinic where every placenta is carefully examined, we have been surprised to find how many placentae have old blood clots on the maternal surface; hence we have come to feel that ablatio is seen more frequently than placenta previa. The factors which seem to predispose to this accident are age, multiparity, advanced period of pregnancy, and the unstable attachment of the placenta due to the physiologic structure of the serotina at, or near term.

Upon reviewing my cases I found that the majority of these accidents have occurred in women between 25 and 35 years of age, who have had an antepartum history of toxemia; while the minority have shown evidences of deciduitis or placentitis with hemorrhages in the serotina, and but a few could be attributed to direct violence, as blows, kicks or sudden muscular exertion.

The point and degree of separation have considerable bearing on the amount of blood which the patient loses and the severity of her symptoms; consequently they must also have some bearing on the prognosis and form of treatment which should be instituted.

As I have already stated, the normally situated placenta may become (1) partially or (2) completely separated from its placental site. If the former, the separation may be central (Fig. 1), the placenta remaining
attached at its circumference, which allows the formations of a retro-placental blood accumulation. This stimulates contractions which in turn compress the clot and further separate the placenta from its attachment, so that one edge may separate and the escaping blood strip the membranes from their uterine adhesion.

It may be stated that all cases begin with absolute concealment of the hemorrhage and later, may develop an apparent hemorrhage; for as the membranes are detached from the lower uterine segment, there may be an apparent hemorrhage when the presenting part does not completely block the lower segment (Fig. 2), blood and clots escaping at the time of contractions, or the blood may remain concealed if the presenting-part is engaged, and completely blocks the cervix. In this case blood can be demonstrated by the escape of serum, blood, or clots, when the presenting-part is displaced upward on vaginal ex-

Fig. 1.—Central separation. Concealed hemorrhage.
amination (Fig. 3). When the separation is complete, the accumulation may rapidly distend the uterus; for the placental site in an over-distended spastic uterus cannot retract unless the membranes are ruptured soon after the separation takes place, for the increased intra-

Fig. 2.—Apparent hemorrhage, partial separation. Head unengaged.

uterine bulk prevents thickening of the uterine walls by normal retraction.

While pathologically there seem to be two types—the one (Fig. 4) with concealed, and the other with apparent bleeding—this difference is only relative, or one of degree.

The diagnosis should be readily made upon the symptom complex, which is almost always present. The patient, an old primipara, or a
 multipara, usually at, or near term, who may have shown some of the prodromal signs of toxemia (such as a trace of albumin in the urine, or a rise in the systolic blood pressure, or these signs may have been absent) is suddenly seized with cramp-like uterine pain, which may be localized and referred to the placental site, faintness, or nausea, which is always attended with some degree of shock, blanching, and pulse rise. Pal-

Fig. 3.—Head filling lower uterine segment, preventing escape of blood.

vation shows a uterus that is extremely sensitive, spastic, tense and firm, or flaccidly filled with retained blood which does not intermittently contract and relax, as in normal labor. The fetal movements may be tumultuous and then cease, depending on the degree of separation. Owing to the spasticity of the uterus, detection of the fetal parts is difficult. Auscultation will show the fetal heart to be absent if the
Ablatio is complete, or if the separation is incomplete there will be progressive signs of impairment in the fetoplacental circulation—of course both the fetal movements and the changes in the heart sounds are dependent on the amount of separation.

The diagnosis is confirmed in both the relatively concealed, and in the apparent cases by the escape of bloody serum, or by actual vaginal hemorrhage. In the relatively concealed cases, on raising the presenting-part out of the pelvis, it is usual for some of the accumulated blood
and clots to escape into the vagina, while palpation and mensuration will demonstrate the asymmetry, or the rapid enlargement of the uterus (Fig. 5).

It is my purpose, in this short communication to outline the obstetric procedures indicated in the management of this accident, for like ectopic, the cases may be divided into those in the nontragic, and those in the tragic stages.

Clinical study of a large number of these cases has shown that it is possible to differentiate between those that can be safely treated on the expectant plan, and those that require rapid infrapelvic delivery, or section and hysterectomy. The treatment depends largely on the extent of the pathology, and while today, in many instances of separation, there seems to be irrefutable evidence of an associated toxemia, there are others which cannot be attributed to this cause.

Morse's observations confirmed by his experimental work on rabbits, in which he tied all three groups of the efferent veins of the uterus on one side, seem to prove that the exciting cause of many of these separations may be attributed to placental apoplexy produced by sudden

Fig. 5.—Mensuration showing the rapid increase in size of uterus with retained blood.
uterine torsion which interferes with the out-going blood. One has but to remember the picture of the uterine veins of the pregnant uterus when the abdomen is opened at section, to realize how increased torsion of the uterus, near term, may block the venous return on one side (Fig. 6), and engorge the mesometrie veins, the intervillus spaces and the decidual radicals. This torsion when it is greater than normal may be further increased by muscular effort or by uterine contractions of the torsioned uterus. This naturally further engorges the large veins on one side, and engorges the vessels in the serotina which act exactly as does retraction of the uterus during the third stage of labor, namely, allows
hemorrhagic extravasations to take place at many points in the spongy layer of the decidua which during contraction further separate placental attachment in the so-called concealed type. Owing to the fact that the placental site cannot retract because of the bulk of the uterine content, the area behind the placenta becomes distended with blood, fluctuant then spastic and very tender. If the placenta completely separates, retraction of the site may not take place as long as the uterine content prevents diminution in the size of the uterus. Consequently, instead of the uterine wall thickening, the walls become thinner and more atonic as the bleeding from the placental site continues and the blood accumulates in the space between the membranes and the uterine walls, always increasing the size of the uterus; hence, continued intrauterine bleeding may be demonstrated clinically by repeated mensuration of the uterus, record of the rising pulse rate, persistent fall in the systolic blood pressure, and progressive drop in the hemoglobin percentage. While objectively the patient continues to show more pallor and other external evidences of internal hemorrhage, such a picture does not brook expectancy, but needs prompt surgical intervention with coincident blood transfusion.

On the other hand, the nontragic cases likewise present a typical syndrome which may be readily recognized i.e., a pregnant woman at, or near term, who after exertion, or without appreciable muscular effort, except perhaps a few uterine contractions, is seized with cramp-like uterine pain, slight collapse evidenced by nausea, pallor with perspiration about the lips, nose and forehead, lowering of the blood pressure, and increased pulse rate. On physical examination the uterus will be found to be tense and tender, and may be asymmetrical if the blood has accumulated behind the placenta (accessory tumor) or with the occurrence of pain, vaginal bleeding may be apparent, or only be demonstrated on making a vaginal examination and raising the presenting part which liberates some accumulated blood clots.

Given a patient presenting the foregoing picture, and excluding placenta previa by the absence of its physical signs, a diagnosis of ablative placentae may be readily made. Such a patient should be immediately transferred to the hospital and allowed a short period of intelligent observation. If the cervix is effaced, or the patient is a multipara, the membranes may be ruptured and the bulk of the uterine contents diminished. This theoretically allows the fetus to act as an intrauterine tampon which stimulates muscular contraction. A quarter to a half a grain of morphine is administered to relieve the shock and aid in the dilatation, while a tight many tailed abdominal binder is applied from above downward in order to firmly compress the uterine wall against the fetal tampon. In addition to this, the vagina may be firmly plugged with sterile gauze or cotton moistened with boroglycerid which further stimulates uterine contractions and favors dilatation.
If it is certain that the pelvic measurements at the outlet are ample, the presenting-part is engaged, and there is already evident dilatation of the cervix, the suggestion of Tweedy, of giving small repeated doses of pituitary extract every 20 minutes, will further aid the control of bleeding.

During this watching period intelligent observation is imperative. The pulse should be taken and recorded every fifteen minutes, the systolic pressure every half hour, and the hemoglobin and red cell count every hour, while the height and size of the uterus which has been carefully marked out upon the abdomen, should be noted and any increase in uterine distension recorded. If these measures check the hemorrhage, as they usually do in the majority of cases, the pulse will gradually improve in quality and become slower, the systolic pressure will rise or remain stationary, and there will be no further fall in the hemoglobin percentage until delivery occurs and the placenta is expelled. If, however, the pulse rate is high, I have found it wise to firmly pack the interior of the uterus with washed iodoform gauze and thus control further oozing.

On the other hand, if the intrauterine bleeding is continuing, the uterus will further enlarge, or the outward flow of blood will not be checked. It must be remembered however, that the amount of vaginal bleeding is no index of the amount of blood lost; for more or less blood is always retained within the uterus. The pulse increases in rapidity and diminishes in quality, while the systolic pressure will slowly fall as will also the percentage of hemoglobin.

In those patients, in whom the clinical picture above described, show the signs of progressive intrauterine bleeding, no infravaginal method of delivery is justifiable unless the cervix is already dilated. For one is dealing not only with the atonic uterus, but with an organ whose musculature presents definite pathology, namely, an apoplectic uterus with blood extravasations into the myometrium causing disassociation of the muscle fibers making it impossible to secure retraction, and hence postpartum hemorrhage is the sequel (Fig. S). Furthermore, the release of the large quantity of retained blood which immediately follows delivery of the fetus, is always attended with severe shock, for the rapid emptying of the overdistended atonic uterine cavity does not permit of retraction, hence, the frequency of fatal collapse. I formerly delivered these patients by manual cervical dilatation, forceps and version, and saw them collapse after the fetus was expelled, with a postpartum gush so torrential as to be uncontrollable.

As in ectopic, the woman may sensitize herself to a certain amount of blood loss, and if further bleeding is permanently controlled, even if she is pulseless, she will show signs of reaction. But, if in addition to this great blood loss, any further bleeding continues, she will fail to react, for shock and hemorrhage are interdependent, and these
patients are already severely shocked. Hence, I feel that surgical trauma which is attended by any further blood loss must result fatally.

What then should be the attitude in the management of these tragic cases, what will determine the plan of procedure? This will depend largely on the condition of the patient, and the condition of the cervix, for the child is a negligible factor. One is not justified in doing a cesarean section which will entail further shock and oozing to deliver a stillborn child, unless one is prepared first to transfuse the patient, and then prevent further blood loss by hysterectomy. Section upon this type of case has always revealed a constant pathologic picture—large areas of the uterine wall are ecchymotic (Fig. 7) and when cut through do not bleed, but ooze serum and microscopically show multiple thrombosis of the vessels of the myometrium, distorting and disintegrating the muscle fibers. (Figs. 8, 9.)

There is extreme flaccidity with little or no tendency to uterine contraction and retraction; hence, retention of the uterus necessarily means continuation of the oozing and frequently infection, for it is
exceptional that these patients have not been repeatedly examined through the vagina before admission to the hospital.

It has been my practice to prepare the patient during the observation period for possible immediate operation, and secure a donor for blood transfusion by one of the direct methods, such as suggested by Unger or Miller. Experience has taught us that it is good surgical judgment to transfuse these patients before active surgery is done upon them, or to have the transfusion coincident with such surgery. Of course, if the cervix is well dilated, the presenting-part engaged

Fig. 8.—Section showing hemorrhage into muscle wall and thrombosis.

Fig. 9.—Showing large thrombus in a torsioned uterus.
and the woman is actually in labor, a few minims of pituitary extract with a tight abdominal binder will expedite the labor; but this is not the class of case under consideration.

In the majority of these tragic cases, the unprepared cervix offers an obstacle to infrapelvic delivery; hence, it has been my plan after first transfusing the patient, to open the abdomen with a long median incision and eventrate the uterus. Inspection will immediately show whether it requires removal or can be safely left in situ; for the apoplectic uterus shows numerous ecchymotic areas and fails to contract. In the presence of such a condition, the child is invariably dead, therefore, it has been my practice to clamp both broad ligaments in order to control the uterine and ovarian blood supply before inceising the uterus; this permits the performance of a bloodless supracervical hysterectomy. On the other hand, if there are fetal heartsounds, and inspection of the uterus shows no intermuscular hemorrhages which are evidenced by ecchymotic areas under the perimetrium, and the uterus intermittently contracts, hysterotomy, leaving an intrauterine pack within the cavity, is a justifiable procedure.

From this study it is fair to assume:

First, that ablatio is a relatively common accident.
Second, that previous toxemia is a predisposing factor.
Third, that many of the cases have an apoplectic origin from torsion of the uterus, while very few can be attributed to trauma.
Fourth, that the symptom complex is constantly present and makes the diagnosis, which may be confirmed on vaginal examination by the escape of serum, blood or clots.
Fifth, that clinically this accident presents two general classes, the nontragic and the tragic cases.
Sixth, that in the former, intelligent expectancy in conjunction with rupture of the membranes, a tight abdominal binder, and pituitary extract will effect spontaneous delivery.
Seventh, that in the tragic cases which show progressive hemorrhage, fall in blood pressure and hemoglobin percentage, section after transfusion is the procedure of choice.
Finally, the decision between hysterotomy or hysterectomy depends on the condition of the uterine muscle.

20 Livingston Street.

DISCUSSION

DR. ABRAHAM J. RONGY, NEW YORK CITY.—I have not had as much experience as Dr. Polak in dealing with cases of ablatio placentae, but I have had some rather tragic experiences. There is no question that these tragic cases require the immediate opening of the abdomen, for the reason that very many of them are mistaken for spontaneous rupture of the uterus.

I have had two cases in the last two years. One was a woman in labor forty-
eight hours without progress. The family physician telephoned for me to come and see the patient, saying that she required cesarean section. When I saw the patient she was in shock, and I thought the uterus ruptured. I opened the abdomen and found spontaneous rupture of the uterus with the placenta bleeding.

Only recently I had another patient, in the fifth month of pregnancy. She developed pain in the abdomen and went into shock. For a while I did not know what was the matter with her; I could not make out a tumor. When she did not improve, I opened the abdomen and found spontaneous rupture of the uterus. She died. Not only does a case of ablatio placentae require cesarean section, but we must consider it as an acute abdominal condition with the possibility of spontaneous rupture of the uterus, and if we can act early we will save a number of patients.

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—Dr. Polak cites a case in which there was extreme torsion of the uterus, and that this was the primary factor in this case is quite apparent from the picture. However, I do not believe that is a common cause of ablatio placentae. The underlying condition is a sudden rupture of some vessel of small or large size, and therefore I feel the term utero-placental apoplexy is the term which should be applied to this lesion in preference to the term ablatio placentae.

In a recent study which I have previously mentioned, I have noted in a few cases of toxemia that vessel changes occur analogous to the changes which are seen after delivery, so well described by Goodall. I feel these changes are the underlying condition. It is well known that in hypertension intimal changes take place in other vessels of the body. In the hypertension cases the intima of the uterine vessel showed a marked thickening with the other changes. As the degenerative changes advance, its wall becomes definitely impaired. These vessel changes occur in the spongy decidua, and with the increased pressure a rupture is very apt to take place.

I felt that smaller retroplacental hemorrhages are similarly explained. I have demonstrated vessels in the spongy decidua which appear to have more or less aneurysmal dilatation, and under such conditions, I believe rupture can easily take place. These changes take place as well in the veins but it is a different type of change, and with a rupture of such a vessel or the interference with the maternal blood flow, thrombosis may take place. I believe the finding of thrombosis in the uterine wall does not necessarily mean that it is the primary factor.

DR. LOUIS E. PHANEUF, BOSTON, MASS.—I would like to mention briefly three tragic cases of premature separation of the placenta which came under my observation within a short period of time.

The first patient was taken with a sudden pain in the abdomen while riding on a street car. She was brought to the hospital bleeding and in extreme shock. The diagnosis was made, the abdomen was opened, and it was found that she had ruptured her uterus in the median line. The rent was enlarged and the child was delivered through it. The patient was transfused immediately, and despite that fact died on the fifth day. The second case was one that gave a history of trauma; she had a partial rupture of the uterus near the median line through which the fetus was extracted. She recovered without transfusion and without anything else being done. A year and a half later I did a low cervical cesarean section in her case and she had an easy convalescence. A third case came to my attention within two months. This woman had a pulse ranging from 140 to 150 with a complete separation of the placenta and a dead fetus. The uterine body was ecchymotic but the lower segment appeared to be normal. I did a low cervical cesarean section fearing that she could not stand a hysterectomy and she recovered without transfusion.
DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—I want to further emphasize the points that have been placed before you, but I have found that it is a good idea in eclampsia to get a clear picture of the pathology. In the severe cases mentioned by Dr. Polak there is a hemorrhagic condition of the myometrium, and as Dr. Schwarz has pictured greatly dilated vessels. In many cases there is very marked red blood cell extravasation, so that a cross section of the myometrium looks as if the entire structure were involved in the hemorrhagic process. When that is the case, the picture gives the indications for treatment.

DR. POLAK (closing).—Of the three charts I showed you, one represented the traumatic type. We have a large number of these cases in Brooklyn during the Coney Island season. This type of woman is usually leading one child by the hand, carrying another on her arm, and a third in her abdomen. In her endeavor to get on the car after lifting the oldest child on, the car is started suddenly and she is thrown against the seat in front of her. It is surprising how the number of cases of separation of the placenta increase during the summer in Brooklyn. That is the traumatic type.

The second picture was one of the toxemic type, a placenta with numerous infarcts, while the third slide represented the apoplastic type, with thrombosis in the uterine wall.

We really do not know what changes these vessels undergo that make them more susceptible to rupture, but we do know there are certain cases preceded by toxemia which show separation of the placenta, and they are undoubtedly of the apoplectic type as mentioned by Dr. Schwarz. There are other cases in which there is extreme torsion of the uteruses which seems to be a factor on top of the vessel change.

In regard to treatment, there are some of these cases in which we can do a section. But where there are changes in the uterine muscles and when cutting through the uterus, we find it edematous and thrombotive it should come out. In the tragic case we should have a donor ready for transfusion then ventrate the uterus, clamp down on both broad ligaments, and start transfusion. We can then take as long as we want for the operation, for the patient loses no further blood.
I. FROZEN SECTIONS THROUGH UTERUS OF WOMAN DYING DURING THIRD STAGE OF LABOR, ILLUSTRATING MECHANISM OF PLACENTAL SEPARATION AND EXTRUSION.

II. FROZEN SECTIONS THROUGH UTERUS OF WOMAN DYING FROM CENTRAL PLACENTA PREVIA, FOLLOWING BRAXTON-HICKS VERSION


(From the Department of Obstetrics and the Research Laboratories, Western Pennsylvania Hospital, Pittsburgh.)

These specimens are of considerable pathologic interest, but since they have been so clearly reproduced in the accompanying illustrations by Mr. W. B. McNett of Johns Hopkins it is necessary to do little more than briefly outline the history of each case, and point out in an explanatory way certain particularly important features of each specimen.

Case 1.—Mrs. D. W. H. (Hosp. No. 6167-1916) was a primipara, nineteen years of age. Upon admission to the hospital she was moribund with advanced edema of the lungs, dyspnea, a pulse rate inaccurately determined at about 160, and in fact, every symptom of acute cardiac decompensation. The head of a six and a half months’ fetus was showing at the vulva, and had been visible for one hour previous to admission, according to the report of Dr. J. N. Stanton who had been called to see the patient for the first time a few hours earlier.

The symptoms developed acutely at 3 A.M., this being about the time her labor began. She entered the hospital at 6:45 A.M., and without anesthesia the head was lifted out with forceps a few minutes later, the patient dying two minutes after the birth of the fetus (7:30 A.M.).

The autopsy showed edema throughout both lungs, acute exacerbation of chronic nephritis, and acute dilatation of the heart. The uterus with the placenta in situ, the bladder, part of the vagina and rectum were removed, frozen and longitudinal sections cut.

The sections illustrate normal placental separation and extrusion according to the mechanism of Schultze, but it is noteworthy that there is no evidence of the retroplacental hematoma which is so generally considered essential to the extrusion of the placenta by this mechanism. (Figs. 1 and 2.)

According to Williams’ “Obstetrics,” Baudelecque in 1789 described the two ways in which the placenta may be extruded, saying, “In the first case the middle of the placenta being pushed forward by an
effusion of blood beneath it, the organ becomes inverted upon itself in such a manner that it presents by its fetal surface, et cetera." Schultze's name was attached to this mechanism in 1865, when he advanced the opinion that the placenta was usually expelled by the

![Fig. 1.—Third stage of labor. Right half of uterus. Placenta partly separated, and inverted, with fetal surface presenting at os. Unequal contraction of fundus indicates placental separation by muscular contraction with absence of the traditional retroplacental hematoma.](image)

first method described by Baudeloque. Williams and others subscribed to these views, crediting the formation of a retroplacental hematoma of considerable size with practically all of the separation of the placenta from its site.
Fig. 1 shows the right half of the uterus with the placenta sufficiently separated and inverted that by uterine contraction alone its bulging fetal surface already presents at the external os. That this

has been chiefly accomplished by muscular contraction is evidenced by the fact that the fundal portion of the uterus has contracted and foreshortened itself but unequally so, extending on the anterior sur-
face down to the circular vein which is generally conceded to locate the contraction ring or lower edge of the upper uterine segment. Posteriorly, however, the contraction and thickening of the uterine wall does not yet extend to the upper edge of the lower uterine segment, and here the separation of the placenta is still incomplete.
The inversion or infolding of the placenta with its fetal surface presenting at the external os of the cervix is clearly indicated in the drawing. The internal os cannot be identified.

Fig. 2 is a mesial section about 2.5 cm. thick. In this figure that portion of the placenta lying posteriorly, still attached at its upper end and apparently divided from the main portion by a double septum, is merely one edge of the placenta rolled round like an omelet and cut off in the sectioning. The dark mass marked below is blood clot, nor is any other intrauterine bleeding discernible in the specimen.

CONCLUSIONS

1. Placental separation, according to the so-called mechanism of Schultze in which the organ is inverted and extruded fetal surface first, is mainly accomplished by uterine contractions during third stage, comparable physiologically to those of first and second stages.

2. In placental separation the rôle played by the supposed formation of a retroplacental hematoma has been greatly overestimated.

CASE 2.—Mrs. J. E. M. (Hosp. No. 7542-1917), a multipara aged thirty-eight, was sent to the Hospital by Dr. W. H. McCafferty of Freeport, Pa., who gave for her the following history: The patient was nearly nine months pregnant when, four days before being referred to the hospital, she had a profuse, painless hemorrhage from which she became pale and mildly shocked. During the intervening four days she bled slightly but constantly. At the time of admission she was blanched and pulseless.

The external os admitted two fingers with difficulty and the internal os was completely covered with placental tissue. This was quickly bored through and without anesthesia the combined external and internal version of Braxton-Hicks performed, the left leg being drawn down so that the knee was visible at the vulva. An intravenous injection of normal salt solution was given simultaneously but the pulse failed to return at the wrist, and three hours after admission the patient died in shock, the result of her hemorrhages.
The autopsy disclosed general anemia and pyonephritis. The pregnant uterus was removed together with part of the vagina, the specimen frozen and sectioned.

Fig. 5.—Placenta previa after version of Braxton-Hicks. Left half of uterus. Portion of sectioned fetus lifted out to show cavity of uterus with placenta attached over entire lower segment. Area of compression of placenta is seen over internal os, where thigh of fetus had been delivered to check hemorrhage from placental separation.

The illustration (Fig. 3) is self-explanatory, the outstanding features of the specimen being the size and location of the placenta, the areas
of placental separation, and the efficacy of the tamponade produced by the wedge of the thigh after version of Braxton-Hicks for placenta previa. This is the right half of the uterus.

The extraordinary height to which the edges of the central placenta previa extend up the walls of the uterus destroys the usual conception of this pathologic condition. Moreover, the apparently trifling degree of placental separation necessary for fatal hemorrhage is surprising.

The position of the fetus in utero after the version was such that the presenting thigh has been cut through obliquely. Fig. 4 was therefore prepared, in order that the anatomic relations noted in Fig. 3 might be clarified. This sketch shows the approximate posture assumed by the fetus after the version, the black line indicating the course of its longitudinal section, the view being at right angles to that in the preceding illustration.

Fig. 5 is a drawing of the left half of the uterus (the opposite to that shown in Fig. 3) after its portion of the fetus had been lifted out. Here again one is surprised at the amount of uterine surface covered over by this obviously thinned out placenta. The area of placental detachment on this side is small, and the result of the pressure of dilating thigh and buttocks of the fetus on that portion of the placenta at the internal os is clearly indicated.

CONCLUSIONS

1. A central placenta previa may cover a larger portion of the uterine surface than has been generally supposed.

2. A comparatively trivial area of placental detachment may cause serious or fatal hemorrhage.

3. These sections establish the already clinically known fact that the combined external and internal version of Braxton-Hicks is an efficient method of controlling hemorrhage from placenta previa.

1015 Highland Building.
THE ROENTGEN RAY DIAGNOSIS OF NORMAL AND ABNOR-
MAL PREGNANCIES

By Edward Speidel, M.D., and Henry H. Turner, M.D., Louisville, Kentucky

THERE have been such important advances in x-raying obstetric and
gynecologic conditions, that it is of the utmost importance that in-
formation upon this subject be generally imparted. The x-rays have
proved themselves especially valuable in the diagnosis of early preg-
nancy.

We have practically only the absence of one or two menstrual periods
and the softening of the uterus to guide us in the early months. The
absence of menstruation may be an exceedingly misleading symptom,
if a careful menstrual history is not taken in connection with it.

It is not unusual in young married women, who menstruate irregu-
larly, to find a very prolonged absence of their period up to four and
six months. This is associated with such a marked increase in weight
and enlargement of the abdomen that the woman believes herself preg-
nant and consults a physician, only to learn, if he is careful enough to
make an examination, that she has an infantile uterus.

According to Peterson it is just at this early stage of pregnancy that
roentgenology with pneumoperitoneum is such a valuable diagnostic
aid. As early as the sixth week, and more clearly thereafter, enlarge-
ment of the uterus and distinct enlargement and widening of the isth-
mus, at the junction of the upper and lower segment of the uterus can
be shown. Formerly oxygen was injected into the peritoneal cavity,
but as it is not as readily absorbed, carbonic acid gas displaced it. Some
operators in fact use unfiltered air. From one and a half to two liters
of the gas seem to be sufficient to assure a clear picture and there is less
pain and discomfort due to overdistention of the abdomen than if larger
amounts are used. Some care must be taken under abnormal circum-
stances to avoid cardiac embarrassment from upward pressure of the
diaphragm, and although the method in most instances seems to be
harmless, still DeLee reports two deaths from pneumoperitoneum.

In the early months of pregnancy in a fibroid uterus the widening of
the isthmus as shown by a pneumoperitoneum is perhaps the only pos-
tive sign that can be depended upon. In pregnancy associated with
fibroids there may not even be total absence of menstruation.

At times there will be a scantier discharge of shorter duration at the
recurrence of each period or even a persistent metrorrhagia. In such
circumstances without the x-ray we have only the rapid growth of the uterine tumor and the softening of the uterine tissues between the fibroid nodules to guide us.

In the later months the x-ray should show the fetal outlines and with pneumoperitoneum even the fibroid nodules, and there can be little excuse, therefore, at this late day for the operator who, upon opening the abdomen, finds a pregnancy with his fibroid or a five months' pregnant uterus instead of a smooth myoma of about the same size.

The great difficulty with pneumoperitoneal readings will be the lack of experience in most operators. Conditions are rare in which women present themselves at the prenatal clinics before the third month of gestation, and it would be rather difficult in most instances unless there were some distinct abnormality, to get them to submit to so formidable a procedure as a pneumoperitoneum. In consequence with little experience, the recognition of widening of the isthmus in a roentgenogram of a supposed early pregnancy would be no more conclusive, than the detection of softening of the uterine tissues by expert vaginal touch.

It should, therefore, be the custom to have an expert radiographer in every large obstetric clinic in order that pictures of abnormal cases may find intelligent interpretation.

The presence of an abnormal menstrual discharge is a more or less diagnostic sign in at least two distinctly abnormal pregnancies.

In early extraterine pregnancy such a discharge simulating menstruation and unusually free of blood clots, differentiating it from the discharge of a threatened abortion, should attract one's attention to a possible ectopic gestation. If in addition we find some softening of the cervix and a tender fullness on gentle palpation at one side of the uterus, then our suspicion is probably confirmed.

This, it strikes me, should be one of the most fertile fields for roentgen ray diagnosis especially with the addition of the pneumoperitoneum. By the latter a slightly enlarged uterus and the outlines of the distended tube should show in the picture.

A direct x-ray would rarely be available because rupture or tubal abortion occurs, in most instances, before the deposit of lime salts in the skeleton could show the fetal outlines. It is claimed by physiologists that the deposit of lime salts in the fetal bones does not begin until after the tenth week.

No extraterine pregnancies suspected or diagnosed before rupture have come into our service during the preparation of this paper, so it is not possible to prove the statement just made. Obstetricians more fortunate should make an effort to have a pneumoperitoneum made when they have such cases in order to prove whether these deductions are correct. If so, then we have made a marked advance in the early diagnosis of extraterine pregnancy.

I have a splendid picture of a chronic salpingitis made with pneu-
peritoneum. The uterus and distended tubes show clearly in the roentgenogram and demonstrate that a tube distended with an extrauterine pregnancy should register as well.

The only other sign of distinct value in early pregnancy is the abnormal softening of the lower segment of the uterus, and when it can be obtained definitely it justifies one in making a positive diagnosis of pregnancy. The expert obstetrician may determine in his mind from the softening of the cervix and uterus associated with the absence of one or more menstrual periods that the patient is pregnant, but he would rarely risk upon that alone to make a definite statement where the reputation of a young woman is at stake. During the war I did not hesitate to make a positive diagnosis of pregnancy in all early cases where Hegar's sign could be obtained.

In uterine hydatids the peculiar serosanguineous discharge free from clots, especially associated with a uterus that is larger than the estimated period of gestation, should lead to a diagnosis.

A pneumoperitoneum showing the outlines of a uterus the size of a four months' gestation or more and the absence of any fetal outlines by the x-ray, as could ordinarily be demonstrated in a uterus of that size, should settle the diagnosis.

Uterine hydatids are said to occur once in from 2500 to 20,000 pregnancies according to various textbooks. I encountered three in six months a number of years ago and have not seen a case since. It is again not possible in consequence to prove the statement just made by an illustration, but pneumoperitoneums in other cystic conditions would make it appear reasonable that a definite diagnosis could be attained in this manner.

Carelli in an article on pneumoperitoneum published in the April, 1923, number of the American Journal of Roentgenology, shows in a number of beautiful illustrations ovarian cysts of various sizes associated with pregnant uteri.

It is to be hoped that the x-rays will prove of some benefit in refinements of the diagnosis of pregnancy in the later months. It should be possible, for instance, by means of the roentgenogram with pneumoperitoneum, by the relation that the head of the fetus bears to the lower segment of the uterus, to determine the degree of encreaehment of the placenta upon the internal os, whether we have a central, lateral or marginal placenta previa.

The x-ray is of especial value in those cases of pseudocyesis that occur rather frequently near the expected menopause, and most often in women that are rapidly taking on flesh.

In many such cases the absence of the menstrual periods due to the climacteric and the enlargement of the abdomen due to the deposit of fat, convinces the patients that they are pregnant. They are absolutely certain in many instances that they feel fetal movements. In many such
cases the obstetrician is confronted with a large abdomen with such a thick cushion of fat that nothing definite can be felt or heard through it, and a vagina that is so long and narrow that but little can be gained from such an examination. In such circumstances, it is best after a preliminary purging with castor oil to put the patient under nitrous oxide anesthesia, then with the greater part of the hand inserted into the vagina and the abdomen relaxed under the anesthetic, it should be possible in most instances to make a definite diagnosis. If there is still an element of doubt then the absence of fetal outlines in an x-ray picture should be conclusive, as these cases always come to our notice in the latter months of a supposed pregnancy when a definite picture should be possible.

We have been relying upon the absence of fetal movements and fetal heart sounds for a diagnosis of death of the fetus. In especially favorable circumstances the diagnosis should become conclusive if the fetal head can be palpated through the partly dilated os and the bones are freely movable. According to Horner, the x-ray in such cases should show distinct overriding of the bones and asymmetry of the fetal head, and this again should prove to be a valuable aid to a diagnosis of fetal death.

Ovarian cysts should no longer be confounded with a pregnancy, for the reason that if an acute condition exists that demands an immediate operation, then a vaginal examination with the full hand and the patient under anesthesia prior to the intended operation, should establish a diagnosis. In cases that are not so urgent, an x-ray picture with pneumoperitoneum should settle any question of doubt. If a pregnancy complicated with an ovarian tumor is suspected, then a pneumoperitoneum should outline both organs, showing the widened isthmus and enlarged uterus in the early months and the fetal outlines in the late months, alongside of the shadow formed by the ovarian tumor.

Whether the x-ray will come into general use for measuring the diameters of the pelvis will depend upon simplifying the methods that are in use at present. The difficulty in reading such a roentgenogram and measuring the diameters is due to the fact that the parts of the pelvis farthest away from the plate are distorted. In consequence special scale plates, ruled in such a way as to show the same distortion, plumb bobs to give a definite point to measure from, and other complex mechanical contrivances and rather complicated mathematical calculations are necessary at present in order to arrive at an accurate result. With these means, however, expert radiographers appear to be able to get more definite measurements than can be obtained by the ordinary methods of pelvimetry.

As Spalding states, "The method is too expensive to be used as a routine, but will be found very helpful in cases with suspected abnor-
malities of the pelvis detected either with the usual methods of pelvimetry or from an abnormal progress of labor.

The x-rays are of inestimable value in moderately contracted pelvis, because they give an outline of the superior strait and enable one to determine, by the relation of the fetal head to that outline, more nearly what course to pursue when the patient goes into labor. It enables one to decide whether it is advisable to give such a patient the benefit of a test of labor with the possibility of a more or less normal outcome, or to do an elective cesarean section, when the picture shows that no other method of delivery is feasible.

In patients with apparently normal measurements, in whom a first pregnancy may end in a difficult labor and perhaps death of the fetus, the x-ray may show some abnormality or obstruction at the inlet or outlet of the pelvis, that readily accounts for the previous difficulty and will aid in deciding upon a different method of delivery in a succeeding pregnancy.

The x-ray will be of most value in those pregnant cases where a gross deformity and abnormal pelvic measurements, obtained in the ordinary manner, lead one to expect difficulty in delivery. In such cases the contour of the superior strait as shown in an x-ray picture will be of more aid in arriving at a probable method of delivery than the pelvic measurements previously obtained. Cases are few in which a slight difference in pelvic measurements will be the determining factor in the conduct of an abnormal case, the size and adaptability of the fetal head in relation to such abnormality being the final factor after all.

It should be possible in nearly all instances to show the fetal skeleton by x-ray after the fifth month of gestation. Physiologists state that the deposit of lime salts in the fetal bones does not begin until after the tenth week, and it stands to reason that a considerable deposit of such salts must be present before the bones will be outlined in an x-ray.

Even at ninety days, Horner claims that the density of the ossification centers of the fetal bones is not great enough to show through the abdominal and uterine walls and liquor amnii, and at one hundred and twenty days only that part of the fetus over the inlet is demonstrable, the rest being obscured in liquor amnii, muscle and maternal bones. It follows, accordingly, that one need not expect to secure an x-ray of the fetal outlines before the end of four months of gestation.

It is at times impossible to get a successful x-ray in an anteroposterior direction. In such circumstances a lateral view will often yield a successful picture.

For teaching purposes x-rays of the pregnant woman near full term are invaluable. They show clearly by the skeletal outlines the presentation and position of the fetus, so that the various positions of the head and their relation to the cardinal points on the pelvis can be shown. Breech and transverse presentations are readily demonstrated.
The x-ray is certainly the most definite agent in diagnosing multiple pregnancy, as the outlines of the two fetuses can readily be seen in a good picture and there can be no disputing such a diagnosis.

In cases that are postmature, the relation of the presenting head to the outline of the superior strait, as shown in a good x-ray plate, should offer more accurate information than the measurements of the height of the fundus and the attempts to measure approximately the diameters of the fetal head through the abdominal and uterine walls of the patient as practiced by Reed and others.

Warnekros of Berlin, in an illustrated article presented before the Association of Obstetricians and Gynecologists of Berlin five years ago, may well claim to have reached the very extreme of roentgenology in obstetrics as he actually demonstrated the mechanism of labor in the living women by a series of roentgen ray pictures. These also prove his assertion that the fetus does not present the compact attitude described in all the textbooks, the head is not flexed, the spine is bent but little and the extremities lie as loose and unrestricted as the cavity of the uterus will permit.

Warnekros was also able to demonstrate frequent changes of position in pregnancy and even noticed the spontaneous change of a breech into a vertex at full term.

It would seem, therefore, that there is no limit to the availability of the roentgen ray in the demonstration of obstetric and gynecologic conditions. In early pregnancy it should be possible by pneumoperitoneum to bring into distinct relief the enlarged organs of gestation, while in the later months the outlines of the fetus clearly pictured should remove any doubts as to the condition and show any abnormalities present besides.

Dr. Henry H. Turner, to whom I am indebted for the x-ray work in connection with this paper, states that in a series of fully 300 cases, x-rays of the fetus after the fifth month were almost invariably constant. Without pneumoperitoneum the earliest fetal shadows showed at three and a half months, with two at four months.

With the aid of pneumoperitoneum the normal uterus with tubes and ovaries can be shown and the gradual increase in size of the pregnant uterus visualized. As mentioned by Warnekros it has been possible to demonstrate by x-ray the conversion of a frank breech into a cephalic presentation shortly before active labor.

There is no question that with the aid of the Bucky-Potter diaphragm, intensifying screens and Eastman superspeed films, positive and constant diagnosis of pregnancy can be made after the fifth month, and with pneumoperitoneum there is little excuse for failure to differentiate between pregnancy and conditions simulating it.
REFERENCES


717 FRANCIS BUILDING.

DISCUSSION

DR. FRANCIS REDER, ST. LOUIS, MO.—A young lady, twenty-five years of age, unmarried, was in the hospital under the care of a physician. I was asked to perform an operation for the removal of an ovarian cyst. The physician was well known to me. Whether or not he was ignorant of the true condition I do not know. The examination I made was not satisfactory to me. Certain findings aroused my suspicion. I asked that an x-ray picture be taken. The doctor asked, "Why an x-ray picture?" I told him that I would like to know whether or not this was a dermoid cyst. The x-ray picture disclosed a twin pregnancy at about the fourth month.

DR. BURNLEY LANKFORD, NORFOLK, VA.—Dr. Speidel has brought to our attention another method of diagnosis. We can usually make a diagnosis after the cessation of menstruation clinically. There is a certain proportion of cases in which we cannot make a diagnosis, and it is well to draw attention to the value of the x-ray in these cases, and I would like to know how much help we are able to obtain in regard to the question of the postmature fetus when the measurements are apparently normal.

DR. DAVID HADDEN, OAKLAND, CALIF.—My experience with the x-ray in the diagnosis of pregnancy has been unfortunate. In the first six or seven cases sent to a roentgenologist, abortion occurred or labor started within twenty-four to forty-eight hours, but whether due to the dosage or not, I do not know. I have given up the x-ray as an aid to the diagnosis of pregnancy.

DR. SPEIDEL (closing).—The point brought out by Dr. Hadden is an important one and should be considered. In more than 300 x-rays that we have made we have had no accidents of any kind. The picture I showed you here of a dead fetus was not one of those that had been x-rayed previously. The point seems to be this: A slight exposure is necessary in making an x-ray of a fetus. Again, pneumoperitoneum is not injurious to the fetus or to the mother's sexual capacity and should not be confounded with x-ray radiation which is used in the treatment of pelvic conditions. The exposure in the latter is more frequent and longer. In 300 pneumoperitoneums Dr. Turner reports never having had an accident of any kind.

In answer to Dr. Lankford, we have not studied the x-ray in postmature cases because the data we get in our City Hospital are so unreliable that we cannot tell whether the child is postmature or not.
EXTRAPERITONEAL CESAREAN SECTION (GASTROELY-TROTOMY) IN PRESUMABLY INFECTED AND MISMANAGED CASES OF PROLONGED LABOR

By Asa B. Davis, M.D., F.A.C.S., New York, N. Y.

(Medical Director, Lying-In Hospital)

The methods by which a child can be delivered through the abdominal wall are still passing through a period of evolution and development. Many ingenious and different plans have been and still are being attempted. Some are found to be so lacking in merit that they soon, very properly, pass on into the discard. Some show many desirable advantages and yet are attended with serious disadvantages. It is altogether probable that the best method of performing cesarean delivery has not, as yet, been attained. We hear much about the abuse of cesarean section to the exclusion of the other well-known methods of delivery. This criticism, certainly, does not apply justly to large well-conducted maternities. An abuse which we undoubtedly do witness, both in maternity hospital services and in cases under the care of private practitioners, is the failure to recognize early in given cases that delivery through the pelvis will be fraught with great danger to mother and child or else is impossible of accomplishment. If this were not true it would not have been possible for the writer to have seen, during the past March and April, within five weeks, eight cases in which craniotomy was the only thing left to be done. These eight well-developed, full-term fetuses were either already dead or so near dead that it would not have been possible to prepare an operating room quickly enough to give any promise of saving these children. The result was that eight, otherwise healthy, young women, except for the disproportion between pelvis and fetus, had passed through the risks and burdens of pregnancy, had been subjected to hours upon hours of ineffective labor and delivery by craniotomy. One mother lost her life; seven others, if so many survived, were childless. In seven of these cases the dystocia was due to either a well-marked funnel or male type pelvis. The eighth had a neoplasm, so situated that it made pelvic delivery impossible. These conditions should have been recognized during pregnancy, or at the latest early in the first stage of labor. Timely cesarean section was clearly indicated and would have saved these eight children and the mother who was lost. This is not a cry along a new trail. To go back not more than some seventy odd years, Cazeau, with rare comprehensive insight, pointed out the dan-
ger and objections to prolonged ineffective labor, especially with membranes ruptured. Nearly every textbook on obstetrics since his time reiterates the same thing, until we might properly write into obstetric history: "As it was in the beginning, is now"—Are we to continue so that the remainder of the quotation, "and ever shall be, world without end," is to be applicable?

Autopsies at the Lying-in Hospital upon stillborn infants and upon those who die soon after birth are revealing some instructive, if unpleasant, facts. It is found that the number of these children who die from cerebral hemorrhage, after unduly long labors which are eventually either terminated spontaneously or by forceps or version, is unwarrantably large. Similar cases, which have been under the care of private physicians have been admitted to the hospital after long labors, unknown attempts at operative delivery and examinations, but with a living child in fair to good condition. It is this type of case which gives the high maternal and fetal mortality following cesarean section. It is this type of case, with disproportion between fetus and pelvis, long labor, with ruptured membranes, unclean examination, unsuccessful attempts at operative delivery, which has made it impossible for me, in an experience of more than twenty-three years and somewhat over five hundred and eighty cesarean deliveries, to reduce my maternal mortality much below eight per cent, although at one time I could show nearly one hundred consecutive cesarean sections without a maternal death. The different members of the attending staff at the Lying-in Hospital, as seems best to each one, are attempting to cope with the presumably infected case, by a technic other than the classical cesarean section, which gives a very high mortality. Some favor the transperitoneal method, some the so-called double flap method; some a technic which is near or quite extraperitoneal.

I have employed the double flap technic in three cases and have lost one mother and her child. This mother gave one of the most horrible exhibitions of septic infection which has ever come under our observation.

In 1918 I began to employ, for these presumably septic, unfavorable cases, practically the technic of Thomas, which the latter called "gastroelytrotomy." I have used it in twenty-eight cases and have lost two mothers and seven children, three of which were stillborn and four died after delivery—a maternal mortality of 7.2 per cent, fetal mortality, 25 per cent.

Without any attempt at a review of the literature upon this subject, it may not be amiss to quote rather freely from what is found in the Fourth American Edition of Playfair's System of Midwifery, published in 1885, under the title, laparoelytrotomy. We learn that
in 1820 Ritgen proposed laperoelytrotomy, leaving the peritoneum intact. He attempted such an operation unsuccessfully and was obliged to deliver his patient by caesarean section. In 1823 Beaudeloque the younger independently conceived and performed the same operation without success. In 1837 Sir Charles Bell conceived a similar operation, but there is no mention of his ever having performed it.

In 1870, Dr. T. Gailllard Thomas of New York read a paper before the Medical Association of the town of Yonkers, New York, entitled "Gastroelytrotomy, A Substitute For Cesarean Section," in which he described the operation which he had performed three times on dead subjects and once on a married woman with a successful issue as regards the child. It is further stated: "The object of the operation is to reach the cervix by incision through the lower part of the abdominal wall and upper part of the vagina, and through it extract the fetus as may most easily be done."

In a footnote we read as follows: "New York Medical Journal, Nov., 1878, Thomas operated twice, Skene four times, Charles Jewett of Brooklyn twice; Hime, Edis, Dandridge and Taylor of Cincinnati, and Walter R. Gillet of New York each once, in all 12; women saved, 6; children living but not moribund, 7; bladder lacerated in 6 cases. In properly calculating the risk of the operation it is fair to exclude the moribund case of Thomas, the intemperate and bedridden case of Hime and the diseased subject of Edis who survived, respectively, one hour, two hours and forty hours. The balance, nine cases, were favorable in four instances and unfavorable in five; six of the nine women recovered and five children were saved."

We may note in passing that while this operation is a much more difficult one to perform, the above results were far better than those obtained at that time by abdominal cesarean section.

**THE THOMAS TECHNIC**

"The abdominal incision extends from a point an inch above the anterior superior iliae spine, and is carried, with a slight downward curve, parallel to Poupart's ligament until it reaches a point one inch and three quarters above, and to the outside of, the spine of the pubes. Beyond this point it must not extend, in order to avoid wounding the round ligament and the epigastric artery. In this incision the skin, the aponeurosis of the external oblique, and the fibers of the internal oblique and the transversalis muscles are divided. The rectus is not implicated. After the transversalis fascia is divided the peritoneum is reached and readily lifted up intact, so as to expose the upper part of the vagina, through which the fetus is extracted." This report continues at considerable length in its description of the anatomic relations and development of the upper part of the vagina during late pregnancy and the difficulties and dangers attendant upon opening it—stating that in Beaudeloque's case, because he incised instead of tearing the vagina he was obliged to discontinue the operation on account of the loss of blood.
While the technic employed in operating upon the cases which I report is in principle, based on the foregoing as described by Dr. Thomas, it differs from it, I believe, in some essential particulars and results.

PRESENT TECHNIC

Starting at a point on a level with, and about 2 cm. to the left of, the right superior iliac spine an incision down to the aponeurosis of the external oblique muscle is extended obliquely downward and inward to the middle line parallel to, and slightly above, Poupart's ligament, the inner end being slightly above the spine of the pubes. As the superficial epigastric artery and other vessels come into view they are double clamped, divided and ligated. It has been found that this is a time saving precaution, in that it keeps the field of operation clear. The edges of the wound are retracted and in succession the remaining layers of the abdominal wall are divided, where possible separating the fibers. The transversalis fascia is opened the whole length of the wound. Passing the hand close to the posterior surface of the front wall of the bony pelvis the bulging peritoneum can be readily lifted, and, covered with a pad moistened in warm salt solution, is held out of the way in the upper and outer part of the wound by a retractor. No attempt is made to expose or open the vagina, although it is sometimes opened for a short distance in cases where more room is needed. The bladder is more readily manipulated if it contains just enough fluid to give it outline. With a boring movement of the fingers at the upper and right margin of the exposed portion of the bladder, its posterior wall is readily reached and an easy line of cleavage is found. Passing the fingers up to the uterovesical fold the bladder can readily be freed from above downward and to the left. This exposes the anterior portion of the lower uterine segment, a large area in a pregnant uterus developed to full term. While a wound of the size and location as described is necessary, it is well, in so far as possible, to keep manipulations away from the outer end of the opening. In my hands, failure to do this has several times resulted in such complications as making a small opening through the peritoneum, tearing across the circumflex iliac artery, resulting in annoying delay from a wound quickly filled with blood, and the necessity to find and ligate the bleeding point, and the undue exposure to injury of the external iliac artery.

Considerably more room can be gained by partially dividing the tendon of the right rectus and the pyramidalis muscles rather close to the right pubic spine. The bladder is covered with a moist pad and retracted downward and to the left. The exposed portion of the uterus is thinned and bulged forward by the presenting part of the fetus. Retracting the wound as far as possible to the left a vertical incision is made close to the left side of the abdominal opening and from below the uterovesical fold downward far enough to furnish an opening sufficiently large to allow the delivery of the fetus. Sometimes, but not in all cases, this opening extends into the upper part of the vagina. At this time it is well to take a culture from beside the presenting part of the child. By this location of the uterine opening as described, and by the usual dextro-torsion of the uterus, should this opening be extended by laceration during the delivery of the fetus, there is less likelihood that the uterine artery will be reached and torn across. In my earlier operations this accident happened in several cases. Proceeding now with the delivery,—forceps were usually applied, but except in two or three instances delivery has proved unsuccessful by this means. Nearly all of the children have been delivered by internal podalic version and breech extraction, followed immediately by manual extraction of the placenta and membranes. Unless more than usual precautions are observed,
the overstrained but now relaxed uterus is more than likely to give an exhibition of several quick profuse hemorrhages in which the total loss of blood is considerable. The fundus should be promptly held and 1 c.c. of pituitary extract should be injected deep into the muscles of the thigh. From observation and experience I have reached the confirmed belief that pituitary extract should have no place in obstetric practice until the uterus is empty. In case a portion of the vagina is opened and annoying bleeding results from the cut edges, this can be overcome by digital compression or by several deep temporary sutures passed parallel to, but well back from, the edges of the wound, to be removed after permanent closure.

The opening in the uterus is closed by two or three layers of sutures with a continuous suture close to the deep edges of the uterine wall. Several interrupted sutures and a continuous Lembert suture complete this part of the operation. Sometimes the uterus has so thinned that it is difficult to find room for three layers. The bladder and peritoneum are allowed to resume their normal location.

The divided portion of the tendon of the right rectus and the pyramidalis muscle are carefully approximated and secured by several interrupted chromic sutures. A continuous suture closes the transversalis fascia; another layer of interrupted sutures secures the muscle fibers. The edges of the aponeurosis of the external oblique muscle are overlapped by the use of the mattress sutures and the free edge secured by a continuous suture. The remainder of the wound is closed with silkworm gut sutures. In earlier cases I employed strands of chromic gut or rubber tissue carried down to the fascia. Soon I abandoned the use of any drains. No better results were obtained with than without drainage.

It should be borne in mind that all of the cases herewith reported were septic to a greater or less degree. All of these cases had high temperatures after operation. In no case was it possible to secure primary union of the abdominal wound. Two showed only an oily discharge for a day or two from two or three stitch holes. In twenty-one cases, part, or the whole length of the wound separated down to the aponeurosis. In four cases the whole depth of the wound broke down with considerable sloughing. Two patients died early before the repair process had time to exhibit what would have happened. The wounds healed readily, and in all cases the infection remained local, with the exception of two or three cases in which there was mild tenderness down the inner part of the right thigh, as of a very slight phlebitis. I have had no evidence that the uterus was infected, or that its wound failed to unite by primary union. In a few of the cases there must have been a very localized peritonitis. With the exception of one case, either by symptoms or leakage, there has never been any suggestion that the bladder had been injured or later become infected. One case which sloughed badly had a vesical fistula for a short time, which soon closed spontaneously.

It is not surprising that considerable fat necrosis occurred in many of the cases from traumatism due to retraction. Because of open wounds the stay in the hospital was usually quite prolonged. In four cases, we freshened the granulating surfaces and the skin edges,
and resutured the wound after sloughing had ceased. Healing was almost perfect in every case and the necessary stay in the hospital was considerably shortened. All of these patients were tired out and exhausted.

The operation is physically and technically a very difficult one to perform. In early cases, I spent something over two hours, later being able to perform this operation in about fifty-five minutes. Much time was lost because of the failure to secure bleeding points before or at once after vessels were cut. Very much more time was lost before I learned how to detach the peritoneum and also in the attempt to detach and separate the bladder along its right side, where the line of cleavage is not distinct. Notwithstanding the previous condition of these patients, and the fact that they were subjected to a long difficult operation, their early postoperative condition was remarkably good. Vomiting was never a distressing symptom, and abdominal distension was almost entirely absent.

In Dr. Thomas' report, considerable stress is laid upon the danger of injuring the deep epigastric artery. From early reports, opening into the bladder was rather a common accident. I cannot recall that the deep epigastric artery ever came into view or was injured in any of the cases. In one case only there appeared a urinary fistula. This became evident after the tenth day postoperative, and was believed to have been due to the neighboring sloughing. In two cases the right round ligament, and in one, the right ureter, were innocently in evidence. They caused no inconvenience, and so far as I was able to determine they suffered no injury. Usually the widely expanded pregnant uterus tends to carry these structures far out to the sides and out of the way.

Some of the more salient points of interest in connection with these cases are that there were sixteen primiparæ, one para ii, five para iii, one para iv, one para v, one para vi, two para vii, and one para viii. The ages ranged from seventeen to forty-one. Twelve of these cases were wholly under the care of the Lying-in Hospital. The remaining sixteen had been under the care of other physicians and midwives for an unknown number of hours. Of the two mothers who died, one was forty-one years of age, and a para viii. She had been under the care of an outside physician, and a midwife. She gave a history of having had three living children. The first was stillborn; an instrumental delivery. The others were difficult deliveries. The second was a small sized child, the third was a large child, the fourth of medium size and difficult delivery. She had also had three abortions in the third month of pregnancy. In the labor under consideration the child weighed 4,160 grams and lived. The mother died on the second day, of general peritonitis. There was
serosanguineous fluid in the peritoneal cavity and cultures showed hemolytic streptococci. This woman had a contracted pelvis, and reported that all of the living children had been injured by the stretching of the brachial plexus.

The other patient who died was twenty-seven years old, a para i, who had had outside medical attendance for an unknown number of hours before admission. A forceps delivery had been attempted. The patient gave a history of having had pneumonia three weeks before labor. Her child weighed 2,020 grams and lived. She was in poor condition on admission, and it was my impression that the cause of her death was pneumonia plus labor, rather than the reverse. No culture was taken in this case.

In all of the twenty-eight cases reported the fetal heart was heard just before operation was begun. Three babies were stillborn. In these cases there was marked tonic contraction of the uterus, and evidence of fetal distress as indicated by the escape of meconium and a varying fetal heart. In one of these stillbirths, the mother was a girl of seventeen years, who had been under the care of an outside physician, and a midwife. Hydrocephalus and spina bifida were found in the child. It was a face presentation.

Four babies died. One child died after four and a half days; another on the nineteenth day from a very extensive pemphigus. The mother in this case showed a four plus Wassermann reaction. The third child weighed 4,870 grams and died on the labor day; the autopsy showed atelectasis and asphyxia. The patient had been in labor for a long while prior to admission to hospital. The fetal heart was from 140 to 180 prior to operation. In the case of the fourth child, labor was said to have been in progress for three and a half days under outside care. The child weighed 3,400 grams, and died six hours after delivery.

All of the cases wholly under the care of the Lying-in Hospital, with trial labor going on for so long a time, and in some instances attempted forceps delivery, had been for this reason rendered unsuitable cases for classical cesarean section. All of these mothers survived. A stillbirth occurred in one case after sixteen hours' labor. One child died on the nineteenth day from pemphigus; the mother was syphilitic.

Six of these patients in a subsequent pregnancy have come under my care. One in the third month, when assured that she was pregnant, declared that her husband demanded that she should have abortion induced. Nothing further has been learned about her. The other five continued to the full term of pregnancy. One had an almost precipitate spontaneous delivery of a very small child. Four others were delivered by me, by classical cesarean section. Bimanually,
with one hand through the cesarean opening in the uterus, the site of the former extraperitoneal operation was carefully examined in each case. It was rather surprising to find how well the uterine wall had closed and how little in evidence were adhesions in the neighborhood. In no instance was there found any weakening or hernia at the site of the former opening in the abdominal wall.

I am more and more impressed with the importance of securing the essential points in the history of every pregnant woman. The primiparous patient is an unknown quantity, obstetrically speaking, but in her case it is important to learn whether she has any history of disease, previous illness, or operations, which may have some bearing upon the course of her pregnancy and approaching confinement. This likewise holds true of the multiparous women, but also a searching inquiry should be made into her previous obstetric history. In women who are able to develop a fetus through pregnancy and into labor, with our present knowledge and equipment it should be impossible to find histories of two, three, four, and in one of our cases, of five consecutive stillbirths or the delivery of injured children who soon die, and certain others who are not so fortunate as to die, but are elected, because of birth injuries, to materially swell the ranks of the incompetent and to overcrowd institutions for the crippled and feeble minded. Patients giving histories of difficult or operative deliveries with bad results should be examined as to the cause of this. They should be watched with unusual care in each individual case. Some means should be found by which the previous course should not be repeated, even delivery by cesarean section if that is the best procedure in a given case. But the condition should be foreseen and provided for.

After the patient's history has been taken there should be a general examination sufficiently thorough to indicate whether she is suffering from pulmonary or cardiac disease. Then should follow the routine obstetric examinations, which should include height, weight, breasts and nipples, abdominal measurements, palpation, and auscultation for the fetal heart, external and internal pelvimetry, blood pressure, urinalysis and the Wassermann test. I find that about 2 per cent of all applicants at the Lying-In Hospital, show a positive Wassermann reaction.

Pelvimetry is important and should in no sense be neglected. Patients having contracted pelves, should be under careful observation. If they are given the opportunity and the observation be close enough, we shall see that a large proportion of such cases will deliver themselves without assistance, or at most, by the aid of easy forceps. The remainder of such cases have either declared themselves by their former history, or they soon make it evident that they require some form of operative assistance—forceps, version or cesarean section. Many of the
patients with distorted and contracted pelves habitually give birth to small children; often the skull bones are thin and capable of being dented like a sheet of eelluloid; they have wide suture spaces; the fontanelles are large. Such heads will mold and pass through surprisingly contracted pelves. In former times we were instructed: Given such and such pelvic measurements, such and such management of a case should be carried out.

We still see, from time to time, publications giving this same sort of advice. The wise obstetrician will do nothing of the sort. He will take pelvic measurements as he would a laboratory report as a part of the data in the individual case under observation at the time, and from the previous history, from the measurements, from the contour, muscular make-up of the uterus and abdomen and their driving force, and above all from the size, shape and moldability of the fetal head, he will decide whether that particular head will pass through that particular pelvis. If his stock of wisdom still holds out and he considers the interest of mother and child and his own peace of mind, he will determine this fairly early, before the patient is exhausted and the fetus shows signs of distress, and the liability to infection has been increased by ruptured membranes and manipulations. It is becoming fairly easy to detect these cases with contracted pelves, or disproportion between pelvis and vertex, which will require some form of operative assistance in delivery. It has seemed to me that this type is rather decreasing in numbers.

There is another distinct type, seen much more frequently than formerly, and far too little called to notice by teachers and writers. I refer to the woman having the male type or funnel pelvis. They are difficult to detect and they require the keenest kind of obstetric judgment and skill to carry a given ease of this kind through labor with safety and success for mother and child. Here pellvimetry gives no assistance whatever. These patients are usually of medium height, stocky build, with apparently broad hips. They have the appearance of robust health and vigor. They are well nourished, buttocks and hips especially are made up chiefly of large cushions of fat. Their external pelvic measurements are up to or above normal. The lumbosacral angle is accentuated. A horizontal plane passing through the promontory and another through the symphysis pubes are far apart. The pelvic bones are thick and strong. The pubic arch may or may not be narrowed. The internal, diagonal conjugate, if the promontory can be reached, not infrequently measures twelve or more centimeters. Sometimes the contour of the pelvis below the inlet is well formed and of ample capacity. In other cases one or both of the side walls of the true pelvis are flat and tend to converge. The pelvic inlet would be ample for an ordinary moldable vertex, and in many of the cases, if a large part of the vertex would pass through the inlet with
a fully dilated cervix, there would be comparatively little difficulty in completing pelvic delivery. But the pelvic make-up and capacity is but one side of the equation. Such patients habitually give birth to large children with hard, square block-like heads, with thick dense cranial bones and suture lines and fontanelles which are hardly discernable. Membranes are apt to rupture before or soon after the onset of labor. Posterior positions are rather frequent. Such cases are deceptive because a considerable segment of the vertex sets into the inlet like a ball valve; it does not advance. Such dilatation and thinning of the cervix as takes place is slow. In many cases labor is neither continuous nor vigorous. One is apt to be misled by the hope that active progressive labor will soon begin resulting in dilatation of the cervix and advance on the head. Such cases are apt to develop tonic contraction of the uterus and thin out the lower uterine segment, risking rupture of the uterus, compressing the vertex down against the inlet and the placenta against the child. As if this were not danger enough, far too many of these cases are given pituitrin at this stage. It would be bad practice to give ergot under such conditions, but pituitrin, which acts with great suddenness and force within four minutes after its injection, as I have repeatedly witnessed in cesarean operations, after the uterus was empty, by some strange reasoning, in the minds of not a few, appears to be good treatment. These cases are difficult and dangerous for mother and child; they belong in a hospital. They certainly should not be attempted single-handed and alone in the patient's home. In many of them if pelvic delivery, dilatation and incisions of cervix and forceps are persisted in, the operator does not usually look upon his completed work with pride. If version is attempted, too often the results are not good. Many of them become unsafe, because of the risk of sepsis, for classical cesarean section, unless this is done early. This type of case gives the high percentage of stillbirths, cerebral hemorrhage, broken necks, children in whom the heart continues to beat for an hour more or less, and yet it is impossible to start respiration, or those who die soon after birth. Would it not be better to foresee some of this early and "abuse" cesarean section in more of these cases and do it early when it is comparatively safe for mother and child? If the mothers are made to understand, there is no doubt regarding the answer which they will give.

RÉSUMÉ AND CONCLUSIONS

1. The sooner the general public, both lay and medical, come to the realization that reproduction is potentially, and in ten per cent of the cases, actually a pathologic process, and act accordingly, the sooner childbirth will be removed from the position which it now holds in this country as, next to tuberculosis, the cause of the greatest number of deaths.
2. Every pregnant woman should be under competent obstetric care and instruction soon after conception, through gestation, labor and the puerperium, which should continue until everything possible has been done to restore her to her normal activities of life in good condition. Ninety per cent of pregnant women should be under careful observation, but aside from a few simple precautions and instructions, as long as they are progressing favorably, should be treated to a very generous share of masterful letting alone. It should always be kept in mind that some from this larger class have a way of moving, gradually or abruptly over into the abnormal class.

3. The emergency obstetric case should disappear. It is this type of case which magnifies the morbidity and mortality of obstetric records. So long as such cases do occur, the well equipped maternity hospital should receive them, even though they are apparently about to die. With such aid, some of the seemingly hopeless cases will recover. There should be some way of checking up the activities of the doctor who is repeatedly showing bad results. Such an one should be rather actively encouraged to direct his energies along less dangerous lines.

4. We can often see more by looking backward. We would accomplish more, with better results, by looking ahead. Preventive obstetrics should be a widely broadcasted slogan. The public should be taught to be more critical of obstetric result, and not to so complacently accept dreadful injuries to mother and child, or death of one or both, as the Will of an overworked Providence. Extraperitoneal cesarean section will save some lives that would otherwise be lost. Classical cesarean would have saved but few of the cases reported.

CASE REPORTS

CASE 1.—C. N. 41815, aged twenty-six, a para i. Operation October 25, 1918. She had been under the care of an outside physician. In labor three days, membrane ruptured, pituitrin soon after labor began. Attempts at delivery, number of vaginal examination unknown. Condition on admission: Temp. 101° F., tonic uterine contractions, fetal heart 156, poor quality, vertex R. O. P. Weight at delivery 3,300 grams. Stillbirth. Culture beside vertex before delivery from uterus showed staphylococcus aureus. Vertex not engaged. Pelvic bones thick. Internal diagonal conjugate 9.5 cm. Postoperative condition of mother good. Discharged twentieth day. Wound healed except 1 cm. superficial granulation at external end.

Case 3.—C. N. 42138, aged twenty-three, para i. Extrapерitoneal delivery December 4, 1918. In labor five days, 10 or more vaginal examinations. Given "black pills" and chloroform. Forceps delivery attempted. Examination: small slight woman, poorly nourished, general condition only fair. Tonic contraction of uterus about fetus. Vertex overriding pelvic brim; fetal heart only fair quality, 160 to 165. Membranes ruptured. Left side of cervix showed recent laceration and portion of left vault of vagina torn away. Child delivered alive, weight 3,140 grams. Had right sided facial paralysis from outside attempts at forceps. Died fourth day, edema of lungs. Mother recovered. Discharged twenty-fifth day. Wound healed except two small sinuses,—discharging small quantities of serum. Cultures from uterus before delivery, staphylococcus aureus; from abdominal wall later staphylococcus albus.

Case 4.—C. N. 42173, aged twenty-eight, para i. Extrapерitoneal delivery December 8, 1918. In labor 60 hours, membranes ruptured 25 hours. Private physician made five vaginal examinations. Had been given pituitrin 13 hours prior to admission, no attempts at delivery. On admission general condition only fair. Rough breathing lower left base. Tonic uterine contraction, well marked ring of Bandelier, cervix fully dilated. Internal diagonal conjugate 10.5 cm. Fetus, breech L. S. A., partly engaged, tightly compressed by uterus. Weighed 4,000 grams, white and limp when delivered; respiration established with difficulty. Cultures not taken from uterus before delivery,—from partially broken down abdominal wound later, showed staphylococcus aureus. Recovery slow, discharged forty-fifth day. Wound open two inches,—one-fourth inch deep, clean, granulating. Child living.

Case 5.—C. N. 42754, aged twenty-nine, para i. Operation February 17, 1919. Sent from a hospital thirty miles outside of New York. In active labor for many hours before admission; floating head, funnel pelvis, membranes intact until ruptured by me twelve minutes before operation. History of repeated examinations by three physicians, no attempt at delivery, morphine had been given. Condition of mother and fetus fair. Living child weighing 3,650 grams. No culture taken. Puerperium uneventful. Mother and living child discharged seventeenth day.

Case 6.—C. N. 42838, aged thirty-eight, para vii. Operation February 26, 1919. Two stillbirths, a third died when two weeks old, one abortion at three and a half months, has two living children, three had been forceps deliveries, second and third children delivered spontaneously. Sent from outdoor service. Membranes ruptured spontaneously two days prior to delivery. Ten vaginal examinations, no attempt at operative delivery, morphine had been given. Systolic murmur without symptoms. Tonic condition well marked. Pelvis rachitic, contracted; Internal diagonal conjugate 8.5 cm. Vertex, R. O. A. overriding brim. Weight of child 3,625 grams, living. Profuse bleeding during and after operation, pulse rapid and irregular. Pituitrin given during operation. Left side of vagina torn from uterus, peritoneum opened, intestines exposed, rent repaired. Cultures developed staphylococcus albus. Discharged with living child twenty-first day;—shallow granulating wound 3 to 4 cm. at outer end of abdominal wound.

Case 7.—C. N. 42850, aged thirty-five, para vi. Operation February 26, 1919. First child, attempted forceps, craniotomy. One abortion in fourth month. Three living children, all small, spontaneous deliveries. This labor wholly under care of hospital, in progress two days—membranes ruptured early, vaginal examinations three by staff, one by attending. Vertex L. O. A., impacted, contracted pelvis. True conjugate, 8 cm. Tonic contraction. Cervix edematous with old deep laceration. Condition of mother and fetus good. Ergotole given,
delivery by version. During delivery opening four inches long torn into peritoneum, exposing intestines. Living child 3,675 grams. No cultures taken. Discharged with living child fortieth day,—wound almost healed.

CASE 8.—C. N. 42948, aged forty-one, para viii. Operation March 11, 1919. One stillbirth, 3 abortions third month, 2 living children, first instrumental, difficult labor 36 hours, stillbirth. Second, small child, 10 hours labor, living. Third labor, 6 hours, large child, midwife and doctor, stillbirth. Fourth, medium sized child, difficult labor, 8 hours, living child. All living children said to have had brachial palsy. Present labor had been under care of two private physicians, duration, examinations and attempts at delivery unknown. Condition of mother and fetus on admission not noted. Shoulder L. S. A., contracted pelvis, internal conjugate 9.5 cm., two examinations after admission. Operation uneventful, child weighed 4,160 grams, lived. Mother died second day. General peritonitis; bacteremia.

CASE 9.—C. N. 45018, aged seventeen, para i. Operation December 25, 1919. Under care of midwife and private physician prior to admission, said to have been in labor 16 hours, membranes ruptured. Contracted pelvis. Impacted face, R. M. A. Ergotole given. Uneventful operation, child weighed 3,630 grams, stillbirth. Hydrocephalus and spina bifida. Mother weak, condition poor, wound broke down seventh day. Phlebitis both lower extremities, wound healed fifty-fifth day and patient discharged.


CASE 11.—C. N. 45299, aged twenty-seven, para i. Operation February 1, 1920. Only partly under care of hospital. Membranes said to have been ruptured one day before admission. Had had five different private physicians; forceps delivery had been attempted and it was stated that patient had had pneumonia three weeks before admission. Condition poor, operation uneventful, living child, vertex L. A. O., weighing 2,020 grams. Contracted pelvis. Tonic uterine contraction. Mother died second day, lobar pneumonia; pneumoecoccus recovered from sputum.

CASE 12.—C. N. 45579, aged twenty-seven, para i. Operation March 9, 1920. Had been under care of private physician. Duration of labor and management unknown. Patient in fair condition but exhausted. Contracted pelvis, tonic contraction of uterus, membranes ruptured. Pituitrin said to have been given. Living child, weight 3,070 grams. Eighteenth day wound healed, mother and child discharged.

CASE 13.—C. N. 45664, aged thirty-three, para iv. Operation March 18, 1920. Wholly under care of the hospital, sent from outdoor department. Three vaginal examinations, no attempt at delivery, membranes had ruptured spontaneously 13 hours prior to operation. Condition of mother and fetus fair. The latter lived and weighed at birth 3,400 grams. Both were discharged on the twenty-seventh day. Wound healed.

CASE 14.—C. N. 48493, aged twenty-two, para i. Operation March 19, 1921. Labor wholly under care of hospital. Marginal placenta previa. Contracted pelvis, conjugate 9 cm. Condition poor, eclampsia, three convulsions after ad-
mission prior to operation. Fetal heart 172. Operation followed by coma. Living child weighed 2,590 grams. Seventy-third day, wound healed, both discharged well.

**Case 15.—C. N. 49789, aged thirty, para v.** Operation August 20, 1921. Has one living child, two stillbirths, one child died at four years of scarlet fever. First easy, others instrumental. One internal podalic version, transverse presentation. Wholly under care of hospital, membranes ruptured five hours before delivery. One vaginal examination, condition fair on admission. Delivered living child weighing 3,610 grams. Wassermann for mother positive, child negative. Mother had abscess of right elbow which was incised and drained. Culture from abdominal wound showed staphylococcus albus and from pus of right elbow staphylococcus aureus. Abdominal wound resutured September 19, 1921. Mother and child discharged fifty-fifth day.

**Case 16.—C. N. 50207, aged twenty-seven, para ii.** Operation October 6, 1921. Wholly under care of hospital, at first in outdoor service. Attempted forceps delivery unsuccessful because of tonic contraction of the uterus. Admitted to indoor department in fair condition. Patient had flat pelvis. Living child delivered weighing 3,710 grams. Cervix was fully dilated, small portion of vertex through brim. There was marked edema of soft parts. Culture from uterus was sterile, that taken later from broken down wound showed staphylococcus albus. Mother and living child discharged in good condition on eighteenth day.

**Case 17.—C. N. 51025, aged twenty-eight, para i.** Operation January 7, 1922. Wholly under care of hospital, out-patient first. Membranes ruptured spontaneously, had seven vaginal examinations, condition fair on admission, fetal heart 144. Flat pelvis, sharp promontory. No progress or engagement of head after long labor. Delivered living child weighing 3,850 grams, died nineteenth day from pemphigus. Patient discharged forty-third day, wound practically healed. Culture from wound showed staphylococcus albus.

**Case 18.—C. N. 51055, aged thirty-eight, para iii.** Operation January 11, 1922. Had had one abortion, one living child. Wholly under care of hospital. Patient had funnel pelvis, ineffective labor for days. No engagement of vertex. Positive Wassermann. Condition fair on admission. Living child delivered weighing 3,250 grams. Abdominal wound broke down tenth day, considerable sloughing; vesical fistula. Wound showed staphylococcus aureus. Mother and child discharged thirty-ninth day, wound and fistula completely healed.

**Case 19.—C. N. 51501, aged twenty-four, para i.** Operation March 5, 1922. Seen in consultation, had been in labor 33 hours, high forceps had been attempted, slight lacerations of the vulva and vagina. Funnel pelvis, no attempt at engagement of vertex. Patient had severe cold prior to labor, subsequently developed lobar pneumonia. Living child delivered weighing 3,650 grams, developed pleurisy with effusion, aspirated twenty-first day. Culture from fluid showed pneumococcus. Patient discharged at own request twenty-seventh day, child living, went home in ambulance.

**Case 20.—C. N. 51651, aged twenty-eight, para i.** Operation March 20, 1922. Condition good upon admission, history of active labor 34 hours. Under care private physician, many vaginal examinations had been made. Membranes ruptured spontaneously in first stage. Male type pelvis, vertex R. O. P., no engagement, no molding of fetal head, bones of skull dense. Culture from uterus showed B. Coli. Living child weighing 3,190 grams delivered. Mother and child discharged twenty-sixth day, wound closed.
Case 21.—C. N. 51653, aged twenty-nine, para iii. Operation March 20, 1922. First child very large, requiring craniotomy, second child still living. High forceps had been attempted by outside physicians. Condition fair on admission. Funnel pelvis, large child, no engagement. Living child weighing 3,150 grams delivered. Culture from uterus showed hemolytic streptococcus. A piece of tissue taken from uterine wall shows that it has the structure of a lymphatic gland. There is hyperplasia of lymphoid tissue with marked proliferation of the endothelium lining the sinuses. Mother and child discharged fifty-third day, wound practically healed.

Case 22.—C. N. 51736, aged forty-one, para vii. Operation March 28, 1922. Patient wholly under care of hospital, first in outdoor service, transferred later to hospital. Had three living children, another child died at one and one-half years from pneumonia, all normal deliveries. High forceps had been attempted, in labor sixteen hours, no engagement of head, flat pelvis, fetal heart rate 148. Fetus weighing 3,800 grams, stillborn. Two cultures from uterus, first sterile, second showed staphylococcus albus, culture from abdominal wound later showed staphylococcus aureus. Patient discharged eighteenth day, wound healed.

Case 23.—C. N. 54864, aged twenty-three, para iii. Operation February 17, 1923. Patient wholly under care of hospital, first in outdoor service. History of two normal deliveries. One living child, one child lived one hour. Membranes ruptured spontaneously at onset of labor twenty-four hours previously. Eleven vaginal examinations. Condition fair on admission, varying fetal heart from 140 to 150. Had moderately contracted pelvis, large child, no engagement after 24 hours of labor, rigid muscles. Living child delivered weighing 4,425 grams. Culture from wound showed staphylococcus aureus. Mother and child discharged twelfth day, both in good condition, wound healed.

Case 24.—C. N. 54910, aged twenty-four, para i. Operation February 22, 1923. Patient wholly under care of hospital, membranes ruptured when admitted, condition good. Funnel pelvis, large child, no engagement. Many vaginal examinations, digital dilation of cervix, long labor, no progress. Irregular rapid fetal heart 140 to 180. Passage of meconium. Fetus weighing 4,870 grams, died a few hours after delivery. Autopsy showed atelectasis, asphyxia. Wound broke down; sloughed badly. Cultures showed mixed infection. Discharged ninety-third day in good condition.

Case 25.—C. N. 55760, aged twenty-five, para i. Operation May 27, 1923. Patient seen in consultation, repeated vaginal examinations. High forceps had been attempted by private physician, membranes said to have ruptured spontaneously at onset of labor. Condition of mother and fetus good on admission. Funnel pelvis, fetal head not moldable. Living child weighing 3,620 grams delivered. Forceps mark over left ear and right malar region. Culture from uterus showed streptococci. Wound broke down, resutured eleventh day. Mother and child discharged thirtieth day, wound healed.

Case 26.—C. N. 56173, aged thirty, para iii. Operations July 7, 1923. Patient under care of outside physician, reported seven vaginal examinations. Had had two abortions. No full term pregnancy. Said to have been in labor three and one-half days. Condition on admission good. Contracted pelvis, vertex overriding brim, fetus weighing 3,400 grams delivered. Died after six days. Patient discharged thirty-first day, clean shallow granulating wound.

Case 27.—C. N. 56252, aged twenty-nine, para iii. Operation July 14, 1923. Patient wholly under care of hospital. One child living, one died at age of three years. Funnel pelvis, in labor 40 hours, no engagement of head, fourteen vag-
inal examinations, condition good. Membranes ruptured at time of operation. Living child weighing 3,020 grams delivered. Culture from uterus negative. Mother and child discharged thirty-first day.


44 Park Avenue.

DISCUSSION

DR. JAMES A. HARRAR, New York City.—This is an operation which every one who performs cesarean section frequently should know because it is sometimes of distinct value. Every now and then there will be cases that demand such an operation. The description sounds rather elaborate, but in the performance of it, it is interesting to see how easily one can dissect through the areolar tissue with fingers and come upon smooth purplish surface of the uterus ready for incision. There is very little cutting done after the abdominal wound is open, until the surface of the uterine muscle is reached.

DR. OTTO H. SCHWARZ, St. Louis, Missouri.—The time this operation requires is, I think, of great importance. The cases in which the operation seems applicable have already been subjected to the strain of a prolonged labor, traumatism, and in some instances, an anaesthetic, and therefore are notably poor surgical risks.

The remarkable results obtained in a series of sixty-four cases at the Johns Hopkins Clinic reported by Harris, in which hysterectomy was done, resulted in only three deaths, and none was due to peritonitis or bacteremia. I feel that this method of dealing with these cases, offers, by far, the best prognosis for the mother.

DR. JOHN O. POLAK, Brooklyn, New York.—Extraperitoneal cesarean section is of particular interest to me as I happened to have had the opportunity of assisting my predecessor, Prof. Jewett, in one of the cases referred to by Dr. Davis. I had not seen the operation again until I saw Dr. Davis do it. The whole point, it seems to me, rests upon whether the patient is potentially infected or not. There is no cesarean section, flap operation, Doederlein operation, or the rehabilitation of the old Thomas operation, that will save the infected patient. I think Dr. Davis will agree with me in this. There are some cases, I can conceive, where the handling has been such, though we have no definite evidence of infection, but where extraperitoneal delivery offers the safest route. We have, of course, in Brooklyn, been doing a modification of the Doederlein operation, the so-called double flap operation of Beck. In this way we have avoided a possible leakage. Patients who have undergone cesarean section die from two causes, aside from hemorrhage, either from a spreading peritonitis, or a general infection. No operation, save hysterectomy, will prevent a general infection. The flap operations will prevent leakage and general peritonitis.

DR. ABRAHAM J. RONGY, New York City.—I think Dr. Polak is right, when he states that if infection has set in, no matter what operation one does, the patients usually die. I have come to the conclusion that no matter how long a woman has been in labor, as long as she has not been traumatized by instruments, I will take a chance with a classical cesarean section. If the woman has been in labor for forty-eight hours or longer, and she is brought into the hospital slightly
traumatized from instrumentation, with a torn cervix or vagina, and the baby is alive, pubiotomy is the operation of choice in those cases. I reported before this Association twenty-seven cases of pubiotomy, of which I personally did sixteen, and saved all the mothers, with a mortality to the children of 27 per cent. When the disproportion is out of proportion, pubiotomy must be eliminated; I feel that in such cases craniotomy is indicated, because these patients have a better chance by craniotomy than by any kind of cesarean section you may perform.

We must take into consideration the secondary results of such operations, although personally I have had no experience with the particular operation described by Dr. Davis. If a patient once gets a hernia along Poupart's ligament, there is no way of repairing it and that woman will have a hernia the rest of her life. What happens, if the woman should become pregnant again and has a hernia in the lower portion of the abdomen, which cannot be supported or corrected? The older one becomes, and the more one sees of neglected cases of labor that call for operation, the more one realizes that any operation, which will keep the woman in the operating room the shortest length of time, should be the operation of choice. Occasionally we may sacrifice a badly damaged baby for the sake of the mother.

DR. HUGO O. PANTZER, INDIANAPOLIS, INDIANA.—We all have been impressed with the unfavorable results following cesarean section in infected cases. Sodium salicylate, as an antiseptic remedy, has powerful effect not yet sufficiently recognized by the profession. I had the virtues of this remedy most vividly impressed upon me while in attendance on the von Jacksch's clinic at Vienna, in 1885. A postparturient woman was presented who had developed grave sepsis and, latterly pyothorax, in the obstetric division of the Allgemeine Krankenhaus. She had been taken first to the surgical division, but there was referred to the internists' division because the surgeons said they did not operate on dying women. The patient showed a temperature of 104°, fleeting pulse of 180, comatose condition with wild carphologia, very dry skin and tongue, the latter, it seemed, in danger of breaking, as it wagged against the teeth in a muttering delirium. The case seemed absolutely hopeless. Much to my surprise von Jacksch said, 'We will give this patient fifteen grains of sodium salicylate hourly, until eight doses are given, thereafter one-half that dose every four hours,' and, concluding, 'when you return tomorrow our patient will have a moist skin, clear sensorium, and will be asking for food and drink.'

Wood, our authority in Materia Medica in those days, taught that sodium salicylate should be given in very small doses, it being a very dangerous remedy. I looked for nothing good to come to our patient. However, to my surprise, von Jacksch's prophecy came true. Since then I have given this remedy extensively, with ever increasing confidence. In quite a number of cases like these under consideration by the essayist I have done cesarean section after large doses of sodium salicylate had been given, preferably by rectum, and have had most remarkable recoveries.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—I would like to say a word in regard to the original Porro operation in these cases. I performed the first Porro operation in Ohio, the third successful one in the United States. The operation was done a good many years ago at two o'clock one morning in a cellar. The woman had an infantile pelvis. The child was alive, the patient's general condition was not bad, but the surroundings were very bad. I carried out a typical Porro operation, brought the uterus out, transfixed it at the cervix, put a rubber tube around, cut the uterus off, and closed the incision around the stump. She made a beautiful recovery, and died only a few years ago. The baby lived several
months, dying of some acute throat trouble. I have had a number of cases that were septic, have operated on them, removed a living child, and made a hysterectomy, panhysterectomy if the cervix was bad, and supravaginal hysterectomy (subtotal) under other circumstances. These women have all recovered, with the babies alive.

I noted with a great deal of interest the laparoelytrotomy operation when brought out by Dr. Thomas, but it did not impress the profession favorably and soon lapsed into innocuous desuetude. I would rather do a panhysterectomy or supravaginal hysterectomy, or even a Porro operation, than do the operation the essayist has described.

DR. DAVIS (closing).—I have employed this technic in a class of cesarean cases in which we have very good reason to believe that the classical operation would have proved fatal. Dr. Polak states truly that in cases generally infected with vigorous strains of virulent bacteria, the patient is not rescued by extraperitoneal or intraperitoneal section nor by the Porro operation. From experience I am convinced that, had these twenty-eight cases reported, been delivered by classical cesarean section, nearly all of them would have died within the first few days. The technic is difficult and intricate. There may be a simpler way to arrive at equally good results in presumably infected cases. I believe that it is a method that is worth while. Twenty-six of the twenty-eight cases recovered. At least six of these women have since borne children, two died. One was undoubtedly of the type referred to by Dr. Polak. The other died from pneumonia plus a long difficult labor and a severe operation.
DUPLEX UTERUS WITH MULTIPLE PREGNANCY: REPORT OF CASES.

By William Seaman Bainbridge, Sc.D., M.D., C.M., New York

PREVIOUS to pregnancy, the pathologic significance of duplex uterus is slight; practically the only symptoms to which the deformity may give rise are dysmenorrhea and occasionally difficulty in coitus. The double uterus is not particularly infrequent; many claim that it is found in about 14 per cent of congenital uterine deformities. The form of the uterus may indicate its double origin and the varieties may range all the way from a slight increase in duplication to two distinct uteri with separate appendages and two vaginas. Vallisneri relates the history of a woman who was poisoned by cantharides, who had two uteri, one opening into the vagina and the other into the rectum.

With uterus duplex, menstruation may take place every two weeks—first from one compartment of the organ, then from the other—each period lasting two or three days and the patient losing in one month only about as much blood as at a normal menstrual period. During pregnancy the unimpregnated horn continues to menstruate. The dual organ seems to favor conception. Picot reports a double uterus where there were fourteen abortions, and Gouterman cites a case of three children born from the right horn and nine abortions from the left horn of a dual organ.

With double uterine pregnancies, anomalies are not uncommon. Dibierre quotes an instance of a woman who bore one child July 16, 1870, and another October 31 of the same year, both at full term. She had but three menstrual periods between the confinements. In commenting on this case Hirst says: "There must be kept in mind the possibility that one of the children might have been of protracted gestation or the other of premature birth." In my opinion there exists no reason why both of these conditions might not have been simultaneously present in a case of double uterus where impregnations had taken place at different times. Jellinghaus reports a case with a full term child in one uterine horn and a four months' fetus in the other, and another instance where the patient was delivered of a full term white infant from the left horn, and two months later a full term black infant from the right horn of the uterus. Ross relates an instance of a triple pregnancy in a double uterus, and Cleveland describes a discharge of an anomalous deciduous membrane during preg-
nancy, which was probably from the unimpregnated half of a double uterus.

There seems to be a considerable difference of opinion among obstetricians regarding the extent to which a double uterus may complicate labor. It would seem logical to assume that the unimpregnated half, especially if congested in sympathy with the development of the impregnated side and possibly thickened in consistency by sympathetic contraction during labor, might obstruct delivery to some degree. DeLee reports a very difficult delivery where the child straddled the septum of the double organ. Malpresentations of the fetus and a faulty direction and insufficient expulsive powers are common in double uterine confinements. In the case of double uterus with multiple pregnancies which I herewith present, the patient had two malpresentations of the fetus at previous deliveries, but otherwise seemed to suffer but few ill effects during labor from the deformity of the organ. The case is of interest because of the dissimilarity in the confinements preceding and following the one at which the additional uterine compartment was disclosed, as well as an example of justifiable abortion.

Case 1.—Mrs. J. M., thirty-one years of age, had four children. Menstrual periods commenced at fifteen years, were profuse, painful and irregular. The patient was married at twenty-three years of age. First pregnancy: female, born February 9, 1906, at full term, birth was normal. Second pregnancy: male, born May 9, 1907, stillbirth. Third pregnancy: male, born December 15, 1908, at full term, arm presentation but child normal. Fourth pregnancy: female, born November 29, 1910, at full term, and child normal. Fifth pregnancy: August 21, 1911. Patient had an uncontrollable uterine hemorrhage. I was called in consultation, operated and found a duplex uterus with a single cervix. (Fig. 1.) The right half of the uterus contained the remains of a dead fetus—miscarriage of about four months. There was a living fetus in the left body of the uterus.
In order to stop the hemorrhage in the right side of the dual organ, it was necessary to curette both halves, as the uterus would not contract and the mother's life was in immediate danger. The patient had an uneventful convalescence and a rapid recovery. She had two subsequent pregnancies; one a full term child, with normal delivery, and the other a miscarriage at three months.

In this case the great variations in the types of pregnancies were probably due to the malformation of the uterus. However, the extra compartment offered little, if any, resistance at delivery. Doubtless, it rose spontaneously out of the pelvis or was pushed up manually during labor.

![Diagram of a duplex uterus with multiple pregnancy](image)

**Fig. 2.**

**Case 2.**—In April, 1923, a second case of duplex uterus came under my observation. In this instance, the patient was operated on by me for degenerating fibrocysts of the ovaries and retroflexion of the uterus. When the uterus was brought into position, it was observed that a partition divided the fundus and extended practically to the internal os. (Fig. 2.)

The patient was forty-four years of age. She had been married eleven years and had never been pregnant. Her chief preoperative complaint was backache of a type so severe that she was often unable to stand.
DISCUSSION

DR. DAVID WILLIAM TOVEY, NEW YORK CITY.—I would like to report two cases of double uterus. The first is a case of rupture of a gravid uterus bicornus unicollis, the other is a rupture of a double uterus with large hematocele, mistaken for fibroids with pregnancy.

It is important to recognize those anomalies of the uterus, otherwise grave accidents may occur, as in the case reported, where the septum between the uteri was ruptured, and the omentum drawn into the vagina. What might have been the result, if, in the other case, mistaken for a fibroid, the bleeding had been treated by radium, as is the custom at present?

R. B., aged twenty years, menses regular, two children, sent to the Polyclinic Hospital, bleeding, with a foul discharge and a diagnosis of four months' pregnancy with a fibroid. An attempt was made by the house surgeon to dilate the cervix. As it was impossible to get enough dilatation to remove the fetus and placenta, the cervix was packed with iodoform gauze, the patient put to bed and ergot given. The next day, after a few hours of regular contractions, the pains stopped suddenly. The house surgeon in an attempt to clean out the uterus, passed a sound in its full length, and with sponge forceps he removed piecemeal a four months' fetus, and part of the placenta, and drew the omentum into the vagina.

On my arrival I found the patient shocked. On opening the posterior culdesac, blood and clots were evacuated. A cigarette drain was inserted and the abdomen opened. I found a double uterus, one horn of which had been enlarged by pregnancy, with a ragged hole, larger than a silver dollar, in the uterine tissue of the gravid horn, where it joined the nongravid horn opposite the internal os. This tissue was less than a quarter of an inch thick.

A supravaginal hysterectomy was done at the internal os. She recovered after a stormy convalescence. Examination of the removed specimen, showed a uterus bicornus unicollis, with a ragged hole, the size of a silver dollar, in the septum of the gravid horn between the cornu. Adherent to the edge of this hole, a piece of degenerated placenta, two by four inches, was found. The supravaginal part was enlarged and had contained part of the ovum and membranes. The nongravid horn was fully developed, as were the tubes and ovaries.

I believe that after the cervix was packed and ergot given, contractions ruptured the thin uterine tissue between the horns, and the house surgeon passed his instruments through the hole opposite the cervix, and drew down the omentum in his attempt to clean out the gravid horn. The pains stopped suddenly as they always do, when the uterus ruptures.

A. W., 31 years of age, one child four years old, one miscarriage two years ago at three months; menses regular, five to seven days; last menses were ten days before the usual time. Bleeding off and on for the past three months, badly constipated for five weeks. She came to the clinic, complaining of severe pain in right abdomen from the iliac fossa to ribs, and cramp-like pain in the pelvis with bleeding.

On abdominal palpation a hard round tumor above the pubes, reaching halfway to the navel on the right side was found. Vaginal examination revealed cervix and vagina normal, with a round hard mass filling the pelvis, and pushing an enlarged uterus, the size of a two months' pregnancy against the pelvic wall on the left. The diagnosis was a large fibroid, with early pregnancy, fetus dead. Upon opening the abdomen, a large round bluish tumor presented. It was a large hematocele adherent firmly in the pelvis. Rupture occurred in an attempt to deliver it. A ruptured ectopic tube and broken down ovary were found on the
right side of what proved to be one horn of a double uterus. Against the pelvic wall, the left horn slightly enlarged with normal tube, an ovary was seen. A deep sulcus one inch wide covered with vesicouterine peritoneum and the bladder separated the two horns. The vesicouterine peritoneum was separated from the supravaginal portion of the right horn, and a supravaginal amputation removed this horn with the ruptured ectopic tube and ovary. The vesicouterine peritoneum was sewed over the raw surface of the amputated supravaginal cervix. There were two very distinct supravaginal portions of the cervix, but only one vaginal portion. The left horn with normal tube and ovary now looked like a uterus, the right tube and ovary of which had been removed. She has since had a baby. Both these cases had children, but the physicians who delivered them did not discover the conditions present.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—I have had several cases of double uterus. In some, children had been delivered without the slightest difficulty, and the deformity was discovered by accident. I had one case of a young girl who was operated on for appendicitis and it was found that she had a one-horned uterus. Fearing that there might be difficulty in child-birth I warned her people that if she married and became pregnant they should let me know or report the case to some competent obstetrician. Some years later she did become pregnant, was sent to me, and was put in the hospital. One of our leading obstetricians was associated with me. She fell into labor, but the pains were inefficient, and after giving her plenty of time we agreed on a cesarean section, which was made in the usual way. The uterine tissue, as anticipated, was found remarkably thin, as there was of course only half the normal amount of tissue present. I excised the tubes from the uterus after delivery so that there would be no more pregnancies. The patient made a prompt recovery.

DR. GEORGE CLARK MOSHER, KANSAS CITY, MISSOURI.—I have seen three cases, somewhat similar, two of which were double uteri, and a third a fetal development of Müller’s ducts with a single vagina. The first two delivered themselves without any untoward conditions, and the third one was a case in which I was called in consultation, where the woman had been in the hands of a professional abortionist, and had an abortion induced with a puncture through the non-pregnant horn of the uterus. She died from a general peritonitis.
THE TIME FOR OPERATION IN ECTOPIC GESTATION

(A Preliminary Study of the Action of the Systolic Pressure in These Cases.)

BY THURSTON SCOTT WELTON, M.D., F.A.C.S., BROOKLYN, NEW YORK.

It is not my purpose to reopen the debate regarding the advantages or disadvantages of the immediate or delayed operation in ruptured ectopic gestation. I wish to give a resumé of my records of the action of the systolic pressure in the various degrees of shock complicating ruptured extraterine pregnancy, and to draw certain deductions from our observations.

For this purpose ectopies may be divided into four general groups:

1. Those cases in which a positive or tentative diagnosis of unruptured ectopic has been made. The patient is in the non-tragic stage. The systolic pressure is not affected.

2. (a) Those cases in which rupture or tubal abortion has occurred, not accompanied by shock. The systolic pressure shows a gradual decline.

(b) Cases of ruptured ectopic, with the patient in moderate shock. The systolic pressure ranges from 80 to 95.

3. Cases of exaggerated types observed in subheading "b" of Group 2. The shock is severe; the patient is often moribund. The systolic pressure ranges from 0 to 50.

4. Here the diagnosis is made from the history and at autopsy. The history is obtained from others than the patient. The patient suddenly felt a sharp, cutting pain in her pelvis, fainted, remained unconscious, and died before aid could be rendered.

The type of case most frequently seen is that of the patient in shock with a systolic pressure between 80 and 95. In the large majority of instances the blood loss is not proportionate to the degree of shock exhibited. It is not the amount of the hemorrhage, *per se*, that is responsible for the shock, but adjunct factors. We have noted this clinical fact many times at operation.

Under appropriate treatment—the usual measures employed are raising the foot of the bed, applying heat and abdominal compression, and administering morphine—the systolic pressure rises. Under favorable conditions the pressure reaches 105 to 115. It is very rarely that the pressure fails to respond under treatment. If the pressure is permitted to rise higher than 115 the sealing clot in the rent tube may be disturbed with renewed hemorrhage and shock. When this occurs the pressure takes a sudden drop. It has been noted that the
TIME FOR OPERATION IN ECTOPIC GESTATION

THE LONG ISLAND COLLEGE HOSPITAL

Fig. 1.—The usual picture of the systolic pressure in ruptured ectopic in shock but with moderate hemorrhage. In six hours the pressure rose from 85 to 110. Operation was done with recovery.

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Fig. 2.—The pressure rose to 100 at which point it remained for two hours. Operation with recovery resulted.
Fig. 3.—An example of permitting the systolic pressure to rise beyond 115. The sealing clot was disturbed, active hemorrhage followed. Death followed shortly after operation.

Fig. 4.—Patient in shock responded to treatment. With a systolic pressure of 105, she was sent to operating room. Five minutes prior to anesthetic she fainted, collapsed. Operation done immediately. Patient died at close of operation. She was operated upon while in shock.
pressure will rise, in some cases, and then remain stationary. It is a fine point to determine how long to watch a patient with a stationary pressure; it is a good rule to wait not longer than two hours. A pressure will rise, reach its maximum point and then slowly begin to fall. This means a slight blood leak, the forerunner of what might be an excessive hemorrhage.

In the cases observed in Group 3 the patient is pulseless, her initial systolic pressure may be anywhere from 0 to 50, and she is in every sense moribund. The temptation is great to do something at once.

Under treatment the rise in pressure is never more than 20, in those cases in which the initial pressure read 50, or thereabouts. In the moribund cases, in which no systolic pressure can be elicited, only under the most favorable conditions will the pressure rise to 45. But we have noted that after even a slight rise in pressure the patient is in an improved condition, and although not definitely in the non-tragic stage, is not in the severe state of collapse when first observed. Even after a rise in pressure these patients are poor operative risks. Many who survive the operation do poorly postoperatively, and succumb from a variety of causes.

As recorded in the pressure findings in Group 2, the pressure in these cases may rise to remain stationary, or rise and then begin to decline.

Unlike the majority of reporters we do not operate upon any patient immediately, if in the tragic stage. By "we" I mean the group in Dr. J. O. Polak's clinic, Dr. H. B. Matthew's clinic, and Dr. C. A. Gordon's clinic. I quote these workers as they are in our personal group. We continue to practice the so-called "delayed operation" for the simple reason that it has given excellent results.

We do not sit by and watch the patient's life ebb away, as described by so many writers. Instead we use the familiar measures to combat shock, and carefully follow the findings. Blood pressure, hemoglobin, and pulse readings are frequent and the rule. This waiting is not a matter of days but of hours.

In the cases common to Group 2 we wait until the pressure has reached 105 to 115. To us this means the woman is in the non-tragic stage. It has been found dangerous to permit a further rise in pressure as the clot is pushed loose and further hemorrhage ensues. A falling systolic pressure in a patient not in shock means hemorrhage and immediate operation is our procedure.

A pressure that rises and then remains stationary calls for clinical judgment. How long shall we wait? It is a safe workable rule to wait about two hours, and if there is no further rise in the pressure, operate. Likewise, in a pressure that rises and then begins to fall, immediate surgery is our custom.

In cases of the type in Group 3, it is not safe to wait two hours in
Fig. 5.—Patient severely shocked. Moderate blood loss. Patient not in tragic stage at time of operation.

Fig. 6.—A diagnosis of unruptured ectopic pregnancy was made in a physician's office. After entering hospital rupture must have occurred. There was no shock. The systolic readings showed a steady decline. Operation was done with recovery of the patient.
a pressure that remains stationary after a persistent rise. Operation without delay is paramount. In a pressure that rises and then begins to fall, immediate operation should be done.

From clinical observations in ruptured ectopic certain postulates can be enumerated:

1. A woman with a ruptured ectopic either dies almost immediately, before aid can be rendered, or remains in a state of shock often amenable to treatment.

2. Some die not of the hemorrhage, but of the shock which follows the hemorrhage.

3. Shock with a systolic pressure of 90 or above is often the result of the injury and not the amount of hemorrhage which has occurred.

4. A patient moribund, with a systolic pressure of 50 or lower has had excessive hemorrhage in addition to the injury.

5. If a patient does not die at the time of the initial rupture, but responds to proper treatment, the point of rupture has sealed itself and hemorrhage is checked.

6. Treatment will aid in overcoming the state of shock to a certain degree, and so make surgery a safer procedure.

We believe a misunderstanding is the cause of much debate regarding the time of operation—early or delayed. Many men claim they operate early, the patient is in severe shock, when, as a matter of fact, they do no such thing.

We have studied records of such types of cases. For the most part they are without scientific value. An example will suffice for all.

A woman is brought to the hospital, and the interne or resident makes a diagnosis of ruptured ectopic. The patient is in a state of shock; the usual work-up is attempted. The history is obtained from a relative or friend; the pulse, temperature and respiration are recorded. Also, is recorded on the chart the hemoglobin, a differential blood count, and the blood pressure. The patient is placed in the Trendelenberg position, heat applied, morphine administered and the attending surgeon is notified. He responds to the call—sometimes half an hour, or an hour and a half later. He examines the patient and accepts the interne’s or resident’s findings, the operating room is prepared and operation is done. Prior to operation no further hemoglobin or pressure readings are taken; the woman recovers. The case is recorded as one operated upon while in the tragic stage. Who knows but what in the interim between the first pressure reading and the time of operation the shock did not abate, and the patient passed from the tragic to the non-tragic stage? Surely such a case is without value for study.

Which brings us to the observation, based on a study of hospital records, that too little work is attempted in these cases. We hear much talk about repeated pressure readings, but few practice what they
Fig. 7.—This is an extreme example of a ruptured ectopic, pulseless and moribund. She reacted to treatment. The pressure rose from 0 to 40, then began to fall. Operation was hastily done. Patient died three hours postoperative.

Fig. 8.—This patient was in severe shock. Operation revealed the hemorrhage was excessive. She responded, as shown by the systolic pressure chart, to treatment, and was operated upon with satisfactory results.
preach. Until frequent, systematic pressure readings are done, hemoglobin percentages obtained, and the pulse recorded, we will have clinical reports of no practical worth.

CONCLUSIONS.

1. One gains nothing by operating while a patient is in shock.
2. If a patient does not die at the time of her initial collapse, it denotes she will respond, to a certain degree, to measures in treatment.
3. All ectopics in shock should be given a trial to demonstrate what they can do by way of a recovery. This is well shown by systolic pressure readings.
4. In all unruptured ectopics surgery is the rule.
5. In a pressure that continues to fall, in spite of treatment, surgery is imperative.
6. In a pressure that reacts to, at the maximum, 115 operation is indicated.
7. In a pressure permitted to return to normal limits the sealing clot may be disturbed and renewed hemorrhage and shock occur.
8. In the moribund type of case, with an initial pressure of 50 or lower, the rise, under treatment; is never back to normal limits.
9. A pressure that rises and then remains stationary calls for surgery. The time we wait while a pressure remains stationary depends upon the type of case, and is governed by the experience of the operator.
10. Any pressure that rises and then begins to fall calls for immediate surgery.
11. The action of the systolic pressure is a good index of the patient’s condition.
12. Records, to date, are for the most part unreliable, as inadequate clinical data have been recorded.

842 Union Street.

DISCUSSION

DR. ROBERT E. FARR, Minneapolis, Minnesota.—I know that in all cases of severe hemorrhage that are in collapse, the injection of novocain and adrenalin will rapidly improve the condition of the patient. It may be partly due to the fluid, and partly due to the adrenalin and to the novocain. In the cases we have had we have not deferred operation because we have never failed to follow out the technic I have detailed under local anesthesia, and the patient invariably has improved no matter what the condition was in these cases of hemorrhage, unless we had to do a badly traumatizing operation. We simply make an incision in the abdominal wall, check the hemorrhage and do as little operating as possible. We start transfusion at the same time—saline or blood—and make an immediate attack upon the bleeding vessel. I would concur in everything the essayist has said except in the points mentioned.

DR. HERBERT W. HEWITT, Detroit, Michigan.—Without going into details of the discussion of the delayed versus the immediate operation, I wish to state that it has been my policy for a long time to do the immediate operation in nearly
every case, first of all doing blood transfusion. In these days, when the citrate method may be used by any assistant, the transfusion may be given while preparations are being made for the operation. By the time everything is in readiness for the operation the patient is in a much better condition. It is a fact, which I think is known to all, that a patient with ruptured ectopic gestation will stand operation very well. Taking this fact together with the use of blood transfusion, it seems clear to me that the most advantageous time for operation is the earliest possible moment after diagnosis has been made. I do not believe that anything will be gained by waiting.

DR. CHARLES P. NOBLE, PHILADELPHIA, PENNSYLVANIA.—Judging from my personal experience, I believe Dr. Welton is wrong in several ways.

The first thing I would like to criticize is the growing tendency to consider the surgeon as a "cutter." The surgeon makes a diagnosis, which includes both the nature of the patient, and the nature of the disease; and, when indicated, he operates. When operation is not indicated, he does not operate. The use of the term surgery synonymously with operation is to be deplored, yet that is what most of the young men do.

The next point is the question of when to operate. The essayist speaks of delayed operation. The truth of the matter is that, usually, he delays only two hours. That is not a delayed operation, because it takes two hours to get the operating room ready. When a patient had improved up to a certain point, he delayed twelve or twenty-four hours. He may have delayed operation twenty-four hours before that. The point is, when shall we operate? If a patient is in a private house and one cannot do the operation secundum artem, I am as much a believer in waiting until you can operate decently as anybody else. To operate under wrong conditions is not operating; it is misoperating. The only exception is when a patient is evidently bleeding to death. Of course, there is one problem we have to contend with, namely, if the patient is in a private house, there is the danger of transportation.

DR. OTTO H. SCHWARZ, ST. LOUIS, MISSOURI.—I would like to ask Dr. Welton what type of lesion he found in these so-called tragic cases. In a comparatively small service we have had several very interesting tragic cases recently, and, with one exception, the lesion was located in the isthmus of the tube comparatively early, the period of gestation being eight weeks or less. The lesion in each instance resulted from the fact that the chorionic villi had corroded the tube wall, with very little coagulated blood around the site of the rupture. We obtained two of our specimens from autopsies in outside cases.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—This is an effort to classify these cases and to bring some law out of a chaotic condition; yet there are a great many cases of ectopic gestation that get well of themselves and are never recognized. I had this point forcibly brought to my attention ten or fifteen years ago. I reported a few cases at the Cincinnati Academy of Medicine, and one of the old doctors asked every one who had had a case of ectopic gestation to hold up his hand, and not 50 per cent of the practitioners present held up their hands and yet every one had had a case of ectopic gestation but had not recognized it. A great many had ruptured, the fetus died, and the patients got along without recognition of the true condition. I agree with Dr. Schwarz regarding the type of cases that die usually with the first hemorrhage. I do not agree with the essayist that there is so much danger attending these cases. His experience has been different from mine. If the patient has her first hemorrhage, provided she is not moved, and in the second place nothing is done to try to elevate the blood pressure too rapidly,
she may get along all right. In fact, my advice in these cases has been to do nothing except to give them plenty of morphine. I have had a lot of these patients go five or six days, and to the best of my knowledge I do not regret it. On the other hand, in a large experience extending over many years I have operated on but two cases where there was really active hemorrhage that was dangerous. Just because we have a lot of free blood in the pelvis and can get it out, it does not necessarily mean that the patient is bleeding very much. It means that the patient has bled. If the patient's condition is improving, well and good. Many of them recover, and I not infrequently run across cases a month or two after rupture, and not being sure of what I had to deal with, I have opened the culdesac and cleaned out a lot of clots, and they got well. It is sometimes wise to err on the side of conservatism.

DR. JOHN O. POLAK, BROOKLYN, NEW YORK. — There is one point we all lose sight of, i.e., abortion may occur in ectopic pregnancy as it does in intrauterine pregnancy, and as in the latter it may be incomplete or complete. When the abortion is complete the bleeding ceases. When incomplete, the hemorrhage continues. Whether the pregnancy be in the uterus or the tube the analogy is perfect. The type of case Dr. Welton has been discussing is not the kind we meet in office practice, where we make the diagnosis before rupture or after a primary rupture, and operate at our convenience. He is speaking of those severe cases, extremely shocked, that have not died at the time of rupture. Most of these cases rupture several times before the final burst; the first erosion through the tube wall is small, and usually closes by blood clot, or the rupture is into the folds of the broad ligament, when they may go for four or five weeks before they have another rupture. As we do not know when this next rupture will take place, we operate as soon as the diagnosis is made. In the severe cases where the woman is absolutely pulseless, where there is no pressure, operation turns the balance against her. We transfuse these cases, but we do it coincidentally with the time we place a clamp on the bleeding vessel, and we get results. We do not want to raise blood pressure before we are ready to operate. We want to keep the blood pressure below that point which will blow off the clot. There is a type of case referred to by Dr. Welton where we sit alongside the patient and watch her minute by minute. The blood pressure shows what is happening, shows whether she is reacting, or whether the bleeding is still going on. If she reacts, it is folly to go in and add trauma to shock, if we can get her back to a point where she is a relatively safe surgical risk.

DR. W. WAYNE BABCOCK, PHILADELPHIA, PENNSYLVANIA. — There is a surgical rule we sometimes forget, which was enunciated by the fathers of surgery, although often omitted from the present day text books, that on the first occurrence of a secondary hemorrhage you may operate; but if the hemorrhage recurs you must operate. This old rule holds good today, and during late years experimental evidence gives added reason why it should be followed. A patient may survive the loss of 20 or 25 ounces of blood but die from a recurrent hemorrhage with the loss of but 6 or 8 ounces of blood. Transfusion is far from being a perfect antidote, for I have seen a patient die from recurrent hemorrhage despite large transfusions of carefully typed blood. Likewise, the experimental animal that may survive an enormous initial bleeding, may the next day or day after die from the loss of perhaps only one-fifth the quantity of blood previously withdrawn. This I think emphasizes the point that we should be very fearful of recurrent secondary hemorrhage, and shows how wise the older surgeons were when they said you must operate and not delay if the hemorrhage returns.

A second point—the impression I have is that vaginal section produces very
much less shock, and can be carried out in the patient exsanguinated from ectopic hemorrhage with much less risk than can an abdominal section. For over twelve years those patients whom we felt had the tragic form of ectopic rupture have been brought to the operating room as quickly as possible and the hemorrhage controlled through the vaginal culde sac. These patients have been given spinal anesthesia, which is in line with Dr. Polak's argument, for it also lowers the blood pressure. In the ordinary way we simply thrust a pair of curved scissors through the culde sac, tear the puncture widely open with the fingers, quickly introduce two fingers, or even the hand, into the pelvis, locate and free the bleeding tube, pull it down into the vagina and apply a clamp near the cornu. In two minutes the bleeding may be controlled, and if the patient is pulseless or nearly so, merely introduce gauze through the culde sac beyond the points of the clamp, send the patient back to bed as quickly as possible, raise the foot of the bed and use rest, heat, transfusion, hypodermoclysis or other measures that may seem indicated. We do not take time to remove the blood or clot or to wash out the abdomen; we merely locate, bring into the vagina and clamp the bleeding appendage. If the patient is in fair condition and haste is not imperative, we tie off and excise the affected tube.

After the patient goes back to bed, the liquid and coagulated blood continues to escape through the vagina. As the patient improves, a low Fowler position is used. The abdominal operation is marked by low viability and time is lost, and the patient is shocked as blood and clots are baled, sponged or washed out of the abdomen, and the abdominal contents are exposed and manipulated.

In the vaginal operation the hemorrhage is quickly controlled without exposure or manipulation of the abdominal contents, and without any effort to remove the escaped blood. The clamp may even be applied through the vagina in the patient's own bed in five minutes time. We had three deaths in about two years time, after abdominal section for ectopic hemorrhage, before we adopted the vaginal method. For twelve years since we have changed our method of treatment, although our service is not large, we have had only one death from ectopic pregnancy, and that patient, although in a very serious condition at the time of operation lived several weeks and died from the effects of the catheter cystitis.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—Just one point that has not been mentioned, in regard to the physiologic adjustment of the fetal and maternal tissue, where the adjustment is not normal, and there is in the history a number of indications. There is quite a difference in the erosion effect of the fetal tissues upon the maternal tissues. I believe that many patients who die quickly and have repeated severe hemorrhages are those in whom the maternal tissue does not offer physiologic resistance to the fetal tissue. The indications for treatment are often obtainable from a carefully taken history, and after bearing in mind that the wall of the tube is thinned out very decidedly and that there is much corrosion in the cases where this physiologic adjustment has not taken place.

DR. WELTON (closing).—Dr. Farr's method of local anesthesia with adrenaline has great possibilities and is worthy of a thorough trial. Dr. Hewitt speaks of immediate operation and of transfusing all patients. Unless he gets donors quicker than we can, he is not doing an immediate operation but is doing a delayed operation.

Dr. Schwarz asked regarding the common type of lesions in ruptured ectopic, and where they are located. We find most of the lesions located either in the ligamentous or isthmic portion of the tube. There is no coagulation of blood around the lesion due to the chorionic villi. We transfuse these patients coincident with the operation or immediately after the operation.
ECLAMPSIA—IS IT A BIOLOGICAL NECESSITY?

BY O. M. Gruhzit, M.S., M.D., DETROIT, MICH.

In a search for the cause of eclampsia and the explanation of the symptoms and signs of the disease, I am not creating new hypotheses or facts. No doubt exists in the mind of anyone that what has been said about the symptomatology and pathology of eclampsia is true. This paper aims to account for, and to give an explanation of, the concurrent phenomena associated with eclampsia and thus to lead to the answer regarding the etiology of the disease.

Recently, I advanced an idea that the eclamptic status is due to the interagglutination of the baby’s red cell elements by the mother’s serum. Since this publication, McQuarrie has presented additional data which confirm my contention. Dienst in 1905 advanced a similar conclusion, but later in 1908 retracted this idea and substituted another for it.

Castle defines heredity as “organic resemblance based on descent.” “The son resembles the father because he is a chip of the old block.” The mendelian law implies that the individual is made up of unit characters which are transmissible to the progeny. Von Dungern and Herschfeld demonstrated the presence of different unit characters specific to each blood group, and that these characters never occur in the progeny if not present in one of the parents, and that the blood group peculiarities remain permanent through the life of the individual. Recently, Ottenberg has diagrammatically presented the possible transmission of the group characters from parents to offspring.

Landsteiner in 1901 postulated the presence of different agglutinating substances specific to each blood group. Deseatello and Sturli in 1902, and Hektoen in 1907 proved by the absorption method the presence of two cell agglutinogens and two corresponding serum agglutinins. Jansky in 1907, definitely recognized four types of blood. This was confirmed by Moss in 1910.

In their embryologic development the red cells acquire agglutinogens first which are usually present at birth. The complete blood group type is completely established inside of two years. Recently Jones claims that blood groups are completely established at birth. In summary, we may say that the heredity determines the blood groups. The essential property which differentiates groups is an interagglutinating power between certain types. Upon this latter property, practice of blood transfusion has been based.

The hereditary transmission of blood group characters from parents
to offspring has its limitations. The union of pure types of the same group results in a pure type of the same group. The union of hybrids of the same group results in a blood type according to the Mendelian law of segregation.

If a union occurs between two different pure line groups the offspring is a hybrid with dominating blood group characters of one parent, or with a different blood group in which characters of both parents are present.

In this presentation we are not interested in all the possibilities of group transmissions as presented by Ottenberg, Jerrell, and Dyke and Budge. What we want is to know those instances in which the baby’s blood type is compatible with its mother’s. This may occur only in limited blood group union of parents as shown in Table I.

Table I

INCIDENCE OF COMPATABILITY BETWEEN MATERNAL AND FETAL BLOOD GROUPS

<table>
<thead>
<tr>
<th>The mother’s and baby’s blood groups are compatible if</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mother is group I and husband is group I</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; &quot; &quot; II &quot; &quot; &quot; &quot; &quot; I or II</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; &quot; III &quot; &quot; &quot; &quot; &quot; I or III</td>
</tr>
<tr>
<td>&quot; &quot; &quot; &quot; &quot; IV &quot; &quot; &quot; &quot; &quot; I, II, III or IV</td>
</tr>
</tbody>
</table>

Clashing cannot take place if the parents have the above blood grouping.

Our knowledge of interagglutinability of certain blood groups leads one to question what occurs in instances in which the mother’s group is incompatible with her husband’s and her baby’s group; and whether such incompatibility is not responsible for some of the conditions in pregnancy, especially such obscure diseases as eclampsia, pernicious vomiting, some ideopathic sterility as well as some miscarriages.

Halban, Happ, and Martin have noted that the mother’s serum may agglutinate in some instances the baby’s red cells. Dienst says that eclampsia is a result of incompatible blood transfusion. Shawasse states that there is no relation between eclampsia and fetal or maternal “threat.” This latter statement contradicts a theoretical conception based upon experience with blood transfusion.

If the union occurs between groups II and III with the resulting offspring of group IV, the serum of either of group II or III agglutinates in vitro cells of IV. We presume that similar agglutination could take place in vivo. Is there a possibility for the baby’s cells to pass into the mother’s blood stream? This we do not know, but if we do not challenge the long accepted theory that waste products of fetal metabolism pass into the mother’s system for disposition, we must admit that such may be the case. Or, we may admit that Dienst and Young and Miller were right when they assumed that a hemor-
rhage occurs in the placenta and that through this hemorrhagic area (according to Dienst and McQuarrie) the fetal cells may be poured into the mother’s system. The latter statements are purely speculative and can be doubted if we study the history of the onset of eclampsia, especially the preeclamptic cases, where for several weeks we note a gradual progress of the disease. All symptoms gradually advance. With a hole in the placenta, symptoms would occur almost instantaneously.

However it may happen, it is not the purpose of this paper to explain how the elements carrying agglutinating powers pass into the mother’s blood stream, whether as the “hypothetical agglutininogen” with a protein molecule or as red cells. The fact remains that to produce the symptoms of eclampsia by the interagglutination the baby’s agglutinating substance must be present in the mother’s blood stream. This would always occur, as shown in Table II.

**Table II**

**Incidence of Incompatibility Between Maternal and Fetal Blood Groups**

<table>
<thead>
<tr>
<th>If the mother’s type is I</th>
<th>and husband’s type is II, III or IV, or</th>
</tr>
</thead>
<tbody>
<tr>
<td>“” “” “” “” II “” “” “” III or IV, or</td>
<td></td>
</tr>
<tr>
<td>“” “” “” “” III “” “” “” II or IV, or</td>
<td></td>
</tr>
<tr>
<td>“” “” “” “” IV she can never have incompatibility of blood with any of the groups.</td>
<td></td>
</tr>
</tbody>
</table>

Interagglutination can never occur if the parents have compatible blood group, as presented in Table I. On the contrary, interagglutination is always possible if the union occurs between parents of incompatible blood group, as presented in Table II.

This remains true in unions of pure types. If the union occurs between pure and hybrid, or between two hybrids, the blood type of the offspring is according to the Mendelian law of segregation and the interagglutination will occur according to the law of chance in segregation. The type of the female’s blood, however, plays a great part in the occurrence of interagglutination. Thus, if the female is type I and the male is hybrid II, the resulting offspring may be either type I or II. If the offspring is type I there will be no possibility of interagglutination whether female is type I or II. If, however, the offspring is type II, there will occur interagglutination in 50 per cent of offsprings.

On the contrary, if the male has type I blood and the female is type II with the offspring’s type of blood I or II, in no case could the female develop interagglutination, because from the experience on blood transfusion, we know that type II serum does not clash with type I cells.
According to the isoagglutination theory based upon the principle of the Mendelian law of segregation, interagglutination is possible in multiparae upon as many occasions as there occur incompatible segregation of blood types in mother as compared with her offspring. Thus, for instance, according to Ottenberg, if one parent hybrid of type II with one recessive character and other parent of type IV with two recessive character units, of which one recessive is like that of the other parents, their offspring may be 33.2 per cent IV, 33.2 per cent II, 16.6 per cent III, or 16.6 per cent I. In this case if the female is type II there may occur interagglutination with either type IV or type III child, but not with type II or type I child.

The eclamptic syndrome manifests itself with certain clinical phenomena and laboratory findings. The rise in blood pressure occurs first. The headaches, albuminuria and edema follow in the footsteps of increased blood pressure. The blood becomes "thicker," the urea content remains low, while the uric acid content is high. The total nonprotein nitrogen content remains almost undisturbed. The alkali reserve is decreased considerably. The carbon dioxide is manifestly increased.\(^\text{21, 22}\) On necropsy, coagulation thrombi and focal necrosis are found in liver, lungs and kidneys.

There is extreme congestion, stasis and edema in all organs.

Zweifel\(^\text{23}\) and Stronganow\(^\text{24}\) have called attention to the increased blood viscosity in eclampsia as compared with normal pregnancies; however, no explanation has been forthcoming as to the cause for such an increase.

Determann,\(^\text{25}\) Austrian,\(^\text{26}\) and Burton Opitz\(^\text{28}\) have shown that the viscosity of blood is maintained by the corpuscles and dissolved proteins. Salts, carbon dioxide and lacking of corpuscles increase viscosity greatly.

In normal pregnant women the blood volume is increased by about 15 per cent of the total volume\(^\text{27}\) and consequently the viscosity of the blood of pregnant women is considerably below that of nonpregnant. The average viscosity of nonpregnant women is given by Austrian as 4.5, as compared with distilled water, which is taken as one.

During the last month of pregnancy the viscosity is about 3.4. In these cases of true eclampsia the blood viscosity was 4.5, 5.0 and 5.5. The blood chemistry does not lend evidence to the assumption that the increased viscosity is due to the retention of the salts or the waste products of metabolism.

The increase in viscosity can be experimentally reproduced in the test tube. If normal human serum is mixed with the incompatible red cells, as shown in Table III, the mixture acquires far greater viscosity than the same serum mixed with the same proportions of compatible red cells.
ECLAMPSIA—IS IT A BIOLOGICAL NECESSITY?

Table III

<table>
<thead>
<tr>
<th>Compatible Serum IV and Cells IV</th>
<th>Incompatible Serum I and R.C. IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole R.C.</td>
<td>Hemolyzed R.C.</td>
</tr>
<tr>
<td>0.5 c.c. x 0.1 c.c. 2.3</td>
<td>2.40</td>
</tr>
<tr>
<td>&quot; 0.2 c.c. 3.0</td>
<td>3.80</td>
</tr>
<tr>
<td>&quot; 0.3 c.c. 3.25</td>
<td>4.70</td>
</tr>
<tr>
<td>&quot; 0.4 c.c. 4.00</td>
<td>5.30</td>
</tr>
<tr>
<td>&quot; 0.5 c.c. 4.40</td>
<td>6.50</td>
</tr>
</tbody>
</table>

The viscosity is further increased if the cells have been previously hemolyzed by freezing.

Bailey, Erlanger and White and Kruse have shown experimentally that the introduction of colloid substances into the blood stream, as acacia or gelatin, elevates the blood pressure and the blood volume and may lead, according to Kruse, to the suppression of urine.

From the data presented, one is justified in assuming that the increased blood viscosity in eclampsia is due to a new colloidal state produced by the interagglutination between the mother’s and her baby’s blood.

The increased blood viscosity added to the increased blood volume irritates the capillary walls. This undoubtedly is an explanation for the occurrence of spasticity in the capillaries in eclampsia. With the rise of blood pressure extra work is placed upon the heart, as it takes more force to pump a larger amount of thick blood against a higher resistance. However, these are not the only predisposing causes found in cases of eclampsia. A number of other factors come into play simultaneously. The blood chemistry shows an increased carbon dioxide content which indicates that the gaseous exchange between lungs and blood stream is slowed. There is a considerable lowering of the alkali reserve which means that oxidation processes of the body are lowered.

The low urea and slightly increased total nonprotein nitrogen content indicates that the hydrolysis of the proteins is interfered with. Baer and Cornell have conclusively shown that the basal metabolism in pregnant women is considerably increased above normal, being about plus 35 per cent. In few cases of eclampsia in which the latter could overcome the difficulties of recording basal metabolism, it is indicated that it is considerably lower than in normal pregnancies, and that it is lower before delivery in eclampsia and may increase after delivery, while in normal pregnancy it is higher before and gradually becomes normal.

Thus, it is more than suggestive that both oxidation and hydrolytic processes are seriously interfered with. This will appear more evident if it is remembered that throughout the body of the eclamptic
there is extreme congestion, edema, and stasis in addition to the coagulation thrombi and focal necrosis in all organs.

In summary, the pathologic changes in eclampsia can be explained satisfactorily on the basis of the new colloidal condition in the mother’s blood stream which is produced by the interagglutination between the maternal and fetal blood. This results in a “thick” blood which calls forth an increase in blood pressure, spasticity of capillaries, general edema and stasis. In its turn, the body is not able to hydrolyse quickly enough the end-products of agglutination. The oxidation processes are slowed and the end-result is lowered metabolism, increased acidosis and the accumulation of carbon dioxide in the blood stream.

EXPERIMENTAL AND CLINICAL FINDINGS

In normal pregnancies the mother’s blood type was determined before or inside of twelve days postpartum. The baby’s type was determined at birth or inside of two days after birth. A drop of blood was suspended in about one cubic cm. of normal physiologic saline. The cells were typed against known types II and III sera by the cover glass drop method of Brem. The reading was done immediately and repeated several times for a period of at least two hours. Typing was done at room temperature. The known sera II and III were always checked up against cells of type IV before their use. On the following day, the supernatant saline-serum mixture was poured off and substituted by fresh saline and the typing repeated. In abnormal cases the blood typing was invariably followed by ascertaining the effect of the mother’s serum upon the baby’s red cells and the baby’s serum upon the mother’s cells.

It is noted from Table IV that out of 86 cases diagnosed by the clinician as normal pregnancies, there were three cases in which the mother’s serum agglutinated her baby’s cells. Upon the examination of the hospital record, in one of these cases, the laboratory report

<table>
<thead>
<tr>
<th>NUMBER OF CASES</th>
<th>MOTHER’S GROUP</th>
<th>CHILD’S GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>18</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>4</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>4</td>
<td>IV</td>
<td>IV</td>
</tr>
<tr>
<td>11</td>
<td>II</td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>III</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>IV</td>
<td>II</td>
</tr>
<tr>
<td>1</td>
<td>IV</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>IV</td>
<td>II</td>
</tr>
</tbody>
</table>
# Table V

## Blood Grouping in Abnormal Pregnancies

<table>
<thead>
<tr>
<th>Case</th>
<th>Mother’s Group</th>
<th>Child’s Group</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>I</td>
<td>I</td>
<td>Postpartum convulsions. H.B.P. Alb.+</td>
</tr>
<tr>
<td>5</td>
<td>II</td>
<td>II</td>
<td>Nephritis. Secondary anemia. Cardiac hypertrophy. Alb.+ Same with other pregnancies.</td>
</tr>
<tr>
<td>6</td>
<td>I</td>
<td>I</td>
<td>Nephritis, edema. H.B.P. Alb.+ No convulsions.</td>
</tr>
<tr>
<td>7</td>
<td>II</td>
<td>II</td>
<td>Far advanced pulmonary tuberculosis.</td>
</tr>
<tr>
<td>11</td>
<td>III</td>
<td>III</td>
<td>Postpartum convulsions two days following delivery. Polyuria for three months. H.B.P. Alb.+</td>
</tr>
<tr>
<td>15</td>
<td>IV</td>
<td>IV</td>
<td>Nephritis. H.B.P. No convulsions. Alb.+</td>
</tr>
<tr>
<td>17</td>
<td>I</td>
<td>II</td>
<td>Preeclampsia. No convulsions. Alb.+ H.B.P.</td>
</tr>
<tr>
<td>18</td>
<td>I</td>
<td>II</td>
<td>Preeclampsia. Postpartum “blue and black, gasped for breath.” Pulse went up to 160. No convulsions.</td>
</tr>
<tr>
<td>19</td>
<td>I</td>
<td>III</td>
<td>H.B.P. with each pregnancy. Alb.+ No convulsions.</td>
</tr>
<tr>
<td>21</td>
<td>I</td>
<td>II</td>
<td>“</td>
</tr>
<tr>
<td>22</td>
<td>I</td>
<td>II</td>
<td>“</td>
</tr>
<tr>
<td>23</td>
<td>II</td>
<td>III</td>
<td>“</td>
</tr>
<tr>
<td>24</td>
<td>III</td>
<td>II</td>
<td>“</td>
</tr>
<tr>
<td>25</td>
<td>II</td>
<td>III</td>
<td>“</td>
</tr>
<tr>
<td>26</td>
<td>II</td>
<td>III</td>
<td>“</td>
</tr>
<tr>
<td>27</td>
<td>II</td>
<td>IV</td>
<td>Husband IV. Eclampsia, postpartum 21 convulsions Alb.+ Primipara.</td>
</tr>
<tr>
<td>28</td>
<td>II</td>
<td>III</td>
<td>Eclampsia. One antepartum convulsion H.B.P. Alb.+</td>
</tr>
<tr>
<td>31</td>
<td>I</td>
<td>III</td>
<td>“</td>
</tr>
</tbody>
</table>

*H. B. P.=High Blood Pressure.*
showed albumin in the urine, which disappeared four days following delivery. This would indicate that this case was an undiagnosed pre-eclamptic and properly should have been classed under abnormal pregnancies. In two other apparently normal cases the blood grouping was incompatible. No laboratory record was available in these two cases. In the remaining 83 normal pregnancies selected at random, the blood grouping between the mother and her child was such that it could not produce interagglutination.

If we study the blood grouping in abnormal pregnancies as shown in Table V, it will be noted that in hydramnia and nephritis without convulsions, the blood grouping between mother and her child is compatible, though in all of these cases the blood pressure was high and albumin was present in the urine.

There is a group of cases which clinically resemble eclampsia and, for the most part, are diagnosed as eclampsia, but have compatible blood type and the blood viscosity is low. The true eclampsia is understood to have high viscosity of blood. In three cases of eclampsia examined, the viscosity was high, 4.5, 5.0 and 5.5 respectively, while in the normal pregnancies the viscosity was on the average of about 3.4. This would indicate that toxemias of pregnancy fall into two groups; namely, the nephritic toxemia in which blood groups between mother and child are compatible and the blood viscosity is low; and the eclamptic toxemia or more properly isoagglutination toxemia which occurs when the maternal and fetal blood groups are incompatible and the viscosity is above normal for pregnant women.

**Table VI**

<table>
<thead>
<tr>
<th>Viscosity of Blood in Normal and Abnormal Pregnancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>8533 Normal P-2 B. P. – 130/92 Alb. – neg. 3.1</td>
</tr>
<tr>
<td>8525 &quot; P-1 &quot; &quot; – 118/75 &quot; &quot; 3.6</td>
</tr>
<tr>
<td>8529 &quot; P-2 &quot; &quot; – 120/75 &quot; &quot; 3.4</td>
</tr>
<tr>
<td>8567 &quot; P-4 &quot; &quot; – 110/70 &quot; &quot; 3.3</td>
</tr>
<tr>
<td>8579 &quot; P-2 &quot; &quot; – 130/80 &quot; &quot; 3.4</td>
</tr>
<tr>
<td>8045 Nephritis without convulsions. H.B.P. Alb. + 3.4</td>
</tr>
<tr>
<td>Kils Nephritis with postpartum convulsions H.B.P. Alb.+ 3.3</td>
</tr>
<tr>
<td>7911 Myocarditis, secondary anemia. Low B.P. Alb.+ 3.3</td>
</tr>
<tr>
<td>8326 Chronic nephritis with retention and cardiac de-compensation. 2.90</td>
</tr>
<tr>
<td>8361 Nephritis with postpartum convulsions H.B.P. and polyuria. 3.2</td>
</tr>
<tr>
<td>Edw. Chronic nephritis. H. P. B. Alb. + 2.8</td>
</tr>
<tr>
<td>8060 Eclampsia, isoagglutination toxemia. 4.5</td>
</tr>
<tr>
<td>11651 Preeclampsia, isoagglutination toxemia. 5.0</td>
</tr>
<tr>
<td>8594 Convulsions, H. B. P.; polyuria; Alb. trace 3.1</td>
</tr>
<tr>
<td>8658 Preeclampsia. B.P. 220/110, Alb. +. No convulsions. 5.5</td>
</tr>
</tbody>
</table>

We note from Table VI that normal pregnancy is associated with low viscosity. The complications of pregnancy, as nephritis, hydramnion and cardiac diseases tend to fluctuate around the normal pregnancy viscosity of blood. Secondary anemia tends to lower the
viscosity of blood below the normal average for pregnant women, which is in agreement with the findings by Austrian.  

It is evident from the experimental data that in normal pregnancies compatibility of maternal and fetal groups is a rule. An incompatibility may occur without severe symptoms, but such occurrences are rare and far between.

In nephritis blood grouping has no relation to the disease.

In true eclampsia the interagglutination between maternal and fetal blood groups occurs as a rule.

Blood viscosity in isoagglutination toxemia is high as compared with normal pregnancies.

Blood viscosity in nephritis with or without convulsions remains the same as in normal pregnant cases. The variations which occur due to the other complications still further tend to lower the viscosity of the blood.

Blood viscosity may aid in the differentiation of isoagglutination toxemias from nephritic toxemias.

**DISCUSSION**

I have attempted to present briefly the theoretical foundation and practical experience of others leading to the formation of new ideas concerning the etiology of eclampsia as based upon the transmission of hereditary factors which invariably lead to the isoagglutination phenomena. It was shown that the incompatibility between two blood groups upon clashing produce in the test tube a new, more viscous fluid. It is assumed that a similar condition would occur in vivo upon the passage of agglutinogen from the fetus to the mother's blood stream. The viscous colloidal state of blood can account for all symptoms, signs and pathology of eclampsia. The end-result of these changes produce stasis, congestion and decreased rate of metabolism, protein as well as carbohydrate.

Experimental data on the blood typing from normal and abnormal pregnancies further tend to substantiate that the interagglutination may be at fault in true eclampsia, but not in nephritic toxemias or normal pregnancies.  

There is a group of toxemias which have low blood viscosity, compatible blood grouping and approximately the same blood findings as in true eclampsia. These cases may show no suppression of urine, in fact some may have considerable polyuria before and after delivery. The casts and small or large amount of albumin may or may not be present before the onset of convulsions. After the onset of convulsions, albumin and casts in urine increase considerably with each successive convolution. Clinically these cases are difficult to differentiate from the true eclampsia unless one ascertains the viscosity and the
blood type between the mother and child or her husband. These cases probably belong to the type of "nephritic toxemia."

In fifteen clinically diagnosed cases of eclampsia or preeclampsia, the blood grouping in mother and her child was incompatible. In five cases of pregnancy toxemia with convulsions, blood grouping of the mother and her child was compatible. In eighty-three cases of normal pregnancies blood grouping was compatible.

SUMMARY

The laws of heredity determine the blood group of the offspring. The incidence of incompatibility between maternal and fetal blood groups is limited and may occur only in limited blood group unions of parents.

In normal pregnancies examined the blood grouping was such as to exclude the possibility of interagglutination between the maternal and fetal blood.

In the majority of clinically diagnosed cases of eclampsia the maternal and fetal blood grouping was incompatible.

High blood viscosity was found in eclampsia with incompatible maternal and fetal blood.

Low viscosity and compatible maternal and fetal blood was found in the "nephritic type of toxemias."

The high viscosity of blood in isoagglutination toxemias probably is due to the passage of incompatible blood elements from the fetus into the mother’s blood stream.

The new colloidal condition of blood in eclampsia produces congestion, stasis and edema which are followed by lowered body function in general and especially of basal metabolism. As a sequence to the lowered metabolism hydrolysis of proteins and oxidation processes of carbohydrates compounds are slowed. This leads to the appearance of acidosis. The thick blood and spasticity of the capillaries lead to high blood pressure, stasis, edema, acidosis and convulsions.

BIBLIOGRAPHY

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DISCUSSION

DR. WM. S. BAINBRIDGE, NEW YORK CITY.—The essayist has brought us the result of some very painstaking laboratory and clinical work which, if the findings are verified by others, may prove of practical value not only in preventing eclampsia but in opening a door for promising research in other conditions. The determining of the coagulability of blood and the initiation of proper preoperative treatment have saved many patients from serious complications and even death from hemorrhage.

Some of us who have been particularly interested in cancer have been hoping that the study of the blood may help us explain why 33½ per cent of all mice who live two years or over develop malignant disease, and about five per cent of those so afflicted spontaneously recover from the disease. Some light may come through laboratory study of the body fluids, especially the blood.

Certainly the paper we have heard today, while startling because of its statements and needing confirmation, is enough to encourage further research along this line.

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—I would like to ask some questions in regard to the incompatibility between the husband and wife. If the blood of the pregnant woman is incompatible with her husband, then at the end of pregnancy she bears an incompatible infant. It is supposed that during the pregnancy the excretions of the infant enter the mother’s circulation, does that immunize her against the former incompatibility existing between herself and her husband in future pregnancies? In the second place, when and how shall we examine the blood of the infant and type it with the mother in case of eclampsia, to prove or disprove the assertion the essayist has made?

DR. GRUHITZ (closing).—Dr. Speidel asked whether there are changes in the mother’s blood at the end of her pregnancy if she has an incompatible baby. This phase of the subject has not been studied to any considerable extent. Among the cases of eclampsia, only in two cases had the serum lost the agglutinating power. This may be explained by assuming that fetal cell elements passed into the mother’s blood stream in sufficient amount to bind the mother’s agglutinins.
A STUDY OF THREE HUNDRED CASES, PRIVATE PATIENTS, SIX WEEKS OR LONGER, POSTPARTUM: WITH REFERENCE TO THE CONDITION OF THE PELVIC FLOOR, CERVIX AND FUNDUS

BY BURNLEY LANKFORD, M.D., NORFOLK, VA.

AMONG the methods of preventive medicine, which is the slogan of today, may be justly mentioned all the means employed for better obstetrics. We note a tendency to more careful examination and more frequent observation of women during pregnancy; hospital deliveries with consequent more careful, accurate and aseptic immediate repair of birth injuries; more careful observation and advice during the involution period; a more thorough discharge examination at the sixth week or later, at which time, if further advice or treatment be necessary, or helpful, the patient may be kept under observation as long as may be needed, to restore her to her previous state of health.

With the object of checking up my own obstetric work, and also of presenting a paper for discussion, I have gone over the records of three hundred consecutive cases, with reference to their final examination, taking into consideration during this study the condition of the pelvic floor, cervix and fundus. By the end of the sixth week after delivery, the generative tract of most women will have returned, approximately, to the normal state, and for that reason the end of the sixth week is taken for the discharge examination, this examination being final only in those cases considered to be normal.

Some years ago a gynecologic friend made the assertion that no woman ever passes through a labor without showing evidence of trauma to her genital tract, and that she will always thereafter show some evidence of birth injury. I admitted that he had the preponderance of evidence on his side, and that his statement was, in the main true. It is equally true, however, that not every woman who shows some anatomic trauma, gives a history of subjective symptoms the result of parturition. Furthermore, this particular study would seem to show that not every woman who has borne a child and who has suffered some birth injury, shows either subjective symptoms or objective signs of such injury thereafter.

The gynecologist who does no obstetrics, and the general surgeon who does no obstetrics, see only the obstetric "failures" who seek their aid, whereas the obstetrician who repeatedly confines the same
women, and who follows up all his cases, does frequently see what he may call obstetric "successes"; that is, women who have borne one or more children and who yet remain symptom-free. Once in a while he may even find what, in his pride he calls an obstetric "triumph"—that is, a woman who has passed through a delivery and whose genital tract and general condition thereafter, may almost simulate that of a nonparous woman! There is, to be sure, a small enough number of such women to keep any obstetrician humble, but at the same time enough to furnish a goal towards which to work. The higher the ideal, the greater will be the effort to attain it, and the greater the effort, the nearer perfect will be the result in accomplishment, even though the ideal be seldom or never reached.

In this study of the genital tract, beginning from below, the first note was made upon the appearance of the vulva, this being described under three headings: first, those showing no gaping of which there were 115; second, those showing slight gaping, of which there were 139; third, those showing marked gaping, of which there were 46. Slight gaping of the vulva seems to be the normal condition of parous women and this slight gape is not accompanied by any uncomfortable, subjective symptoms, per se. This study has also seemed to show that a slight vulval gape does not necessarily mean an impaired pelvic floor, certainly not from a functional standpoint. On the other hand, a marked vulval gape certainly does mean impaired function and any woman showing such a condition must be classed as an obstetric "failure."

The second note was upon the tendency to, or actual presence of cystocele, or rectocele, or both. What I termed a beginning cystocele was found in 24 cases, a beginning rectocele in 10 cases and a cysto-rectocele in 29. In none of these women were the subjective symptoms of sufficient severity to demand immediate surgical procedures, though the 16 women to be mentioned later, who were advised to have an early repair, were all among this number.

The next point to be noted was the tone and condition of the levator muscles. These were judged by their thickness, passive resistance to two examining fingers, and by their power of voluntary contraction. This power of voluntary contraction is elicited by directing the woman to contract the muscle against the examining fingers, and where she does not understand what is meant, or pretends she does not (as some will) the contractility of the muscle can be instantly brought out by directing her to contract her muscles just as she would at the end of a bowel movement. This takes her mind from the vagina as a sexual organ and focuses her attention upon her bowel and she has no objection to displaying the power of the rectal muscles. The levators were classed "excellent condition" when
they were thick, of well appreciable passive resistance, and when the muscle tone, or voluntary contraction was very marked; of such there were 157. The levators were classed as "fair condition" when the above characteristics were present and easily appreciable, but not to such a marked degree as the preceding class; of these there were 102. They were classed as "poor" when they were thin, of slight resistance, showed separation in either vaginal sulcus, and had very poor power of contraction; of such there were 36. Of those in which the levator action was apparently absent, there were six. From a study of these muscles it would appear that where the levators are thick and have a fair degree of passive resistance, and where the voluntary contraction is what was classed as excellent or fair, there need be no fear of functional or anatomic poor results following labor, as far as the pelvic floor is concerned. With the other two classes, one may confidently look for trouble and predict the need for reparative surgery in the near or not very distant future. It is much more conducive to kindly feeling from the patient in the future to predict that she will need reparative surgery, than to say nothing and have her informed at some later date by some confrère that she had been left in very poor condition after her last confinement.

The next note was upon the condition and position of the cervix. The condition regarding lacerations was described as follows: slight, unilateral 80; deep unilateral 30; bilateral 99; stellate 16; and no appreciable laceration 75. The number of cases showing apparently no laceration, came as a surprise to me, because I had thought that practically every woman who had had a baby, had a laceration of the cervix; however if these 75 women had lacerated cervices, the lacerations were so slight as not to be noted by my gloved finger. The position of the cervix was described under two main heads, though it would vary slightly from either head in some cases. The cervix was called "back," that is, at right angles to the vagina, which is taken as the normal position; and as "in line with the vagina," variations of which constitute the abnormal positions. Of those with the cervix "back" there were 200; of those in line with the vagina there were 96.

The fundus was studied with regard to its position, size, consistency and mobility. The position was classed under three heads, "forward" 175; "mid-position" 45; "back" or retroverted 79. The size of the fundus was estimated as "normal" in 212; or as larger than normal in 85. The consistency was taken to be normal in 237, boggy in 18, and tender in 35. The uterus was found to be "mobile" in 284 cases and "immobile" in 11. In the immobile cases, the fundus was held back so tightly (probably by adhesions) that it could not be brought forward by a safe degree of force in the manipulation
used, or it was so tender or so painful to the woman that it was not deemed wise to persevere in efforts to replace it at that time.

Of those uteri found in backward displacement, the following notes were made. Those replaced at once, either by easy and simple bimanual manipulations, or with greater difficulty by means of tenaculum and bimanual efforts, and thus replaced remained in correct position thereafter, despite immediate exercises calculated to redisplace, and checked up by a further examination, one week or more, later. In this class, there were 40. (Did not return for this check-up examination, four cases.) The next class was of those replaced, but who showed a recurrence of the displacement, either immediately, after the usual exercises, or upon their first return for the check-up examination. These women were fitted with a pessary, which they wore from one to three months, were found to be in good position at the end of the pessary period, and were again checked up by another examination one or more weeks after the pessary was removed. Of such women there were 59. Five required an anesthetic before the displacement could be corrected. One woman wore a pessary three months, one four months, two five months, one seven months, one eight months, all eventually cured. Of those that recurred, whenever the pessary was removed, there were five. One of these last mentioned wore a pessary for seven months (off and on), made several engagements to go to the hospital to have a suspension done, but finally became pregnant with pessary in situ. It was allowed to remain until the fundus rose out of the pelvis, after which the pessary was removed and the pregnancy went on to term. (This woman's uterus has remained in good position since this last pregnancy.) There were 24 cases showing a general descensus, 19 showing slight decensus, and 5 a marked decensus.

Sixteen of these 300 women were advised to have an early repair of the pelvic floor, from a standpoint of comfort or function, the function of the pelvic floor, it must be remembered, being a varied one.

In summing up, there were 225 out of the 300 in which appreciable lacerations of the cervix were found, a condition that we cannot do very much to correct, other than by surgery, when such lacerations are found after the puerperium. The problem to be worked out here, in the interest of better obstetrics, is to prevent the cervical laceration, which is far more ideal than a repair, no matter whether the repair be made immediately or later.

There were 119 cases showing some abnormality in the position of the fundus, 74 of them in which the fundus was completely displaced backward, and would certainly have given some future trouble. All but five of these 74 were put back into approximately normal position and remained so, checked up by subsequent examinations. This seems
to show that a very large number of women develop backward displacement after parturition, but also that such a condition is easily amenable to proper treatment. Right here we undoubtedly have a large field for better obstetrics, first in the effort to prevent such displacements, and second, in the recognition and treatment at the end of the period of involution. There is little doubt but that the large majority of women who develop backward displacement after childbearing, will eventually need the aid of surgery to make them comfortable, or to put them in a condition of ordinary physical efficiency.

This leads us to the question, why do so many women have these displacements following labor? It seems reasonable to suppose that one of the chief reasons why this condition occurs so often, is the relatively long time that the lying-in woman spends on her back. A woman in bed after labor, will spend the larger part of her time on her back, and the danger of this continued position becomes apparent after the first ten days. During the first ten days, the uterus is an abdominal organ and cannot be displaced because it has not gotten back into the pelvis. After this time however, it becomes a pelvic organ, and it is probably true, in the cases of displacement, that the suspensory ligaments which have hypertrophied with the growth of the fundus during pregnancy, have not involuted as rapidly as has the uterus, and if the fundus be forced back, possibly by straining of the abdominal muscles while the woman is in the dorsal position, or almost certainly by an overdistended bladder, the suspensory ligaments are not able to exert the customary degree of pull in righting the uterus, as they do when the normal sized fundus is temporarily and physiologically displaced. Also, the same intraabdominal forces that ordinarily are exerted upon the posterior surface of the uterus (holding the fundus forward), when the fundus is displaced backward, will exert the same force upon its anterior surface and hold it back, with greater likelihood of keeping it back, because of the larger size of the fundus at this period. It is not the full bladder nor the overdistended bladder of the first week or ten days that brings about this displacement, because the uterus at this time is an abdominal organ and cannot retrovert. Therefore, the time to caution the patient against overdistention (often quite voluntary) would seem to be the second and third week postpartum, while the uterus is still large. The ease with which this frequent complication, fraught with so much discomfort and semiinvalidism in the woman’s future, can usually be corrected, makes it obligatory upon every physician who does obstetrics, to follow up his cases for six weeks (or six months if necessary) in order to leave them in the best possible condition.

At the present time, the subject of prenatal care seems to be largely filling the literature. The study of even so few cases as those presented here, would seem to show that in our efforts to reduce our
obstetric morbidity and mortality, we should not permit our ante-
partum care, extremely important though that is, to overshadow our
care of the patient during the puerperal and late postpartum periods.

530 Shirley Avenue.

DISCUSSION

DR. GEORGE CLARK MOSHER, KANSAS CITY, MO.—Dr. Lankford’s paper,
because it is on a subject that so often is overlooked by the busy man doing a
large obstetric practice, is valuable and timely. The average man does not follow
up his cases with sufficient care to give them the best possible after-results.

DR. EDWARD SPEIDEL, LOUISVILLE, KENTUCKY.—There are a few things
which should not be attributed to poor obstetrics. There is no doubt that in
observing our patients postpartum, at times we are very much astonished to find
a poor perineal floor and badly lacerated cervix in a case in which we thought we
had done excellent obstetrics, which proves undoubtedly that there is a difference
in the degree of elasticity of the pelvic floor in women, and in consequence lacer-
ation occurs under the best of circumstances.

The most important thing to impress upon the lying-in woman is the fact that
it takes fully six weeks under normal circumstances for the genital organs to
return to a normal condition, and that after her departure from the hospital at
least four weeks should be spent in conducting herself as a convalescent. During
the time such women are in the hospital they should be kept off of their back as
much as possible. We have our patients lie on the side, and if they can be in-
duced to do so, to lie upon the abdomen. In that way we favor involution and
prevent backward displacement. After the seventh day we use the knee-chest
position. In those cases in which the bloody lochia persists for a longer time
than usual, we assist the involution by hot vaginal douches and keep the patients
in bed a longer time.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—This paper of Dr. Lankford is
most timely in these days of antepartum furo. Antepartum care does diminish
toxemias, but it must be supplemented by good obstetrics, and that good obstetrics
must be supplemented by proper postpartum care by a careful person if the
obstetric patient is to get the best. In most of the maternity centers they give
casual prenatal care but the patients are so placed sociologically that they do not
get the consecutive obstetric and postpartum care that the doctor has mentioned.
Those of us who have followed our work know that everything he has said is
true; that about 25 per cent of these women, no matter how they are discharged
from the hospital at the end of the first two or three weeks, come back with a
retroverted uterus because of its lax supports. We try to obviate this as well as
we can very much on the line Dr. Speidel has spoken about, yet we go a little
further. Our patients in the wards have to spend their day divided into four
parts, and three parts on the abdomen and on the sides. We then teach every
woman and every nurse how to put a patient in the knee-chest position and allow
air to go into the vagina to inflate it. We have adopted the “monkey trot,”
walking on all fours, and by that simple procedure we have reduced the number
of retroversions from 25 to 2 per cent. His suggestion of the use of the pessary
is most timely as we are doing too much operating for retroversion, and those
who do retroversion operations find a large proportion relapse, really a larger num-
ber than those where we used to use the pessary. If we can get the cervix and
the pelvic structures in good condition, as can be done when we adopt inter-
mediate repair of the cervix in pelvic floor lacerations, and follow out postural
treatment during the lying-in period, supplementing it with a pessary, we will have
a larger percentage of well women who will not fall into the hands of surgeons.
DR. ABRAHAM J. RONGY, NEW YORK CITY.—It is my impression that pelvic defects after childbirth are not of local but of constitutional origin. In some women the muscular structures are such that they will stand labor, while others will not stand labor, no matter what you do, and there will always be a number of lacerated cervices and lacerated perinei. The same thing holds true with regard to abdominal viscerae, dropped cecum, and dropped abdominal structures. Of course, immediate attention to improve the tone of the muscular structure is in order, and I think Dr. Lankford has called our attention to one of the most important things in connection with postpartum care, particularly in those cases that have a dropped uterus, and if the uterus is supported by pessary for a certain length of time it may return to the normal position.

Then comes the next problem, as to what to do with the second stage of labor. Shall we permit a woman, who has reached the second stage of labor, after the cervix has been thoroughly dilated, to continue the labor and allow her to press for two or three hours until the head presents, or shall we, after the cervix is fully dilated a certain length of time, deliver these patients and prevent laceration of the pelvic floor, and if she is lacerated, repair it right then and there? Those women, whose muscular structure is not what it should be, if allowed to remain a long time in the second stage of labor, do a great deal of damage to the pelvic floor, and are better off if they are delivered gently by forceps.

It is still a question in my mind, whether any plastic work should be done on the vaginal vault, if the woman has only one baby. The birth of the second child not only undoes the operation, but it very often causes dystocia.

DR. JAMES E. DAVIS, DETROIT, MICH.—During the past year there came to my notice an incontrovertible argument for immediate repair of the cervix. A young woman, multipara, died after her third childbirth from hemorrhage originating in a small tear in the cervix. It was my opportunity to do a very searching autopsy upon that case, and there was absolutely no evidence whatsoever of any cause, for death other than that of loss of blood. The laceration of the cervix could easily have been repaired immediately. Other measures were adopted which did not succeed in stopping the hemorrhage, and the patient died within three hours after childbirth. While that is one of the striking arguments for immediate repair, I do not mean to advocate it in all cases and say that they call for an immediate repair, but there are certain cases in which the indications are clearly defined.

DR. MAGNUS A. TATE, CINCINNATI, OHIO.—When a woman bleeds excessively after she has her baby, any good obstetrician will try and find out from where and why she is bleeding, and if the cervix is badly torn he will repair it. That is ordinary, good common sense. If she is not bleeding very much, we do not pay any attention to the cervix primarily.

DR. LANKFORD (closing).—When I first began the practice of medicine I thought the pessary was a back number and that it was a confession of ignorance to use it, but in the last three or four years I have come to consider it a most valuable instrument, and I am glad to find that the rest of the men uphold me in its use. Some of these women had short anterior vaginal walls and cervical lip. Some of these women have constitutional conditions which cause displacement. The short anterior vaginal wall causes backward displacement of the uterus. I learned from Dr. Polak several years ago the value of the kangaroo walk or monkey trot which has a great deal to do in correcting backward displacement of the uterus. I have induced a great many of these women to use the monkey trot, and some of them do it after they leave the hospital and are out of my immediate supervision. My mistake has been in not making them do it while they are in the hospital. A woman will very often allow her bladder to overdistend voluntarily. If we cautioned her against it and told her the reason why, the displacements would be fewer.
LESIONS OF THE CERVICAL STUMP OF A SUPRAVAGINALLY ABLATED UTERUS

BY FRANCIS REDER, M.D., ST. LOUIS, MO.

EVERY surgeon in exercising the conventional conservatism in his operative work, a dictum in surgery that must command the respect of every hand that wields the scalpel, should be properly cognizant of the consequences his conservatism may levy upon the future welfare of his patient. There are instances in the surgeon’s work when conservatism practiced to the best of his ability may prove the worth of his wisdom, and again there may be instances when such conservatism may disprove the erudite conceptions of the operator.

In giving expression to these sentiments I have in mind that anatomic insignificance part of the uterus, known as the portio vaginalis. What this neck-like portion of the womb lacks in anatomic importance is wonderfully compensated for by its physiologic function.

When in a state of health, the “portio” is perhaps the least considered anatomic structure in the body, but when diseased its pathology arouses an interest of the keenest nature. And it may well be so, for the convincing evidence is clearly shown in the fertility of its soil for malignancy. Although other diseased conditions depicting features of an infectious process either acute or chronic, such as follicular or papillary erosion, hypertrophy and hyperplasia, cervical endocervicitis with its resultant cystic degeneration and the sequential ectropion of a childbirth trauma, constitute concrete clinical entities of pathogenic potentialities, none of these conditions, however, presents the grave aspect of cancer of the cervix.

There is no doubt that the enumerated lesions initiate a cervical malignancy whenever the biogenic balance becomes sufficiently disturbed. In these instances the solution of anticipating the development of a cancer by instituting the proper measure for a cure, is clear.

During the past year my thoughts have been stimulated by a subject that has found rather decisive expression in the valid opinions of Dr. J. O. Polak, viz.:—the total removal of the uterus instead of a supravaginal amputation in cases of a myomatous growth in the body of that organ.

I have met with three cervical stump lesions demanding removal during the past year. Two were cancer and one a myoma of the cervix. Of the malignant cases the patients were respectively fifty-eight and sixty-two years of age. In both patients a supravaginal amputation for myoma was performed. In the patient fifty-eight years old
the uterus was ablated supravaginally eight years ago, and in the patient sixty-two years of age, seventeen years ago.

The patient with the cervical myoma was thirty-six years old. Three years after an operation for a uterine fibroid in which the supravaginal amputation was performed this patient presented herself with a cervical myoma of the posterior lip the size of a billiard ball.

Dr. Polak supports his argument by referring to a number of cases of cancer developing upon the remaining cervix years after the primary operation had been performed. It is reasonable to assume that such an argument is deserving of serious consideration. When it is a known fact that cancer of the cervix is a very common disease, that it is more frequent even than cancer of the breast, and is the chief cause of the greater prevalence of cancer in the female than in the male, there remains the inference that a total removal of the uterus would be the proper procedure whenever a myoma of the uterine body demanded removal of the abdominal portion of that organ.

Such a procedure has its appeal and no doubt meets the approval of the surgeon in cases where the cervix gives evidence of disease, or in a subject that presents a predisposition to cancerous disease, as may be elicited from the family history.

That the operation of total hysterectomy for a myoma of the body of the uterus, the cervix being healthy, will ever meet with general approval, must be doubted.

There are objections to a total ablation, and although these objections may be responsible for a disaster in the future, a situation that will, however, always be problematic, they serve at least for the present a highly satisfactory reason for not sacrificing the entire organ in some cases of uterine myomata.

Operation for uterine tumor is today performed by every casual operator, and of casual operators there are many. When I look back upon my hospital interne days and recall the keen spirit and steeled tension the master surgeons evidenced when about to perform a hysterectomy, I cannot wholly suppress my feelings at the indifferent attitude taken by many operators of today, who in an apparently nonchalant manner undertake to perform this operation.

We can be assured with convincing certainty that, under the circumstances, a routine complete hysterectomy would show a rise in the mortality rate, and the number of nonfatal injuries to the bladder, ureter and rectum would be proportionately increased. In the less complicated cases a hysterectomy may, even in the hands of the average operator, be not difficult to perform, but frequently perplexing situations are met with which demand the skill of a finished surgeon for their safe elucidation.

To those operators whose sense of timidity would deter them from
performing a total hysterectomy when the indications are clear, a thorough familiarization with the excellent technic of Drs. Noble and Baldwin, if not already known to them, will prove of great advantage.

Although pronounced vaginal prolapse has seldom manifested itself after entire removal of the uterus, it does occur in a mild degree in many of the cases. This condition must be attributed to the lack of support from the intrapelvic structures that have suffered through complete hysterectomy. In a supravaginal hysterectomy a healthy cervix serves excellently as a support for the fixation of the round and broad ligaments, thereby maintaining the almost normal stability of the vaginal canal.

With the ablation of the entire uterus there must occur vaginal shortening. In a woman whose sex life is extinct, such a condition would be of little weight when advanced as an argument against total hysterectomy; in a woman, however, who is still in active sex life due consideration should be given to this state, and unless the cervix is extensively diseased, a supravaginal amputation should receive preference.

It may not be pertinent to speak of infection in connection with total hysterectomy, when performed for a myomatous condition, but recently a very careful surgeon suffered the loss of two patients through infection following this operation. The origin of infection after a hysterectomy will always remain more or less in doubt; however, if the ablation has been complete the suspicion regarding the origin of infection will undoubtedly be cast upon the vagina. The cleansing of the vaginal canal may have been most thorough at the beginning of the operation; however, the fact must not be overlooked that contamination with infectious material from the uterine cavity may take place during the progress of the operation. It is one of the uncertainties occasionally encountered in this character of operative work, and its potentiality must be considered a salient feature in deciding upon an operative course which will present the greatest measure of safety. Here again it would appear that the best interests of the patient could be served by allowing the cervix, if not diseased, to remain.*

Whenever circumstances demand the removal of the uterus for a myomatous growth in which the question of cervix retention is being considered, the suggestions which occur to me in connection with this subject are the following:

If the patient’s family history shows the presence of malignancy the assumption of the inherited tendency of a constitutional predis-

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* I do not wish the inference to be drawn from this assertion that infection may not occur through retention of the cervix. On the contrary, it may happen; however, it is reasonable to assume that a supravaginal amputation would greatly diminish this danger.
position will be sufficient cause for a total hysterectomy. In those cases of cervical lacerations that have developed an extreme ectopic condition a complete ablation of the uterus should be undertaken.

Patients with a cervical disease amenable to a plastic operation, and still in active sex life, should be subjected to supravaginal section as the preferable operation. In these cases a simple but thorough plastic should be performed on the cervix, sufficient in scope to remove all of the diseased tissue. Special precaution, however, should be exercised in equalizing the wound surfaces created by the wedge shaped excisions, so that a good apposition of the newly formed lips may be obtained. Such a cervix after healing is perfectly smooth and healthy in appearance, and what remains of the cervical canal is almost completely obliterated. The removal of the cervical tissue should be as extensive as is consistent with the judgment of the surgeon, inasmuch as it is presumed upon histologic grounds that the removal of a large amount of glandular portions of the cervix proportionately diminishes the chances of subsequent carcinomatous degeneration.

I prefer this procedure to the "cupping out" of the cervix practiced by Kelly of Baltimore, or the intracervical enucleation of Lahey of Boston (Annals of Surgery, July, 1923).

The cervical plastic requires but a few minutes for its execution. The operation is a minor procedure and should not react severely upon the general condition of the patient.

Cancer of the cervix is extremely rare in virgins. In consideration of this fact the weight of opinion should favor the retention of the cervix whenever circumstances demand an operative procedure for a fibroid uterus. If the patient is still a young woman an appreciable service will be rendered her should she ever enter into wedlock. In explanation of this latter remark I have reference to the vaginal shortening which results from the employment of complete hysterectomy for these lesions. The partial obliteration of the function of this canal may not be inconsistent with a good degree of health and comfort; it however, may evidence its shortcomings under different conditions.

Ever since Dr. Polak has agitated this subject of stump cancer so forcibly, my examination of the cervix in a patient to be operated on for a uterine fibroid has been more searching and minute. If lacerations are present they are thoroughly scrutinized, for it is well known that a hidden cancer nidus may readily find concealment in a fissure and easily escape detection.

When it is known that cancer is five times more common in women who have fibroid tumors than in women who do not have them, the position of the surgeon becomes vested with more than a passing
responsibility. Upon his understanding the future welfare of such patients must repose.

UNIVERSITY CLUB BUILDING.

DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—Three or four years ago I went into this subject very thoroughly because I had a series of cases, all occurring within one year, of malignant changes in the cervix after supracervical hysterectomy. The only work done up to that time was that by Leonard, then a resident of the Johns Hopkins Hospital, which was open to some criticism. I went into the matter by personal correspondence with professional friends throughout America, and succeeded in collecting 256 cases of cancer occurring in the cervical stump after the body of the uterus had been removed for fibromyoma. This seemed rather a large number, and yet at the meeting at New Orleans when I reported these cases, there were 11 additional cases, if I remember rightly, reported by men in the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association, making a total of 267 instead of 256. My idea of treatment was not that every woman who was operated for a fibromyoma should have supracervical hysterectomy. My contention was that we knew that certain factors predisposed to cancer, and that chronic irritation was one of these factors; that infection was also very common in connection with chronic irritation; and that in Bonney’s experience every case of epithelioma of the cervix had been preceded by an endocervicitis. Childbirth was another predisposing factor—therefore if the cervix was infected or extensively traumatized it should be removed.

The question comes up how are we to rid ourselves of this cervix. If the cervix is necessary for the comfort of the woman, there is no question that by taking it out we shorten the vagina. By taking it out we lose some of the lubrication of the vagina. These cases are not so comfortable as when the cervix is left in. If we use the uterosacral ligaments for support as described in the technic of Dr. Baldwin, we do not have prolapse of the vaginal walls. Lately I have handled these cases of extensive infection or extensive trauma by panhysterectomy but in the borderline cases, I have left the cervix and used radium in the cervical canal to prevent cancer from occurring in the stump.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—For a good many years, for the reasons advanced by Dr. Polak, I have made it a rule, to which exceptions are very rare, to remove the cervix in cases of hysterectomy. Now and then, in some women with deep pleves, thick abdominal wall, virgins perhaps, with perfectly normal cervices, I have left the tip of the cervix. Every woman who has had a baby has a traumatized cervix, with scar tissue which is a possible source of trouble.

The technic I have used is simplicity itself. I have made the complete operation over and over again in fifteen minutes and never wounded the bladder or the ureter. I do not see how any one can wound these organs in an uncomplicated case. When we are dealing with cancer we must remove everything widely. I have resected an inch or two of the ureter in cancerous cases, but there is no excuse for injuring the bladder or ureters in ordinary cases, so that this feature can be dismissed entirely; it is a blunder on the part of the operator if either organ is injured. The woman’s cervix projects into the vagina to the extent of three-quarters of an inch; I take that out, but the vagina is not shortened. I have examined hundreds of such women. The vagina cannot prolapse; I do not see how it can be shortened, or how there can be any lack of moisture. I have
had cases complain for a while of excessive moisture, but never of lack of moisture or shortening of the vagina.

I have had no fatalities from infection. In these cases I wash out the vagina myself; I do not trust to an assistant or nurse, who might swab it out in a make-shift sort of way. I scrub it out myself with soap and hot water, so that I feel that it is mechanically clean. After I have scrubbed the vagina I catch the cervix with a volsellum, and pass into the cervix the tip of what might be called a large medicine dropper and inject carefully, not using so much force as to go through the fallopian tubes, a number of drops of full strength tincture of iodine. This goes into the uterus, fills it, and part of it runs out. I then flush the vagina with one-fourth strength tincture of iodine. I have thus practically sterilized the vagina and endometrium. Then going in above, the uterus is removed by the technic which I have used in several thousand cases, and which all my colleagues at the hospital have adopted. At the proper time I draw in the round ligaments on each side, shorten them if necessary, put a pursestring suture around the end of the vagina, catching the broad ligament bases and bringing them in. This gives a full length vagina. If the uterus has been low I have really lengthened the vagina, and I have taken away all possibility of cancer of the uterus. I do not know that I have ever had a death from vaginal infection. I do not see how there could be with that technic. I do not think it increases the risk one-tenth of one per cent to take out the cervix.

I personally know of 21 cases of cancer of the cervix following the subtotal removal of the uterus.

DR. HENRY SCHMITZ, CHICAGO, ILL.—It has been stated that carcinoma of the cervix is more common in the married than in the virgin woman. This statement would hold good if there were as many unmarried as married women. Brothers in a recent paper on the study of about 400 pelvic carcinomata, found that 88 per cent occurred in married women. However, if we knew the ratio between the married and unmarried women I think we would change this statement.

A chronically irritated cervix should be removed; it must not be left behind if a hysterectomy is being done. The vagina is carefully suspended by the round and broad ligaments, and if we carefully close the opening of the vagina by inverting the vaginal mucosa into its lumen, we will not have infection.

DR. LOUIS E. PHANEUF, BOSTON, MASSACHUSETTS.—I would like to bring out one point in connection with this discussion. Granting that with a woman in good physical condition, the total removal of the uterus is the ideal operation, we, nevertheless, occasionally run across women who have had a number of children and have lacerated cervices, and their general condition is such that we fear they would not stand the added shock of a total hysterectomy. My practice with this type of case has been to do a cervical amputation from below, to cover over the raw areas carefully with vaginal mucosa, and then to do a subtotal hysterectomy from above, suspending the small wafer of cervical tissue which is left by the round and infundibulopelvic ligaments. I believe that the performance of a total hysterectomy offers no great difficulty to one who is trained to do the operation. In my mind, the vaginal preparation before the operation is the most important step.

My method of preparation has been to have the patient scrubbed with soap and hot water as carefully as if a vaginal hysterectomy was to be done; the vagina is then dried and wiped with alcohol. The lacerated cervix is sutured with a running stitch to prevent the escape of any uterine discharge into the peritoneal cavity as the uterus is brought out through the abdomen. Following this the
vagina is painted with tincture of iodine, and a strip of gauze one yard long is used to pack the vagina. The end of the strip which is placed against the cervix is saturated with iodine. This pack acts in two ways: in the first place, it raises the cervix higher in the abdominal cavity, thus making the dissection around it easier; and in the second place the vagina is opened over iodine-gauze, and no vaginal secretion enters the abdominal cavity. This preparation has resulted from an experience which I had during my house surgeon days. A woman was operated on before the Clinical Congress of Surgeons some years ago, having a total hysterectomy done for myoma. Previous to the operation she was given a douche following which the vagina was not dried or prepared. I assisted at the operation and during the opening of the vagina, from above, a small amount of the douche water and with it some vaginal secretion entered the abdominal cavity. The woman left the table with a pulse of 80, shortly after this the pulse rose to 150, and she subsequently died of peritonitis. Her death, in my mind, was due to the improper preparation of the vagina.

Again, in operating on a patient who cannot stand the complete hysterectomy because of her physical condition, we may cone out the cervix from above, thus removing all the cervical mucosa. The principle used in the Sturmdorf operation is employed here, but the procedure is reversed, since the cone out of the cervix is done from above, rather than from below.

Following the supravaginal hysterectomy I have been in the habit of suspending the cervical stump by attaching to it the round and infundibulopelvic ligaments. The suspension of the vagina following the complete operation is best accomplished by suturing the round ligaments to the vaginal cuff. The infundibulopelvic ligaments are usually under too great tension if brought down to the vagina.

DR. WM. SEAMAN BAINBRIDGE, NEW YORK CITY.—For about fifteen years it has been my custom, where I left part of the cervix, to follow the method of Bland-Sutton, namely, to remove the mucus-bearing tissue by a wedge-shaped incision to the external os above. I have personally never seen any of my cases return with malignancy.

There is one point on which I must disagree with the essayist. I feel it would be very unfortunate if it went out from this Society that we concur in the belief in a strong hereditary influence in the production of cancer. The facts before us today do not, I believe, warrant as yet any alarm for either profession or public, along this line. While there is undoubtedly an influence, with intensive inbreeding, in the lower animals, as proved by Miss Schley, of Chicago, and by the Imperial Cancer Research of London, I do not feel that any marked hereditary influence has yet been proved to occur in the human subject.

DR. RUFUS B. HALL, CINCINNATI, OHIO.—I do not believe it is the best practice to make a total extirpation of the cervix in every case of fibroid tumor of the uterus. Personally, I have not done so. I have carefully studied and examined my cases and have taken out the cervix when it was hypertrophied and lacerated, and the women have borne children when near the menopause, which the majority of these patients are. I have operated on many hundreds of these patients, and I have never had one case come back with cancer of the cervix. I have no knowledge that any of my patients on whom I have done hysterectomy, have gone to any one else for cancer of the cervix. I think it is good practice not to make total hysterectomy, unless there is some especial indication for doing so, such as extensive lacerations of the cervix or great hypertrophy or other marked disease present. If any or all of these conditions were present the cervix should be removed.
DR. E. P. SLOAN, Bloomington, Illinois.—I think the inner shell of the cervix after hysterectomy is a menace. If we examine these patients carefully we will find that ninety-nine out of a hundred have a discharge, all the fibers of the pelvic diaphragm, have their termination in the outer shell of the cervix, and when you cut the ends of these fibers you can never get the natural union you had before. When you coapt them the union is largely of sclerotic tissue which sometimes gives way under tension. I do not see any reason why we should not leave a shell of the cervix, and I see no reason for not removing the inner portion of the cervix. With a narrow bladed knife, with large handle slightly curved and double edged, it is easy to take out a cone-shaped portion of the cervix when a supravaginal amputation is done, and it is easy to remove the same area of tissue with the cautery.

DR. REDER (closing).—I am very glad indeed to be instructed in regard to the cancer situation, but if I have a married woman who has a uterine fibroid and a lacerated cervix, and she tells me that her mother died of cancer of the womb, I am going to perform a panhysterectomy on that woman with her consent.

I was much interested in what Dr. Baldwin said regarding cleansing the vagina of his patients. My difficulty in preventing the shortening of the vagina in a panhysterectomy has been usually the result of improper orientation. I have overcome this to a large extent by taking two volsella with bulbar ends, pinching one in the uppermost corner of the anterior fornix, and the other in the uppermost corner of the posterior fornix. The bulbar end of the volsellum will aid in orientation. I think Dr. Baldwin has convinced us that his technic will prevent shortening of the vagina. When we find that three per cent of all fibroid tumors of the uterus are associated with cancer, it behooves us to give this subject serious thought when we meet with a patient who is suffering with a fibroid tumor.
THE CLINICAL SIGNIFICANCE OF CHEMICAL AND SERUM ANALYSES OF THE BLOOD OF UTERINE CANCER CARRIERS SUBJECTED TO MEASURED RADIATION DOSES

BY HENRY SCHMITZ, M.D., CHICAGO, ILLINOIS

Roentgen and radium ray sickness has interested clinicians for some time. Walsh, in 1897, was probably the first to recognize and describe this reaction. Pfahler attributed the symptoms to poor ventilation of the roentgen ray room, the patient inhaling some gases present in the air that were produced by the action of the high-tension current. Wilbert expressed this same theory in a different manner as the cause of the symptoms. Another theory is that of a toxin produced in the blood by the roentgen rays and that this toxin is responsible for the blood changes causing roentgen ray sickness. (Linser and Sick, Engel, Joltrain and Bernard)

Linser and Helber, Warthin, Rosenstern and others have explained the symptoms upon a basis of a nephritis caused by the roentgen rays. Krause and Ziegler, Buschke and Schmidt, Hall and Whipple could not find evidence of nephritis following roentgen ray treatment.

Lange attributes the symptoms to the acidosis that develops as a result of cellular activity. Hirsch and Petersen find a disturbance of the acid-base equilibrium, and sometimes a slight lowering of the alkaline reserve, manifested immediately after treatment of patients with roentgen rays. Golden observed no diminution of the alkali reserve after treatment with roentgen rays.

Autolytic ferments present in tissues under normal conditions have been thought by some observers to be accelerated in their action as a result of radiation. (Baerman and Linser, Rosenstern, Edsall). Heile has shown that the spleen removed from dogs treated with radiation autolyses more rapidly than the control spleen from unrayed animals. Neuberg found the same to be true using cancer tissue. Richards experimented with ferments in vitro and found the roentgen rays in small doses accelerated and in larger doses inhibited action.

Some have thought the symptoms were brought about by the destruction of white blood cells with the liberation of the enzymes of these cells.

The part played by ferments in the roentgen ray sickness must, at
the present time, remain an open question. There is not sufficient experimental evidence to warrant a conclusion to be drawn at this time. As mentioned above, the well known decrease in the number of white blood cells after treatment with roentgen rays has been connected in some way with roentgen ray sickness by several observers. Giraud, Giraud and Parés have recently shown that the leucopenia does not follow the radiation of an organ (spleen) that has been clamped off from the circulation, but leucopenia occurs as soon as the clamps are removed and the blood of the treated organ is allowed to flow into the systemic circulation. The changes in the white blood cells following radiation would take us too far afield from our present paper to warrant further discussion at this time. But it might be added that the sensitiveness of the white blood cells, lymphocytes and leucocytes, is not limited to roentgen rays. These are probably the most responsive cells in the body as Leo Loeb has recently stated: "They are the finest reagents for the discovery of what we have called syngenesio- and homotoxins."

Hall and Whipple observed in dogs after massive doses of roentgen rays that the nonprotein nitrogen of the blood was markedly increased a short time before death, the urinary nitrogen increased following the exposure to the roentgen rays and remained high until the death of the animals. These authors conclude that the roentgen ray intoxication or general constitutional reaction is a good example of a "nonspecific" intoxication.

The chemical constituents of the blood of cancer patients have received considerable attention. The first work was done in an effort to find some variations in these constituents that would help in understanding the neoplastic process involved or as an aid in its diagnosis. The results obtained from this line of work have been negative. (Theis.)

There has been little attention paid to the blood from a chemical standpoint during the treatment of neoplastic growths with roentgen rays and radium. Whipple and his associates found an increase in the nonprotein and urea nitrogen of the blood in dogs exposed to massive doses of roentgen rays. These workers observed focal necrosis in the lining of the small bowel and suggest that this may cause the general intoxication with the accompanying vomiting and diarrhea.

Hirsch and Petersen could not demonstrate a striking or consistent alteration in the urea nitrogen, total nonprotein nitrogen, uric acid or creatinin in blood of carcinoma patients treated with roentgen rays.

The first effect produced upon the neoplastic growth after radiation is of a traumatic nature. The hyperemia that is first noted is quickly followed by an exudation of lymphocytes and leucocytes, and accompanying this one sees a swelling of the epithelial element in the radiated tumor.
There is always some necrosis in all malignant growths; there must be a process of autolysis going on all the time in such areas. Petry was the first to call attention to this fact. This author found that the nitrogen not coagulated by heat is increased in breast carcinomata, while in the normal breast practically all of the nitrogen is coagulable. This has been substantiated by several workers.

If the proper amount of radiation energy is applied to a deep-seated neoplastic growth, the subsequent hyperemia and edema should lead to an increased absorption of the autolytic products. Noneoagulable proteins will form a part of the material in such an area. The absorption of these, with protein splitproducts of a higher order, within a relatively short period of time due to the hyperemia and increased permeability of the capillary plexus should lead to symptoms of intoxication in the patient.

If a larger dose of radiation is applied, leading to hemorrhage and thrombosis immediately following its application, we would expect little absorption from the radiated area as compared with one in which the dose was not great enough to damage the blood vessels in the area. Such an injury caused by overradiation should produce shock symptoms in the patient, not accompanied by evidence of absorption of the autolytic products of the neoplastic mass.

Freund and Kaminer found that tumor cells, separated from the connective tissue and blood, when suspended in 0.6 per cent sodium chloride solution, were destroyed by the serum of noneancerous subjects; but, on the other hand, they found serum of cancerous patients did not cause a destruction of the tumor cells in the suspension. They attributed this to some lytic property present in normal serum that was capable of destroying the cancer cells.

To review the whole field of the Freund-Kaminer reaction would take too much time and space. The results of various observers have not been constant. There are many uncontrollable factors involved in the reaction. I agree with most workers that this reaction can hardly be used for diagnostic purposes. My purpose in using the Freund-Kaminer reaction was to see the effect that would be exerted by the radiation upon the serum of cancerous patients taken at various times following the initial therapeutic dose.

I wish only to mention the results obtained by other workers using the Freund-Kaminer reaction in malignant growths treated in various ways. Freund and Kaminer, using their original technic showed that the serum from patients who had the carcinoma removed by radical operative procedures, returned to the usual normal serum in respect to their lytic power of carcinoma cells. Koritschoner and Morgenstern, by using the refractometric method, showed that in one case of carcinoma of the rectum the differences in the reading before and after
digestion with the carcinoma cells and the patient's serum was −10; one month after the tumor was surgically removed, the difference was +20, or comparable to a normal serum. These authors also show two cases, five and four years respectively, after surgical removal of malignant growth, in which the sera reacted like nonmalignant or normal sera.

I have observed for many years a large number of patients with pelvic carcinomata subjected to radiation therapy. Some of these evidenced severe reactions, others showed only mild or no reactions at all. Again I lost seven patients who died from a severe intoxication. Clinically I found that patients having a clearly inoperable carcinoma with large ulcerating and infiltrating and necrotizing growths, usually showed a marked reaction, while the patients with borderline growths evidenced usually a mild or no reaction at all; while the deaths occurred in patients with frozen pelves and low vitality. The condition of the blood and leucopenia apparently did not explain these discrepancies in reactions. I therefore concluded to undertake a series of chemical analyses of the blood and blood serum to determine the effect of radiations on the patients.

The technic and dosage of radiation therapy have been described in other communications, especially in an article entitled "Technique and Statistics in the Treatment of Carcinoma of the Uterus and Contiguous Organs with the Combined Use of Radium and X-Rays," published in the American Journal of Roentgenology in October, 1922. Those interested are referred to this monograph to obtain the exact measuring of a 120, 150 or 175 per cent E.S.D. of combined radium and x-ray dosage.

To draw practical and clinical conclusions from these investigations I deemed it advisable to include in the list of cases investigated carcinomata of other regions of the body, and also benign uterine diseases subjected to radiation treatment.

TECHNIC

The patients entered the hospital at least twenty-four hours before the beginning of treatment. In most instances, they were in the hospital for a longer period of time before treatment was started. The blood was taken from the arm vein before breakfast on the day the first radiation treatment was administered, the patient having been on a fluid diet for twenty-four hours. The next morning before breakfast another blood specimen was taken, the patient remaining on a fluid diet. The third specimen was taken one week after treatment; the fourth specimen six weeks after treatment. In many patients living at a distance from Chicago, it was impossible to obtain the fourth specimen as patients were dismissed from the hospital before this time after treatment. All blood specimens were taken before breakfast, i.e., during a postabsorptive period.
The blood chemical methods followed were those of Folin and Wu. The Freund-Kaminer reaction was carried out according to the technic of those authors, using the refractometer suggested by Koritschoner.

The cancer tissue extract was obtained from Dr. G. Kaminer.

Table I contains in brief tabulated form the record of thirty-five cases studied by us during the past few months. The blood chemical findings: (1) before treatment; (2) twelve to eighteen hours after treatment; (3) one week after treatment; and (4) six weeks after treatment. There is, in addition to diagnosis, a short note of the outstanding features of the condition with the dose of radiation energy used.

Cases of carcinoma of the cervix of the uterus showing intoxication following radiation treatment. Cases I to VII inclusive.

Reference to Table I will show that all seven cases included in Table II are advanced carcinomata of the cervix; parametrium and vagina were invaded in most instances. Necrosis was present in all cases, usually most marked in the cervix, surrounded by the malignant and infiltrating growth. Intoxication followed the radium treatment.

The average nonprotein, urea and rest nitrogen before treatment are within the normal amounts found in resting individuals on a fluid diet. Even the increase after radiation is not high for blood under pathologic conditions, but is 40 to 55 per cent higher than before treatment.

Cases of carcinoma of organs other than the uterus, with one case of myoma uteri, showing intoxication following radiation treatment. Cases VIII to XIV inclusive.

Upon consulting Table I, it will be seen that the cases referred to in Table III can hardly be considered together from a morphologic or pathologic standpoint. Two were mammary cancer, one bladder, one lingual, one lip cancer, one inguinal lymph gland, involvement by metastasis from scrotum cancer, and one was myoma of the uterus. There was one feature characterizing all of these growths, namely, degenerative processes. Intoxication followed the radiation treatment.

When Table III is examined, it will be seen that the amounts of the various nitrogen fractions are higher before treatment than are those cases considered in Table II; in fact, the average normals in Table III are about the same as the average after treatment figures in Table II. The amounts of nitrogen in the blood after treatment in the group included in Table III are too high to be considered normal. The increase in the nonprotein and urea nitrogen was 33 and 32 per cent, but the rest nitrogen fraction increased 96 per cent.

The high control nonprotein fractions are suggestive of kidney impairment in this series. The increase in the nonprotein and urea nitrogen in the blood after treatment is not so great as the increase in the rest nitrogen fraction; the latter increased almost 100 per cent as compared with 33 per cent of the former two respectively. This is prob-
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<td>REACTION FROM RADIATION</td>
<td>REMARKS</td>
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| Mrs. K. XXVII | Carcinoma cervix II, uteri III | \[\begin{array}{cccc}
23.5 & 13.6 & 2.1 & 3.9 \\
24.4 & 15.1 & 2.0 & 4.0 \\
22.0 & 12.0 & 2.2 & 3.7 \\
\end{array}\] | 0.10 | None | 4 months previously had 175% E.S.D. Large infiltrating mass in left parametrium. 175% E.S.D. |
| Mrs. B. XXVIII | Carcinoma cervix II, uteri III | \[\begin{array}{cccc}
31.5 & 18.2 & 2.1 & 1.9 \\
33.3 & 16.1 & 2.0 & 2.1 \\
30.1 & 17.3 & 2.0 & 8.8 \\
\end{array}\] | 0.11 | Slight | Extensive recurrence with necrosis. Previously treated with x-ray. |
| Mrs. D. XXIX | Metastatic tumor abdominal wall | \[\begin{array}{cccc}
29.9 & 16.4 & 2.6 & 3.1 \\
27.5 & 12.0 & 2.5 & 3.0 \\
23.4 & 13.6 & 2.4 & 2.8 \\
28.0 & 14.7 & 2.5 & 3.0 \\
\end{array}\] | 0.11 | None | Following oophorectomy for cystoma. Treated 7 months previously with x-ray. |
| Mrs. P. XXX | Carcinoma cervix II, uteri III | \[\begin{array}{cccc}
30.7 & 15.6 & 2.4 & 3.1 \\
29.6 & 14.4 & 2.4 & 3.4 \\
28.7 & 14.0 & 2.8 & 3.2 \\
\end{array}\] | 0.10 | None | Ulceration and necrosis marked. Radiated 5 months previously. |
| Mr. C. XXXI | Carcinoma right inferior maxilla | \[\begin{array}{cccc}
25.4 & 12.2 & 3.8 & 4.0 \\
24.4 & 11.8 & 3.9 & 4.1 \\
26.0 & 13.7 & 3.5 & 3.3 \\
20.0 & 9.2 & 2.3 & 3.5 \\
\end{array}\] | 0.12 | None | Necrosis and cervical glands involved. Terminal. 150% radium dose. |
| Mrs. N. XXXII | Carcinoma cervix II, uteri, récurrences | \[\begin{array}{cccc}
25.4 & 12.1 & 2.5 & 2.1 \\
30.2 & 16.0 & 2.6 & 2.0 \\
29.5 & 14.7 & 2.3 & 2.1 \\
\end{array}\] | 0.07 | None | Pelvis frozen. Vaginal vault necrotic. Terminal. 175% E.S.D. |
| Mr. F. XXXIII | Carcinoma cervix, vagina, glands | \[\begin{array}{cccc}
36.1 & 20.8 & 2.2 & 3.0 \\
27.4 & 11.9 & 2.0 & 3.3 \\
29.5 & 15.4 & 1.8 & 2.9 \\
\end{array}\] | 0.08 | None | Large indurated area. Terminal. |
| Mrs. R. XXXIV | Carcinoma mammae, récurrences | \[\begin{array}{cccc}
20.6 & 9.6 & 3.6 & 4.0 \\
48.3 & 24.0 & 4.2 & 4.6 \\
31.7 & 15.3 & 3.9 & 3.8 \\
37.9 & 14.0 & 2.3 & 4.0 \\
\end{array}\] | 0.09 | None | Radical amputation 6 months previous. Scar and axilla indurated. 150% E.S.D. |
| Mr. D. XXXV | Metastatic carcinoma kidney | \[\begin{array}{cccc}
24.6 & 16.5 & 2.6 & 3.6 \\
28.9 & 19.3 & 2.1 & 4.2 \\
27.4 & 17.2 & 2.4 & 4.0 \\
\end{array}\] | 0.10 | Slight | 130% x-ray dose. |

ably due to the increased absorption of autolytic products present in and around the tumor areas exposed to radiation.

The severe cases of "roentgen ray sickness" were encountered in this group of cases of early neoplastic growths of various organs not showing intoxication following radiation treatment.

Cases of early neoplastic growths of various organs not showing intoxication following radiation treatment. Cases XV to XXII inclusive.

The cases considered in Table IV form a varied pathologic group. They
TABLE II

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<th>BEFORE TREATMENT</th>
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<td>Urea nitrogen</td>
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<tr>
<td>Rest nitrogen</td>
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</table>

*All figures represent milligrams per 100 c.c. whole blood.

TABLE III

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<td>AVERAGE</td>
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<td>Urea nitrogen</td>
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<tr>
<td>Rest nitrogen</td>
<td>6.4-15.5</td>
<td>9.5</td>
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</table>

*All figures represent milligrams per 100 c.c. whole blood.

were all early neoplastic growths, characterized by little or no evidence of degenerative changes. No intoxication was noticed after radiation. The nitrogen fractions, as shown in Table IV, before and after treatment do not show a marked change, the fluctuations are within normal daily variations, the changes varying from +9 to -14 per cent.

Cases of hemorrhagic metropathy; no intoxication following radiation. Cases XXIII to XXV inclusive.

There was little variation in the blood nitrogen fractions before and after treatment in these cases. (Table I.) It should also be noted that the dosage was small as compared to that used for therapeutic doses in malignancy. In these cases the necrotic or autolyzing tissue was negligible in amount and the dosage was in keeping with the minor pathologic changes.

The results of the blood chemical findings in these and subsequent cases does not warrant special tabulation; such tables would not differ materially from the averages shown in Table IV.

Recurrent cases of malignancy following previous treatment by radiation. There was no intoxication in these cases after the last treatment. Cases XXVI to XXX inclusive.

The nitrogen fractions do not show much variations before and after treatment in these cases. There was no intoxication following our treatment.
Very advanced cases of malignancy showing no evidence of intoxication after radiation. Cases XXXI to XXXIII inclusive.

These were all hopeless cases. The absence on any evidence of a reaction although autolysis and other degenerative changes were present, we attribute to lack of reactive power on the part of the patient. All of these cases died within a short period of time.

Case XXIV.—Carcinoma of right breast; radical amputation on September 5, 1922. On December 28, 1922, the area of operation, scar and the axilla were found indurated. Several palpable nodules were in the chest wall. It was radiated with 175 per cent E.S.D. There was a marked rise in the various nitrogen fractions of the blood after treatment. There was no intoxication accompanying this rise. In this respect this case is an exception to the previously mentioned cases. We cannot explain this lack of reaction accompanied by a marked elevation of the nonprotein nitrogen fractions at this time. We cite this case as an exception to those recorded above.

Case XXXV.—Metastatic carcinoma of the left kidney. A large massive tumor was felt in the upper left abdomen surrounded by indurated area. Two operations had been previously performed for the removal of the tumor in this region, one five years and one three months before applying for treatment. A 130 per cent E.S.D. of x-rays was given. There was no marked intoxication and no change in the nonprotein nitrogen constituents comparable to other cases of similar nature. I cite this case as another exception to those reported in this paper.

I have omitted all cases of malignancy treated by radiation that show abnormally high nonprotein nitrogen of the blood. These cases have severe kidney involvement of one kind or another and cannot be considered in this group. I am engaged in the study of this type of cases at the present time.

The results obtained by radiation in experimental laboratory animals is hardly comparable with those obtained by radiation in cancer patients. The size of the field of radiation, the anatomic location, the histologic structure, the chemical composition and the vascularity of the tumor mass all must be considered, in conjunction with the proper dosage of radiation energy, before we can interpret the immediate and latent action arising in the patient.

The patients showing a severe reaction following the treatment with roentgen rays and radium have an increase in the nonprotein nitrogen of the blood. The urea and the rest nitrogen fractions show the greatest increase in amounts. I think this is due to rapid absorption of the autolytic products from the tumor area, due to the hyperemia and edema that follow immediately after radiation.

The increase in uric acid is more marked, as a rule, than the creatinin; this, I think, comes from the same source.

The patients showing no evidence of intoxication did not have a noticeable increase in the nonprotein nitrogen of the blood.

"Radiation sickness" occurs in those patients who have areas of autolyzed or necrotic tissue associated with the neoplastic tumors. This
reaction comes on relatively soon after radiation. The microscopic picture of the tumor at the time "radiation sickness" occurs in the patient shows an inflammatory reaction primarily. The hyperemia of the blood vessels with edema of the adjacent tissues is a characteristic picture. The degenerative changes in the neoplastic cellular tissue is not noticeable at this time, but occurs five to seven days after radiation.

The following examples, cases taken from Table I, can be cited and used to make clearer the above statement.

Mrs. C.—II. Necrotic mass in the cervical region; parametrium infiltrated. Received 100 per cent E.S.D. Severe intoxication.

Mrs. T. V.—Infiltration and ulceration of the cervix; no parametrium involvement. Received 120 per cent E.S.D. Severe intoxication.

Mrs. B.—XVIII. Chorioepithelioma, removed with curette. Received 175 per cent E.S.D. No intoxication.

Mrs. R.—XVII. Early carcinoma of the cervix; uterus and adnexa normal. Cervix amputated fourteen days before radiation began. Received 130 per cent E.S.D. No intoxication.

A careful study of Table I reveals many such instances. In these four cases just mentioned, the first two received less radiation than the third case, although the former two had "radiation sickness," the latter case showed little or no evidence of intoxication. The first and fourth cases just cited were both cervical carcinoma, the one with the autolyzing masses of tissue had severe "radiation sickness;" the latter one with no evidence of any degenerative process in pelvis, did not show evidence of intoxication.

Necrotic or autolyzing areas of tissue, particularly when parenchymal elements predominate, are always acid in reaction. The increased hydrogen-ion concentration of the part, due to the interaction of many factors, such as decreased oxygen supply, increased carbondioxide tension, organic acid radicals, accumulates as a result of excessive catabolic activity in such an environment and probably plays some minor rôle in the "radiation sickness" after absorption of these acid products. A slight shifting of acid base equilibrium in the blood after radiation of cancer patients would be expected; that this should be of short duration and quickly corrected by a mobilization of alkali reserve would also be expected under physiologic conditions. An overcorrection, by the mobilization of more alkali than necessary to just balance the acid bodies absorbed, would also be expected to take place under physiologic conditions. This is exactly what Hirsch and Petersen found to be true by careful experiments, using the gas chain method to obtain the hydrogenion concentration values of the blood of cancer patients before and after radiation.

The conclusions and clinical significance to be drawn from these observations are: (1) Patients with carcinomata free from necrosis and of limited extent called localized and borderline cases may be given
the total radiation dose within the shortest time possible. (2) Patients with extensive and necrotizing carcinomata should be treated with fractional doses at stated intervals. We may apply at the first sitting a dose which will arrest the bleeding and discharge, and temporarily stem the further growth of the carcinoma. As soon as the patient has passed the period of the radiation intoxication the rest of the dose may be applied. We thus ameliorate the distressing symptoms and stormy course of the radiation intoxication. (3) Patients with extensive carcinoma filling the small pelvis, having large necrotizing masses and causing advanced cachexia should not be subjected to radiation treatment. They cannot be benefited in the slightest degree and we only hasten the inevitable fatal end. (4) Recurrences occurring after the application of a correctly gauged radiation dose should not be retreated. Such patients have become radiation fast. A useless repetition of the treatment must effect a distrust in an otherwise valuable treatment.

Table V

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<th>Average of 12 normal sera</th>
<th>Sera before adding to tissue reading N.D.</th>
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<th>Sera 24 hours after adding to tissue reading N.D.</th>
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Table V gives in condensed form the results obtained by using the Freund-Kaminer reaction on the serum of carcinoma patients treated with radium and roentgen rays. The Roman figures on the margin designate the time in relation to the treatment that the serum was obtained: (I—before treatment; II—twenty-four hours after treatment; III—seven days after treatment; IV—four weeks after treatment.)

The technical difficulties encountered in the refractometric Freund-Kaminer reaction are so great that the use of this reaction is limited in
its value. Outside of the usual precautions for such refractometric work, the repeated handling of the sera under strictly sterile conditions is very difficult. All experiments were run in triplicate. All readings made upon sera that showed cloudiness or bacterial growth upon subculture were eliminated.

An examination of the cases reported upon will show a gradual change toward normal serum reaction after treatment with radium and roentgen rays. This is the same as has been observed by other authors after surgical removal of malignant growths.

This report is a preliminary publication upon this subject. The chemical study of the blood is now being continued, and will be extended to a careful metabolic study of the patients treated with radiation. The Freund-Kaminer reaction is also being extended to include the patients studied from the above mentioned standpoint.

**SUMMARY**

1. "Radiation sickness" is caused by the absorption of autolytic products from the degenerative areas of the tumor mass. This intoxication is an example of a "nonspecific" reaction.

2. The sera of patients with carcinoma become carcinomalytic after treatment with radium and roentgen rays, as evidenced by the Freund-Kaminer reaction.

3. The results of the chemical and serum examinations of the blood of carcinoma patients would indicate that patients with extensive and necrotic cancer tumors should be subjected to radiation therapy with a great deal of caution, using preferably a fractional interval method to prevent severe radiation intoxications. Patients with advanced carcinomata should not be subjected to radiation therapy.

**BIBLIOGRAPHY**

DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICHL.—Unless we know something of the modus operandi we cannot get the understanding we need for differentiating the best forms of treatment. I think it is exceedingly profitable to have this subject attacked from the standpoint of physiologic chemistry. After all that has been said, the vital thing to be considered is not altogether the question of whether every cancer cell in the field is killed. A change from what we call a normal cell, or relatively normal, to the cancer cell may go on when all the predisposing conditions are present. We do not understand the change of cells from benignancy to malignancy. I am not so sure even after we have the malignant cell killed but what some of the normal cells may have the conditions right to become cancer cells. Another important point, we may think a cancer cell is killed. The histologic appearance, the chemical tests we may apply, will all seem to indicate the cells are dead, yet I have seen more than once a tissue that if it were examined today one would say it was absolutely beyond the possibility of continuing life, yet if you examine it three weeks later you will find a nest of cells beginning to grow. That brings up the problem that many of our diagnoses made at one period of time may, with all the knowledge we have, be absolutely in accordance with the facts, and we render a diagnostic decision that is not going to hold after a lapse of time which will bring about a revivifying of the cells.

DR. SCHMITZ (closing).—Dr. Davis is correct in what he has said about the study of cancer cells. Let us take a cancer located in an area where it becomes again subjected to trauma or function peculiar to that particular region of the body; it will invariably recur after successful radiation treatment. A cancer of the tongue or of the lip may be treated successfully with radiation therapy, but if that growth is not afterwards removed surgically there will be a recurrence. In the uterus the conditions are different. Physiologically the function of the uterus is arrested and if sexual intercourse is prohibited we will not observe recurrences after radiation treatment.
RADIATION THERAPY OF CANCER OF THE UTERUS

By Ursus V. Portmann, M.D., Cleveland, Ohio

(From the Cleveland Clinic)

The treatment of cancer of the uterus and of cancer of the cervix has always presented a difficult problem. The observation that x-rays and radium rays have a more destructive effect upon malignant cells than upon normal tissue induced surgeons to the limited use of radiation therapy in the treatment of cancer of these tissues. Thus, the earlier era of purely operative treatment was followed by a period in which surgery was supplemented by the application of x-rays either before or after operation. During this period no better results were obtained than by surgery alone, because the x-ray treatment was purely empirical, that is, it was not based upon a knowledge of the physics of radiation nor was the dosage determined. During the last ten years the favorable results obtained by radium therapy, especially in the treatment of carcinoma of the cervix has tended to limit the surgical field to the treatment of early involvement of the cervix and to carcinoma of the fundus. However, the most favorable reaction to radium therapy and to surgery depends upon the extent of the malignant involvement. A therapeutic dose of radiation can be administered by radium to areas beyond the reach of the knife or the cautery, but there is a very large group of cases in which the involvement extends beyond the radius of radium activity and therefore, since in any given case the exact extent of the involvement cannot be known, the effects of surgery or of the application of radium cannot be exactly predetermined. These limitations of surgery and of radium therapy are met, in part at least, by the recent development of deep x-ray therapy which has provided another method of attacking malignant diseases within the pelvis, the extent of which may lie beyond the reach of operative procedures or of radium activity.

Radium rays and x-rays are identical in character, except that radium produces a small quantity of short waves of greater penetration than that of any rays yet produced by mechanical means. On the other hand, x-rays of sufficient penetration can be produced in larger quantities than can be secured from usually available amounts of radium. In view of these facts and the fact that x-rays and radium rays are governed by the same physical laws and produce identical biologic effects, it follows that they may be used to supplement each other, radium being used for intense local effects and the deeply penetrating x-rays of short wave lengths for broad diffuse effects.
The reaction of different types of cells to radiation varies considerably, some being highly susceptible and others very resistant. As a rule, cells undergoing rapid division are most susceptible. The endothelial cells of end-arteries and lymphatics are easily affected by radiation and the resultant swelling and death cause an obliteration of the vessel channels, thus cutting off nutrition and causing the death of tissue. Among tumor cells the rapidly growing types, such as those of small cell sarcoma, basal cell and embryonal carcinoma are especially susceptible. However, tumor cells of the same type often vary in their reaction to radiation under apparently similar conditions.

The therapeutic effect of radiation is thought to be produced primarily by direct action upon the tumor cells though secondary effects, as noted above, are the obliteration of vessels and probable stimulation of local resistance to the inroads of the disease by temporary round cell infiltration.

When x-rays are passed through gases the phenomena called ionization takes place, that is, the electrochemical relationship of the atom is changed. It is logical to assume that irradiation of living cells causes an exactly similar action, i.e., an electrochemical unbalance which is incompatible with the life of the cell. Dr. Crile and Dr. Fricke have found that irradiation causes a change in the electric conductivity of the blood. This has given encouragement for future investigation of the theory of the action of the short wave lengths produced by x-rays and by radium.

In view of the present status of our knowledge of the relative limitations of surgery, radium and the x-rays, we feel that the proper treatment of malignant disease consists not in the use of any one of these agencies but rather in the employment of certain combinations of methods according to the indications in each individual case. The limitations of surgery have been quite definitely proved by years of perfected technic. Radiation therapy is in its infancy, and as yet there are insufficient comparative data. I think that most surgeons now concede that radium therapy is the preferred method of attacking cervical carcinoma, although there is a small group of very early cases that may be successfully treated by operation. Even these, however, are as effectively and more easily treated by radium. During the last eighteen months our surgeons have practically abandoned the surgical treatment of cervical carcinoma. Now with the advent of deep therapy with x-rays we believe that we have a weapon which will not only prove as useful as, but broader in its application than radium.

When the use of short wave length x-rays was advocated we began a study of the physics of the problem with our Department of Bio-Physics. Our experiments soon proved that the very large intensities of x-rays at deep locations as measured by early workers, actually could not be obtained by practical methods of application. By careful comparison
and checking, our results and conclusions which will soon be published by Dr. Fricke, have been proved to be accurate. As a result of our experiments we were of the opinion that by x-ray alone we would be unable to obtain sufficient intensities of radiation to carry a therapeutic dose into the most deeply situated lesions such as a carcinoma of the uterus. It was probably fortunate for a possible series of cases that we made no attempt to use deep x-ray therapy alone, but proceeded at once to continue the local use of radium augmenting this with the application of deep x-rays.

There is no biologic standard for the measurement of radiation. Therefore, we assume a 100 per cent dose to be that amount of radiation necessary to develop a mild erythema of the skin within three or four weeks, and then compare the reaction of tumor cells to this reaction of skin. It was first suggested that a carcinoma dose was comparatively 130 per cent of the erythema dose. In the application of x-rays we fall just short of this because we are able to administer only from 80 to 100 per cent of the erythema dose to deep lesions. Therefore, to build up a homogeneous therapeutic dose in a uterus we use radium in the cervix, the activity of which gives approximately a 30 per cent homogeneous dose at a distance of about 4 cm. from the source. Thus, by combining the intensity of radiation from radium with that from deep x-rays there is built up a therapeutic dose that in a case of carcinoma of the uterus theoretically must eliminate all malignancy from the pelvic tissue.

Fortunately the uterus is one of the easiest organs to radiate. It is centrally located in the pelvis so that x-ray radiation can be applied through a number of portals around the body. The cervical canal lends itself to the local implantation of radium without any operative procedure other than some dilatation under nitrous oxid anesthesia.

The x-ray dosage that can be administered to a deep lesion depends upon the rate of absorption of the rays as they pass through the intervening tissues, and also upon the amount that the skin can stand without permanent injury. The ratio of absorption of rays is determined experimentally and charted. By means of these charts we are able quickly to determine the intensity of radiation at any depth below the surface. If the skin is given its maximum or 100 per cent dose over a certain area, then we find that at a depth of 10 cm. there may remain a dose of only 36 per cent, the rest of the rays having been absorbed. By using predetermined physical factors of voltage, current, distance, filter and time and by applying a skin dose to a number of different skin areas or portals of entry and directing our radiation toward the site of the lesion as a focus, we find that we can build up an 80 to 100 per cent dose. A radium absorption curve may now be superimposed upon the x-ray chart and from this we can find the intensity of radiation that reaches each point from the radium. By the summation of the
x-ray intensities and the radium intensities we determine the total dose of radiation that is administered to a lesion and at any point in the surrounding tissues.

I believe that the treatment of carcinoma of the cervix will become entirely confined to radiation therapy. Radium has already proved its value. Surgery and radium are equally successful in a small group of cases of early involvement. In a second group with vaginal involvement the operative procedure becomes more complicated and hazardous, and although good results are secured they are equalled or bettered by radium. A third group in which there is some involvement of the parametrium and a fourth in which the disease is widespread, the surgeon classifies as inoperable. These last two groups include an average of 62 per cent of all cases of carcinoma of the uterus. In cases of this type radium therapy has proved to be no less successful than surgery, and as the technic of radium application is being improved progressively better results are reported. It is particularly in the treatment of cases of groups III and IV that intensive radiation by radium and x-rays perhaps proves of greatest value as compared with surgery.

In making a comparative study of the results of radiation and of surgery it must always be borne in mind that the surgeons who first see these cases determine their operability. It is only within recent years, and even now only by a few surgeons, that any but inoperable cases have been treated by radiation alone.

As for carcinoma of the fundus, heretofore its treatment has been almost exclusively surgical because of the later metastases and the ease of approach to the lesion. In Dr. Crile’s series 26.8 per cent survive five years. While it is doubtful whether radiologists can improve upon the results obtained by surgeons, nevertheless, the fundus is just as accessible to radiation as is the cervix, and fortunately the predominating types of carcinoma found there yield well to radiation. It may be, therefore, that accumulating statistics of the end-results in inoperable cases in which radiation has been employed may prove that in the treatment of carcinoma of the fundus, as in the carcinoma of the cervix, the application of radium and of the x-rays is the method of choice.

At this early date we have not sufficient data from which to compile statistics of the end-results of the treatment of carcinoma of the cervix by x-ray radiation. Experience thus far, however, leads us to believe that by the combination of radium and short wave x-rays patients have been distinctly benefited more than by previous therapeutic methods. We have not refused to treat any case. We have observed the immediate cessation of hemorrhage and pain, more rapid healing of local lesions, early softening and disappearance of induration and a more rapid convalescence than by other methods. Improvement has naturally been particularly striking in some cases with extensive involvement.
The cases in which radiation has been least successful have been those in which some operative procedure has preceded irradiation. In cases of cervical carcinoma, if cauterization is performed, it should be followed by irradiation immediately. Except for diagnostic purposes curettement and excision of tissue should not be done unless radiation is administered at the same time.

The sequelae of radiation therapy are not severe. It is followed immediately by nausea which lasts for a few hours or days and diarrhea ensues in about ten days, lasting from four to five days. An erythema of the skin which should not be troublesome develops in three or four weeks.

The most important contraindication to radiation therapy is inflammation. In some cases of carcinoma of the cervix there is an inflammation of the adnexa. It is extremely hazardous to give intensive radiation in such cases as a fatal peritonitis may develop. A bad general physical condition or severe systemic disease may contraindicate irradiation, but if we proceed slowly or give a blood transfusion there should be no difficulty. Loss of blood or anemia is not essentially a contraindication as radiation quickly shortens the coagulation time of blood and transfusion can support a patient who is too anemic. Radiation does temporarily reduce the number of red cells, but we have as yet had no case in which this was a permanent or detrimental effect.

_Euclid at Ninety-third Street._
THE ROLE OF RADIUM IN THE TREATMENT OF CARCINOMA OF THE UTERUS

By Thomas E. Jones, M.D., Cleveland, Ohio

(From the Cleveland Clinic)

VARIOUS phases of the vital problem indicated by the subject of this symposium are discussed in the papers offered by Dr. Portmann and Dr. Crile. I shall therefore confine myself to a brief statement of our personal experience with radium therapy.

Carcinoma of the Cervix:—The cases of carcinoma of the cervix which have been subjected to radium therapy during the past four years can be roughly classified into three groups:

I Inoperable cases treated with radium alone.

II Cases subjected to treatment with both surgery and radium.

III Cases treated with both radium and deep x-ray therapy.

In the treatment of the cases in group I—the inoperable cases—radium therapy yields excellent results. At first we were unwilling to treat early cases of uterine carcinoma with radium, but secured excellent results in the treatment of the inoperable cases. Thus, among nine cases treated over three years ago, four cases—45 per cent—are now apparently well. Even should any of these cases die during this year they have been able to live in comfort and their economic status has been assured for at least 5 per cent of the normal term of life—during the period in which a mother is an important factor in family affairs.

In the second group,—treated by both surgery and radium,—very bad results were secured and this combined treatment has been discarded.

The third group, in the treatment of which both radium and deep x-ray therapy have been used, shows the best results, although since this combined method of treatment has been in use less than a year we have no available statistics upon which to base a discussion of end-results—three or five year cures.

· Method of Treatment.—The method of application of radium changes from time to time with increasing experience and with individual cases, for it is impossible to treat all cases alike. Often it is feasible to use needles, while in other cases their use is not possible. I think, however, that needles should be inserted wherever possible because by their use a more homogeneous radiation is secured.

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It has been our custom to place 75 mg. in the cervix screened with 1 mm. of brass, 50 mg. against the cervix and 75 mg. (in 9 needles) inserted at various points in the cervix, the treatment being continued for periods varying from 12 to 16 hours. In from three to four weeks the patient is treated again by placing 125 mg. screened with 1 mm. of brass against the cervix for from 12 to 15 hours. Thus, each case receives a total dosage varying from 4000 to 4800 mg. hours. After the second treatment the patient is discharged, but comes in again for observation three months later.

Nausea is the one complicating factor to be considered. This is not invariable as some patients are nauseated and others are not. We have found no means of obviating this condition. There is no foundation for the popular use of alkalies. That there is no acidosis is shown by the fact that the potential alkalinity of the blood is increased after radiation.

We have not seen a single fistula, either rectal or vesical, in the cases treated with radium alone. They have occurred only in the cases treated with both surgery and radium. Proctitis with a slight stricture has occurred in only one case.

It should be borne in mind that in discussing the relative merits of surgery and of radiation in the treatment of carcinoma of the cervix the basis of comparison must be the morbidity and the end-results,—three and five year "cures"—as immediate mortality in these cases pertains only to surgery. No immediate mortality can be attributed to radium therapy. We are convinced of the value of radium in inoperable cases of carcinoma of the cervix; we believe that accumulating evidence will give equally positive evidence of its value in early cases.

Carcinoma of the Fundus.—On account of the excellent results of the surgical treatment of carcinoma of the fundus, up to the present time I have not advocated radiation in these cases. During the past year, however, in three cases we have seen a recurrence in the upper end of the vagina six months after a complete hysterectomy, and all three of these patients died less than one year after operation. This fact suggests that further investigation is demanded—perhaps a trial in cases of carcinoma of the fundus, in which there may be some contraindication to operation, such as old age, or cardiovascular disease, or objection to operation on the part of the patient.

Euclid at Ninety-third Street.
Perhaps there is no field in surgery regarding which there exists a wider diversity of opinion than the treatment of carcinoma of the uterus,—of carcinoma of the cervix particularly. Even before the complex problems presented by carcinoma of the uterus were rendered still more complex by the introduction of treatment by x-ray and by radium, there existed a wide divergence of opinion as to the indications for operation and the type of operation to be performed. Today with the increasing number of advocates of radium and deep x-ray therapy to the exclusion of surgical treatment it becomes imperative for us to examine the evidence presented by the results of various methods of treatment, or of combinations of methods, in the hands of individual operators.

Thus, the American College of Surgeons has attacked as one of its first problems for intensive study the treatment of carcinoma of the cervix; and the uniform presentation of data collected from various clinics covering all phases of incidence, types of tumors, symptoms and operability and the results of various methods and combinations of methods of treatment should throw urgently needed light upon this outstanding problem.

A study of the literature for the past two years, in the hope that we might glean therefrom comparative statistics, shows such a divergence of opinion, and such a divergence of plan of presentation of statistics that it is practically impossible to draw any final conclusions. In this presentation, therefore, I shall, in the main, confine myself to a report of preliminary studies of carcinoma of the cervix and the fundus which have come under the observation of my associates and myself. This study is still in progress and the results reported here and the deductions drawn therefrom are to be considered as the results and deductions of the moment which may possibly be altered by our later investigations.

The results of our statistical studies at the present time are given in Table I and the figures therein suggest the following discussions regarding special features:
Table I  
End-Results—Carcinoma of the Uterus

<table>
<thead>
<tr>
<th></th>
<th>Cervix</th>
<th>Fundus</th>
<th>All Cases—Fundus and Cervix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of cases</td>
<td>251</td>
<td>106</td>
<td>357</td>
</tr>
<tr>
<td>Not treated</td>
<td>31</td>
<td>15</td>
<td>46</td>
</tr>
<tr>
<td>Cases available for study of operability, mortality, etc.</td>
<td>220</td>
<td>91</td>
<td>311</td>
</tr>
<tr>
<td>Radical operation</td>
<td>60</td>
<td>70</td>
<td>130</td>
</tr>
<tr>
<td>Palliative operation</td>
<td>108</td>
<td>17</td>
<td>125</td>
</tr>
<tr>
<td>No operation—radium and X-ray only</td>
<td>52</td>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>Operative deaths—radical operation</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Operative mortality—radical operation</td>
<td>6.7%</td>
<td>8.6%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Operability (radical operation)</td>
<td>27.3%</td>
<td>76.9%</td>
<td>41.8%</td>
</tr>
</tbody>
</table>

Cases heard from

<table>
<thead>
<tr>
<th></th>
<th>Cervix</th>
<th>Fundus</th>
<th>All Cases—Fundus and Cervix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical operation</td>
<td>42</td>
<td>36</td>
<td>84</td>
</tr>
<tr>
<td>Palliative operation</td>
<td>47</td>
<td>5</td>
<td>52</td>
</tr>
<tr>
<td>No operation—radium and X-ray only</td>
<td>50</td>
<td>3</td>
<td>53</td>
</tr>
<tr>
<td>Number of cases surviving 3 years (heard from)</td>
<td>23</td>
<td>14</td>
<td>37</td>
</tr>
<tr>
<td>Radical operation</td>
<td>16</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>Palliative operation</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>No operation—radium and X-ray only</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Number of cases surviving 5 years (heard from)</td>
<td>17</td>
<td>11</td>
<td>28</td>
</tr>
<tr>
<td>Radical operation</td>
<td>14</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Palliative operation</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Percentage of 3 year survivals—all operations</td>
<td>22.5%</td>
<td>34.1%</td>
<td>25%</td>
</tr>
<tr>
<td>Percentage of 3 year survivals—radical operations</td>
<td>38.1%</td>
<td>33.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Percentage of 5 year survivals—all operations</td>
<td>19.1%</td>
<td>26.8%</td>
<td>20.6%</td>
</tr>
<tr>
<td>Percentage of 5 year survivals—radical operations</td>
<td>33.3%</td>
<td>27.7%</td>
<td>28.6%</td>
</tr>
</tbody>
</table>

Operability.—Radical operations were performed in 60 of the 220 cases of carcinoma of the cervix regarding which we have sufficient data for study. On the basis of this figure the operability in this series was 27.3 per cent. Among 91 cases of carcinoma of the fundus, a radical operation was performed on 70, making an operability of 76.9 per cent.

Although various reporters have published operability percentages, it is obvious that their figures cannot be used as a basis of comparison unless the judgment of each reporter as to the standard of operability is known. Moreover, it is hardly possible even in the individual clinic to outline definitely such a standard. In general, we consider a case inoperable in which the broad ligaments and the parametrium are involved with extensions to the bladder and ureters and fixation of the uterus. Even this statement, however, must be considered as general, as in every case the possibility of operation must be individualized. Moreover, many cases which upon their first presentation appear to be inoperable, after a period of rest and observation may successfully endure even an abdominal hysterectomy, the change in
condition being due to the subsidence of inflammatory processes during the period of rest and selected treatment. Thus, rest in bed before operation often reduces the size of the cervix and shows a diminution of the thickening and fixation of the ligaments. Other indications elsewhere in the body are, of course, also to be considered, although in such cases the inoperable cases may become operable by the appliance of therapeutic measures; thus, for example, a weakened myocardium may be strengthened by digitalis, renal complications may yield to treatment, etc.

Of particular interest in this discussion of operability is the short duration of symptoms and the extent of involvement at the time of operation. Thus, among the cases of cancer of the cervix, in three cases in which the symptoms had been recognized for less than a month, two were diagnosed as inoperable and the vagina was involved in one. In 36 cases in which the duration of symptoms had been less than a year, 30 were inoperable and the vagina was involved in six. These figures emphasize certain points to be made later regarding earlier recognition of carcinoma of this organ.

**Incidence.**—Our figures show the highest incidence of both carcinoma of the cervix and carcinoma of the fundus between the ages of 50 and 60 years. This is later than the findings of most reporters who place the highest incidence between the ages of 40 and 45 years. As to the occurrence in married and unmarried women, but six of our cases of cancer of the cervix occurred in single women. A similar relation exists in the case of carcinoma of the fundus, our series showing 78 cases among married women as contrasted with 10 among unmarried. These figures combined with the lack of recognition of early symptoms emphasizes the importance of Kelly's suggestion that "(1) The physician attending a woman at labor should, six or eight weeks later, make an examination and find out what lesions remain," and "(2) Every woman who has borne children should have a careful gynecological examination at least once every year until she is 55 years old," as in view of the symptomless early stages only by direct examination can one surely catch the very first stages of carcinoma of either portion of the uterus. This point is emphasized also by the fact that among our cases hemorrhage or other discharge was noted as the first symptom in 122 out of 132 cases of carcinoma of the cervix in which the first symptom was noted, and in 60 of the 68 cases of carcinoma of the fundus in which the first symptom was noted. It will require a very long period of propaganda and instruction of the public and medical profession at large to assure that every woman above the age of 40 will surely look upon any abnormal discharge from the uterus as a suspicious symptom upon its first appearance, especially during the period of the menopause.
Predisposing Causes.—The preponderating incidence of carcinoma of the uterus in married women, especially in women who have borne children, indicates that laceration and irritations of the cervix are certainly to be considered as primary predisposing causes. Poolese reports that chronic endocervitis preceded cancer in 34 out of 48 cases. Ewing maintains that polypoid myomas of the cervix are usually malignant at all ages and that the presence of a myoma in this region, therefore, is to be considered as a definitely premalignant condition.

In carcinoma of the fundus, Ewing believes that myomata are the first causative factors, an opinion apparently borne out by W. J. Mayo who states that "cancer of the cervix occurs 15 times as frequently as cancer of the body of the uterus, but in myomatous disease, cancer of the body of the uterus is found five times as frequently as cancer of the cervix, chronic irritation of the uterine tumors increasing the incidence 75 times." These opinions would seem to be strengthened by the fact that uterine myoma is estimated to be present in 50 per cent of all women over 50 years of age. Any local congestion or chronic endometritis aids the development of carcinoma. Cullen has reported perhaps the earliest squamous-cell carcinoma of the cervix which has been reported, its occurrence being discovered by an examination of the scrapings in a case cured for hemorrhage due to hyperplasia of the endometrium and a small submucous myoma. Kelly and others urge the importance of most painstaking examination of all curetted material by someone sufficiently expert to recognize the presence of cancer cells.

As for the type of carcinoma, our findings to date coincide with those reported by Ewing, squamous-cell carcinoma predominating among our cases of carcinoma of the cervix, and adenocarcinoma among the cases of carcinoma of the fundus.

Diagnosis—Early recognition.—In addition to the comments made above, it may be noted that cervical carcinoma yields earlier symptoms than does carcinoma of the fundus and that the symptoms of carcinoma of the fundus are more subjectively urgent; that is, in carcinoma of the fundus pain sometimes occurs due to distention of the muscular wall, whereas unfortunately pain is one of the latest symptoms of carcinoma of the cervix. A leucorrhea or hemorrhagic discharge which may be intermittent or persistent and becomes increasingly fetid in character is usually the primary symptom.

Extension.—Two striking characteristics of carcinoma of the fundus and of the cervix noted by Ewing seem thus far to be borne out by our own observations, that is, the tendency of uterine carcinomata to remain localized. Cullen found the nodes free in practically all cases examined by him. Ewing gives the reports of various observations showing lymph nodes free in a large percentage of the fatal
cases of cancer of the fundus. Carcinoma of the cervix, while it extends early to contiguous structures, also is usually limited to the pelvis, its extension to the bladder, as one would expect, being of the most frequent occurrence. Very few cases of carcinoma of the vagina due to recurrence from the uterus or cervix are reported in the literature. In our own series we have one case of carcinoma of the vagina following a hysterectomy for a fibroid tumor, the only case we have noted. Hoffmann, in a limited number of cases, has made an interesting study of the relation of a primary carcinoma in the uterus to the development of cancer in other parts as also of the relation of carcinoma of the uterus to primary growths elsewhere.

**Table II—Hoffman**

**Primary Seat of Growth in Uterus in Relation to Cancers of Other Parts**

| Cancer of bladder | out of 18 in women | 1 |
| Cancer of breast | " " 314 | 1 |
| Cancer of intestines | " " 166 " " | 9 |
| Cancer of liver | " " 184 " " | 4 |
| Cancer of ovaries | " " 21 " " | 1 |
| Cancer of peritoneum | " " 6 (pelvic organs) | 1 |
| Cancer of rectum | " " 48 | 1 |
| Cancer of stomach | " " 326 | 3 |
| Cancer of vagina | " " 11 | 2 |

**Uterus Involved in Primary Growths Elsewhere**

| Bladder | out of 18 | 2 |
| Breast | " " 314 | 1 |
| External organs | " " 16 (pelvic organs) | 1 |
| Intestines | " " 166 | 4 |
| Liver | " " 184 | 1 |
| Ovaries | " " 21 | 1 |
| Stomach | " " 326 | 3 |
| Vagina | " " 11 | 3 |

**Treatment.**—In our judgment, in any patient past the menopause who has either a continuous or intermittent uterine discharge of any character, complete hysterectomy should be performed without delay and without hesitancy. We are told by some writers that uterine discharge is significant only when it is fetid and mixed with blood, but we do not believe that the character of the discharge should delay our treatment if the childbearing period is past. We urge strongly against curettage in these cases, as, if cancer is present, it will tend to disperse and disseminate the cancer cells. In these cases vaginal hysterectomy is performed and this can be done readily and successfully even in comparatively senile patients. A vaginal hysterectomy is performed also in a case of definite diagnosis of cancer of the fundus with the following precaution to prevent sowing the field with cancer cells,—alcohol gauze is first passed well within the cervix which is clamped off with heavy clamps.

In the case of suspected *carcinoma of the cervix* a section is first
made for microscopic diagnosis. If the diagnosis was confirmed, our method in the past has been to destroy the local growth with the cautery and to pack the vagina with alcohol sponges which were left in place overnight. The following day an abdominal hysterectomy was performed with a wide dissection of the parametrium and the broad ligaments, an iodoform drain being placed well within the wound. These procedures applied to the certainly operable period, the operation being followed promptly by radium.

Because of the favorable results of radium and deep x-ray therapy in inoperable cases and the indications of its value in all stages of carcinoma of the cervix, we are, at present, not using surgery in any of these cases. We are, however, holding our final judgment in abeyance until a sufficient time shall have elapsed for a definite comparison of the three- and five-year results of radiation in early cases to be made. Fundus carcinoma is still treated surgically—except those in which metastases involve areas beyond the field of operation. These cases are treated by radium and deep x-rays.

Surgery vs. Radium and X-ray.—As to the comparison of the operative mortality and the length of life after operation combined with radium, with the results of radium treatment alone, few final statistics of value have thus far been published since the majority of reporters give results in but limited series of cases for longer periods, the periods in the majority of the reports extending over two or three years only.

Bumm reports 78 cases treated by radiation in 1913, 77 in 1914, and 127 in 1915. From this large experience he recommends operation in all cases of cancer of the cervix or fundus, in which the condition of the patient permits. This is in marked contradistinction to the judgment of J. G. Clark who reports the extreme opposite opinion that radiation is always the method of choice in the treatment of carcinoma of the cervix, an opinion apparently shared by the Mayo Clinic as indicated in a communication by Dr. W. J. Mayo to Dr. Skeel: “The Wertheim type of operation has today only a very small field of usefulness. Personally, I have not done one in three years. Radium is taking the place of the extensive operation for the cure of carcinoma of the cervix with the exception of very early cases and it is possible that it will soon be the method of choice in all cases, either alone or combined with operation. For carcinoma of the body of the uterus, total hysterectomy is the operation of choice.”

Schmitz' figures are shown in Table III.

<table>
<thead>
<tr>
<th>Table III—Schmitz</th>
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<tbody>
<tr>
<td>Apparent Cures from Radium Treatment for 2, 3 and 5 Year Periods</td>
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<tr>
<td></td>
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<tr>
<td>1914-1919 inc.</td>
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<tr>
<td>1914-1918 inc.</td>
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<td>1914-1916 inc.</td>
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The principal objections urged against the radical operation are the postoperative sequelae, as well as the high mortality and the limited number of five-year survivals. Among the sequelae should be especially noted, cystitis, peritonitis, and fistulae of various types. Since some of these sequelae result also from the use of radium in inexpert hands, since we are by no means as yet assured of a radical cure by the means of radium alone, since without operation the suffering of the patient with carcinoma of the fundus is progressive and the outcome certain, it would seem that since surgery in combination with the postoperative employment of radium and x-ray gives the assurance of saving a large majority of the patients who present themselves in the operative stage, and of palliating suffering and prolonging the life with a fair prospect of ultimate cure in doubtful cases, we should hesitate to abandon such certainties for the uncertainties still presented by the use of radium and the x-ray without surgery in cases of carcinoma of the fundus, and should consider the advisability of abandoning surgery in cases of carcinoma of the cervix as still *sub judice*.

Our own operative mortality following radical operation alone, or followed by radium, has been 6.7 per cent in 60 radical operations for carcinoma of the cervix, 8.6 per cent in 70 radical operations for carcinoma of the fundus. Lincoln Davis gives a mortality rate of 9.3 per cent for radical operations for carcinoma of the cervix. Mortality rates published by other operators vary from 6 to 18 per cent, the latter figure being given by Janeway's figures for the Wertheim operation.

<table>
<thead>
<tr>
<th>Table IV</th>
<th>Various Statistics Regarding Operation and Operative Mortality of Carcinoma of Cervix</th>
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<tbody>
<tr>
<td></td>
<td>Operative Mortality</td>
</tr>
<tr>
<td>Cullen</td>
<td>15.1%</td>
</tr>
<tr>
<td>Lincoln Davis</td>
<td>9.3%</td>
</tr>
<tr>
<td>Graves</td>
<td>5.0%</td>
</tr>
<tr>
<td>Janeway (Collected Statistics)</td>
<td>18.23%</td>
</tr>
<tr>
<td>Cobb</td>
<td>11.16%</td>
</tr>
<tr>
<td>Crile</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

As stated above, no ultimate value can be placed upon these figures without a knowledge of the extent of involvement, that is, the operative judgment as to the operability of the individual case.

**SUMMARY**

Our own standpoint at the present moment may be summarized as follows:

1. In any cases of abnormality in uterine function within the child-
bearing period, meticulous care to determine the cause of the abnormality.

2. In the case of any abnormal discharge after the menopause, immediate vaginal hysterectomy followed by the application of radium.

3. Radium and x-ray therapy in the treatment of all cases of carcinoma of the cervix, final judgment as to the abandonment of surgery in these cases being reserved.

4. Individualization of each patient; that is, certain cases of carcinoma of the fundus which are apparently inoperable may become operable after a period of rest and the application of selected therapeutic measures.

5. Extensive correlation of the experience of individual observers is essential to the establishment of a correct basis of judgment as to the relative merits of surgery, radium and of the x-ray in the treatment of carcinoma of the uterus—whether of the fundus or of the cervix.

Euclid at Ninety-third Street.

Discussion of Papers by Portmann, Jones and Crile

Dr. Edward A. Weiss, Pittsburgh, Pa.—Unfortunately, in the past we have heard surgeons declare that surgery should be the only treatment, and that radium has no place in the management of cancer, and then we have the positive statement of the radiologist who declares only in favor of the x-ray. We have very few surgical clinics where cancer cases have been considered as group studies. These perfectly honest and reliable statements of Dr. Crile and his associates make it clear that surgery has its decided limitations in the treatment of uterine cancer.

During my association with Dr. Werder we found many difficulties attending the radical operation, and for a long time that was the only method of treatment to which we resorted. Our results after several years showed decided shortcomings, and we felt that possibly radium would be of value, and we consequently combined radium with surgery but as Dr. Crile has said, we found the combination to be disappointing. We believe that in the last two or three years, where we have used radium alone, or radium with x-ray, our results are far better.

I would question the treatment of carcinoma of the fundus with radium and x-ray. I believe that surgery is still the method of procedure. In the treatment of these cases it makes a great difference what type of carcinoma we are dealing with, whether squamous-cell or adenocarcinoma. I firmly believe that regardless of what treatment we institute for adenocarcinoma of the canal, we have a very serious proposition and a condition that is practically impossible to cure.

I should like to emphasize the point that has been made that we should be fair and open-minded and we will be safe to follow the teaching of Dr. Crile, namely, we must recognize that surgery has decided limitations, that radium is a splendid adjunct, but from our present observations radium and x-ray promise the best results.

Dr. Edward J. Ill, Newark, N. J.—This is a vital and intensely interesting subject. In 1884 I removed the uterus for carcinoma of the cervix for the first time, and just before the War, when we got the last journals from Europe, I saw that at Freiburg they were giving up operations for carcinoma of the cervix for the use of radium. I said to myself they are mistaken. But four years ago we
gave up the operation on the cervix for radium and since the ultimate results were so much better than from operation that from that time we have not operated on a single case of carcinoma of the cervix. My son, who is working in this line, tells me that 21 per cent of the cases where he has used radium have remained well over three years. In the past we have not operated on every case that presented itself, so we do not think it is fair to use radium on every case of carcinoma of the cervix, because of the hopelessness of the condition.

As to cancer of the body of the uterus, that is another question. I have not lost a single case of cancer of the body of the uterus from operation in twenty-five years, and there has not been a single recurrence in that length of time. Radium can do no better than that. On the other hand radium has been used in three cases that were not mine. In these three cases, the uterus was removed afterward, and in a great many sections not a single bit of tissue of a carcinomatous nature could be found. I think it is possible that as I grow older and do not like surgery as much as I used to, I may refuse to operate on cases of corpus carcinoma and have them radiated. At present I believe that corpus carcinoma should be operated on in preference to the use of radium.

DR. RUFUS B. HALL, CINCINNATI, OHIO.—I would not enter this discussion were it not for the fact that the remarks of Dr. Ill prompted me to do so. There is a certain percentage of cases in which I believe cancer of the body of the uterus should be operated on. Personally, not in twenty years have I had a single recurrence following operation for cancer of the body of the uterus. I have had many recurrences in cases of cancer of the cervix, and while I am not convinced that we still have the right treatment in radium and x-ray, I am willing for these men to try it out under Dr. Crile’s supervision. That is the most desirable means of trying out radium and x-ray in association with a surgeon like Dr. Crile that has ever been presented to us, and I believe we will get some kind of answer we can rely on in cancer of the cervix. I have quite a number of cases that were operated on years and years ago that have yet remained well. I recall one case that I operated on more than twenty-five years ago, a woman, forty-five years of age, with far advanced carcinoma. I believed I had operated too late and that she would have a recurrence and die. I did a vaginal operation. The uterus pulled apart during the operation in three different pieces. Strange to say, that woman is alive today, and one or two other patients equally as bad are alive today also.

Within the last year and a half a woman came to me with cancer of the cervix and I said I would not operate, although the destruction of tissue was not larger than the rubber on a lead pencil. The case looked like an ideal one for radium. She was given radium and x-ray and was dead in four months.

DR. HERMAN E. HAYD, BUFFALO, N. Y.—Three years ago I sent a woman to the Cancer Hospital of Buffalo, who weighed 210 pounds. She had a large squamous-cell carcinoma of the cervix, as big as a small orange and certainly was an unfavorable subject for operation. She was bleeding profusely. Dr. Schreiner, who has charge of the cancer work in the Institute at Buffalo, gave her radium and deep x-ray applications. He showed that woman before the Buffalo Academy of Medicine a year afterward, with a number of similar cases. There was absolutely no return whatsoever of the disease. I naturally became enthusiastic over the treatment of cancer of the cervix by radium, and yet within the last year I sent Dr. Schreiner two more cases. Dr. Schreiner said to me, “These are the kind of cases in which we get splendid results.” But both of them are dead. There is the disappointment. Although we may be enthusiastic over such treatment today, we have to study these cases carefully as we may be disappointed tomorrow. So far as cancers occurring in the corpus,
never returning, after operation, in the main it is true, yet I removed a cancer of the body of the uterus thirteen years ago, and I saw the patient a few days ago with a return of the disease in the stump. I had taken the cervix out, made a clean dissection. I sent her to Dr. Schreiner for radium treatment. Notwithstanding the poor outlook in these cases, whether we use surgery or radium, we must look at the subject with an open mind, and Dr. Crile is doing the right thing. When we have 300 cases in which surgery has been resorted to, and then 300 cases with radium, or radium and x-ray, our statistics will be worth something.

DR. GEORGE W. CRILE, CLEVELAND, OHIO.—In the interest of the discussion I should like to add that we have not given up the surgical treatment of carcinoma of the fundus, but are for the present using x-ray and radium in the treatment of cervical carcinoma.

DR. HENRY SCHMITZ, CHICAGO, ILL.—For the evaluation of radiation therapy in uterine carcinoma we should group them into these groups: localized, borderline, clearly inoperable and terminal. In the last mentioned group we have lost seven patients as a result of severe intoxication produced by the application of radium and x-ray. We have given up radiation treatment in the terminal or advanced cases entirely with radium and x-ray for the reason that these cases are absolutely hopeless from any standpoint of treatment. In our clinc we have not operated on any case of carcinoma of the cervix for the last three years; radium and x-ray have given us better results and the patients have survived three- or four-year periods free of all subjective symptoms. Surgery should not be combined with radium and x-ray in clearly inoperable cases as the patient will do much better and live longer without operation.

In our statistics of 303 cases published a year ago, we had 14 per cent absolute five-year cures, taking all carcinomata into consideration at that time.

The type of carcinoma is of great importance for radiation treatment. Cervical carcinoma are composed either of spindle-shaped cells or cylindrical cells or squamous epithelial cells. They possess a different radiation sensitivity. The basal cell carcinoma will respond to a 100 per cent E.S.D. radium and x-ray dose; the cylindrical cell adenocarcinoma to about 150 per cent E.S.D., and the squamous epithelial cell cancer to about 175 per cent E.S.D.

DR. HERBERT W. HEWITT, DETROIT, MICH.—It is quite generally known that some cases of carcinoma are refractory to the x-ray and to radium. I understood Dr. Crile to say that he did not employ surgery in any case of carcinoma of the cervix. I wonder what he would do with those cases of carcinoma of the cervix which are refractory. I would also like to ask Dr. Crile what his experience has been in removing the uterus with the Wertheim operation or a modification of it?

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I believe that Dr. Portmann in his estimation of 9 per cent of permanent cures is about right. Dr. Hall said he recalls a number of cases that lived twenty-five years, so do I. But the thing I particularly want to speak about is that we must not forget the work of those men who have gone before. The truth of the matter is that in cancer of the cervix, Byrne, of Brooklyn, Baker, of Boston, and Reamy of Cincinnati, secured just as good results from high amputation of the cervix with cautery as any of us have obtained. That brings me to the second point. I was rather surprised at the rapid recurrence of these cases. I have seen cases die that I thought would live, and other cases I thought I had cured have died since. But remembering the work of our predecessors, it has been my custom
DISCUSSION

for a number of years in every case of cancer of the cervix to thoroughly destroy all cancerous tissue that I could with the actual cautery. In that way I believe I have reduced the mortality considerably and prolonged the lives of many.

DR. JAMES E. KING, BUFFALO, N. Y.—For four years I have not done a radical operation for cancer of the cervix and for the past two years I have had a certain amount of radium in my possession. All who do surgery for malignant disease must have been impressed with one thing and that is, that the extent of malignancy does not necessarily determine whether or not an operation is to result in cure. Some of the most marked and worst appearing malignant conditions clinically, have much to our surprise resulted in a cure; whereas other cases apparently with slight involvement have gone rapidly on to death after operation. I have found that the same thing is substantially true in the use of radium. There is unquestionably a factor concerning which we know little that controls the destiny of these cancer cases. We may call it resistance or immunity but there is some biologic factor which determines whether or not operation or radium or any other form of treatment will be of permanent value. This, in my opinion, is the important question in connection with the cure of cancer. The question of radium dosage is entirely a secondary matter and I am sure in the future it will be relegated as a more or less unimportant detail of radium treatment. At this point, I am prompted to ask the essayists whether or not they have ever seen the slight improvement from x-ray or radium where there has been a recurrence of cancer in the broad ligament. Personally I never have, and I have had opportunity to follow these cases which have had the most approved methods of radiation.

DR. PORTMANN (closing on his part).—With regard to carcinoma of the fundus of the uterus, we are not using deep x-ray treatment, but there is no reason why we cannot get good results in treating carcinoma of the fundus as well as carcinoma of the cervix. There is, of course, the difference in the cell resistance. A hundred per cent dose may kill in one instance, and a 70 per cent dose in another.

In answer to the remarks of Dr. King, we have been disappointed in radiation or surgery because we do not know the biological reactions of the cells and have no means of doing so at this time. The different types of cells yield so differently. A certain type of cell will yield differently under similar circumstances.

As to Dr. Schmitz’s cases of carcinoma in which he reports five-year cures, we have had four cases of terminal carcinoma in which we expect no results at all.

DR. JONES (closing on his part.)—With regard to deaths following radium treatment, I have had none because I have not treated type iv with attempt at cure. For their discharge and bleeding small doses of radium were given for palliation, but I can readily see that large doses of radium and x-ray would kill these type iv cases.

DR. CRILE (closing).—The mortality rate for my series of radical hysterectomies has been 7.4 of all that I have attempted to cure. The five-year survivals of all operations, palliative and radical, have been 16.3 per cent.

Regarding the technic, in cases of cancer of the cervix we always destroy all of the cancer that we can with the cautery the day before the hysterectomy if that is to be the only operation. We leave the alcohol pack in place over night and the next morning do an abdominal hysterectomy, carrying the dissection out into the broad ligaments. The reason for that is obvious. I did a group of Wertheim operations, but I do not do it any more because of the high mortality rate. In the cases in which I found carcinoma in the glands which I removed
also, the mortality was so high that I did not feel it was logical to continue that type of operation.

In cases of carcinoma of the fundus we have reversed the picture; we always operate on cases of carcinoma of the fundus through the vagina, first sterilizing the vagina for the purpose of killing any stray cancer cells which might be there. Also before operating we cauterize the cervix, pack it with alcohol gauze, and put on large clamps, thus firmly imbedding the gauze in the cervical canal. I never release these clamps until the uterus has been removed. Our great fear has been implantation of cancer cells. Our results have been so favorable as to convince us that we should continue in the same way.

Dr. King has certainly raised an important question. In our biophysics department we have under way a research which we hope will enable us to forecast the exact physical condition of the cancer in any place so that the proper dose can be prescribed.
THE USE OF X-RAY THERAPY IN DISTURBED MENSTRUATION

By A. J. Rongy, M.D., New York City

The efficacy of x-rays in the treatment of fibroid tumors of the uterus is well-nigh established; in fact, there are gynecologists who advocate x-ray therapy in all forms of fibroid tumors of the uterus. While I do not hold such views, still I believe that x-ray therapy should be employed for patients suffering from fibroid tumors of the uterus, in whom there is a contraindication for operation. Patients, suffering from uterine fibroids, who have organic lesions of the kidneys, or who suffer from circulatory disturbances, or who are not good operative risks because of the location of the tumors, should not be subjected to surgical operation. Our statistics for hysterectomy will greatly improve if we eliminate those patients who are considered poor risks even by the most expert surgeon.

In reviewing my own statistics of uterine fibroids for the past three years, I find that in nearly 30 per cent of the patients I advised against surgical interference because of some definite contraindication and treated them with deep x-ray therapy. Invariably, good results were obtained; that is, the bleeding was controlled and the pain diminished. In only four patients was I compelled to remove the tumors, because the bleeding returned after it had stopped for nine months or longer. One patient bled so profusely that she became exsanguinated, and I had to resort to a number of transfusions before I operated on her.

It was Lengfellner, and later Halberstadt, who first demonstrated the greater sensitiveness of the ovary to the rays, and that menstrual changes are produced by radiation of the generative organs. This led to the use of x-ray in the severe types of dysmenorrhea in order to stop obtaining the cessation of the menstrual function completely.

It is now not uncommon to utilize the rays for the purpose of producing temporary or permanent sterility, especially in patients in whom there exist definite contraindications for pregnancy. Such patients are very often spared the ordeal of a surgical operation.

When the effect of the rays upon the ovaries was fully established and its use to stop the function of menstruation was universally adopted, some investigators gradually extended its use to milder forms of menstrual disturbances and, by developing a finer technic for its application, have succeeded in modifying some of the so-called
functional menstrual disturbances, like menorrhagia or even metrorrhagia, in women between the ages of twenty-five and thirty-five years.

During the past year I had a most striking experience of the effect of radiation in a case of prolonged meno- and metrorrhagia:

Mrs. S. B., thirty years of age, had been married nine years, was never pregnant. For seven months she was spotting and staining irregularly; five days was the longest interval that she did not stain or spot. Vaginal examination disclosed no abnormalities of the genital tract; the uterus was normal in size, shape, and position, but of a somewhat hard consistency. She was curetted after she had bled for four months, but was not relieved. The bleeding still continued and she was advised to have a hysterectomy.

She came to see me after she had been bleeding for seven months. I suggested to her that, before she decided to have a hysterectomy performed, she should give deep x-ray therapy a trial and that, if the bleeding still persisted, she could always have the uterus removed. After four applications of the rays the bleeding ceased and the menstrual flow did not appear again. Four months later she called again and upon examination I found her two months pregnant. The pregnancy continued normally and she was delivered spontaneously of a living male child, weighing eight pounds four ounces.

How the rays acted in this case I do not know, and I believe the most learned of physicists would find it difficult to explain.

As experience with x-ray therapy increased, it was found that the effect of the rays upon the ovarian tissues differed, that their action depended to a great extent upon the mode of application and the dose administered; that a massive dose highly concentrated would destroy the ovarian cells, and that a smaller dose would only modify the function of the ovarian cells. Furthermore, a very small dose, properly applied, would in some instances stimulate the ovarian cell and even cause greater proliferation. This led to the idea of the use of stimulating doses of the rays in menstrual disturbances, which are supposedly caused by deficient ovarian secretion.

Clinically there is a definite group of patients, who are classified under the heading of ovarian dysfunction. They menstruate once in two or three months; the flow is scanty and lasts but a day or two. These patients are usually sterile and some form of cystic degeneration, both macroscopically and microscopically, has taken place in such ovaries, with the result that there is not a sufficient quantity of ovarian structure left to carry on the function of menstruation properly.

Such patients usually tax all the resources of the gynecologist. We have very little at our command which will help to cure these cases. Occasionally some combination of organic extracts will help to improve the menstrual function, but the improvement is temporary only. Tonics and regularly prescribed exercises sometimes help the anemic and chlorotic women, but as a rule these patients do not improve and menstrual function remains the same.
During the past year I selected a number of patients, who suffered from irregular and scanty menstruation, and referred them to an expert radiologist, Dr. I. S. Hirsh, of Bellevue Hospital, for stimulating doses of x-ray. Every patient was carefully examined by me, and the findings of these cases were sent with the patient. I believe this is necessary, for it is important that the radiologist should have a proper conception of the condition of the genital organs before he institutes treatment.

It is difficult to convince patients to take this treatment, because they fear it will stop their menstrual function; in fact, they are so told by their family physicians. However, I succeeded in convincing thirteen patients that no harm would result to them from this treatment. I must admit the radiographer and I were not too enthusiastic about it. It was still an unexplored field, especially in this country; only a few scattered reports appeared in the literature of favorable results obtained by this method of treatment. Fortunately the result obtained in the first patient warranted a further trial of the treatment.

This patient was twenty-one years of age, married four years, and began to menstruate at fourteen, every month, four to five days' duration. At the age of sixteen she began to menstruate every two or three months and gained a great deal of weight. She came to see me February 7, 1923, giving a history of menstruating last, on December 5, 1922, and before then in August of the same year. After four treatments she menstruated February 13, for three days, and had no pain. She menstruated again March 21, for three days, and the flow was more profuse. Since then she menstruated regularly every five or six weeks.

The second patient did not respond to the treatment.

The third patient reacted well. She was thirty-four years of age, married nine years. She was sterile for five years, then became pregnant, and I delivered her of a living baby four years ago. She consulted me October 25, 1922, because she had not menstruated for one year. I gave her the organic extracts in various combinations, but they did not benefit her. On February 19, 1923, she called to see me again, as she still did not menstruate. I then referred her for x-ray and after two treatments she began to menstruate. The menstrual flow reappeared March 29, and lasted until April 3, and she has menstruated regularly since then.

Case 4 did not respond to treatment.

Case 5, Mrs. A. B., twenty-seven years old, had been married three years, and menstruated regularly every month, five days' duration. She became pregnant two and one half years ago and aborted at the end of the third month. She came to see me March 26, 1923, with the history that she had not menstruated since August 21, 1922, five days' duration. She was treated a number of times for about two weeks. She menstruated twice at regular intervals, subsequent to the treatment, and we have not heard from her since.

Case 6 did not respond to treatment.

Case 7 presented an unusual history: She was twenty-four years old, married four years, and began to menstruate at fourteen, irregularly, every two to four months for two or three days. For eighteen months prior to her marriage she did not menstruate. Menstruation reappeared, soon after she married, at irregular intervals of two or three months. She came to see me March 14, 1923, giving a
history of having not menstruated in four months. Vaginal examination revealed a normal vaginal vault, the cervix conical and small, body of the uterus not well developed and of a hard consistency, the right ovary prolapsed and tender, and the left ovary apparently normal. On June 23 she wrote to me as follows: "I am writing to let you know that my monthly period appeared on May 29, and I had it again on June 23, three days each time. I have a great deal of pain in the abdomen and back for three days before the flow appears." She came to see me again on August 20, and said that she menstruated regularly every twenty-eight to thirty-one days.

Case 8 did not respond to treatment. This patient is twenty-nine years old, had been married two and one half years, and never pregnant. She began to menstruate at fourteen, every two or three weeks, at the age of sixteen the menstrual flow began to appear every three or four months. After her marriage she became still more irregular, and at one time she did not menstruate for six months. Vaginal examination disclosed underdeveloped genital organs.

Case 9, Mrs. F. K., twenty-one years old, had been married three years, had a baby at full term two years ago, which died of spinal meningitis at the age of eighteen months. On January 18, 1923, I saw her in consultation. She gave a history of having menstruated nine months ago, and both the patient and her physician thought she was pregnant and due to be delivered in February. Upon examination I found the uterus small and easily palpable, and there were no signs of pregnancy. On February 26, she was spotting and staining two days, and again on May 3 she spotted for a day or so. She called to see me May 26, and I advised her to be treated by radiation. After receiving two small doses of x-ray, she began to menstruate regularly. She last reported July 28, stating that she had menstruated regularly twice after the radiation.

Case 10 did not answer to our many inquiries. In Case 11 no result was obtained. Cases 12 and 13 did not respond to treatment, but in case 13 the treatment has been given too recently to form final judgment.

As will be seen from the above, five patients have definitely improved under this form of treatment, the menstrual function having been reestablished, and is normal as to time and duration. One patient had not menstruated 18 months prior to the treatment.

I believe these results warrant the use of stimulating doses of x-ray therapy in patients who suffer from menstrual irregularities caused by ovarian dysfunction. The cases must be carefully selected by the gynecologist and the treatment must be given by an expert radiologist. I am certain that our next series of cases will show better results, because the radiologists will learn to gauge the dosage and mode of application much better to suit the individual case.

345 West Eighty-Eighth Street.

DISCUSSION

DR. HENRY SCHMITZ, CHICAGO, ILL.—In our clinic we employ radium as well as x-rays in the treatment of benign hemorrhages of the uterus. Radium is used in the bleeding uteri and the small myomata. The radioactive substances act only on the endometrium; hence they should be used if it is desired to conserve the function of the ovaries. In large myomata, however, we feel that the x-ray is the better treatment. Furthermore, if we treat uterine hemorrhages in younger
patients, we can gauge the dose of radium much more accurately than that of the x-ray. The determination of the dosage depends on the kind of normal or abnormal tissue to be treated and on the type of cell in each. The radiation dose may be irritating or stimulating; thereby function is restored and proliferation of tissue stimulated. It is inflammatory when it causes a temporary suppression of function with subsequent restitution to normal; it is destructive or lethal when it destroys function permanently.

In the ovary we probably possess the best organ to study these facts of dosage. The irritating dose stimulates ovulation, and hence on menstruation, the irritating dose causes a temporary amenorrhea, the destructive dose a permanent amenorrhea. These observations may be proved by clinical observation. If we use as the biologic unit of dose the 100 per cent erythema skin dose, which may always be reproduced by using the same source of ray times time of application, and may be controlled by a standardized measuring instrument as an electrometer, intensimeter or iontoquantimeter, then the stimulating ovarian dose is attained by a 10 per cent E. S. D. applied to the ovary; the inflammatory dose by about 25 per cent; and the destructive dose by 30 to 50 per cent of an E. S. D.

When we discuss results of radiation we should mention the exact dosage that was used in these cases, so that other clinicians are enabled to intelligently apply the treatment advocated.

DR. RONGY (closing).—I did not go into details regarding the dosage of radiation for the simple reason that it is not my job. This work is done by the radiologist. Dr. Schmitz is right when he says it is necessary for us to go into details as far as dosage is concerned. It is the unit of the erythematous skin dose established in the patient, which should be the guide. We do not give 10 or 15 per cent of the castration dose. This dose is 35 per cent of the 100 per cent established unit dose, which produces erythema of the skin. These patients receive 25 per cent of the castration dose. A great deal depends also on whether the patient is a thin or stout woman, and how many fields or portals are utilized. If she is a thin woman, we use two portals; if she is a stout woman, we use four portals.

While this work is still in the experimental stage, I believe it is possible to stimulate the ovary so that a woman begins to menstruate regularly, and I think work of this sort ought to be continued and not neglected. The work cannot be done except by an expert radiologist. A gynecologist, unless he becomes a radiologist, has no business to dabble in radiology. The expert radiologist has to do this work, and when he does it he will not overstep the bounds.
RESULTS OF RADICAL SURGICAL TREATMENT OF PROCIDENTIA BY THE MURPHY, COLLINS AND JACKSON OPERATIONS

By E. P. Sloan, M.D., Bloomington, Ill.

THIS discussion will be confined to the surgical treatment of uncomplicated procidentia, or prolapse of the uterus or bladder and rectum to an extreme degree.

Hippocrates gave a very striking and accurate description of procidentia uteri and described a wooden pessary. But the surgical treatment is of comparatively recent times. Among the first really important contributions to the radical surgical treatment of procidentia was that of Professor Olshausen of Berlin, who published a paper upon this subject in 1886.

In 1887 Howard Kelly published in the American Journal of Obstetrics a paper entitled "Hysterorrhaphy." Various operations were soon developed and reported under various names, such as suspension of the uterus, ventrofixation, hysterorrhaphy, and hysteropexy, and Alexander's operation for shortening the round ligaments, all having for their principle either suspension by the round ligaments, or suspension by a peritoneal band of adhesions formed by temporary fixation of the uterus to the peritoneum of the abdominal wall, above the pubes. It was soon discovered that the success of most of these operations depended upon holding the uterus in the anterior position.

In 1895 Kocher advocated fixing the body of the uterus into the anterior abdominal wall. The entire uterine body was retained and while it was usually successful so far as the cure of the procidentia was concerned, yet frequently, when the uterus was large, the tumor in the abdominal wall so formed was quite noticeable and caused much pain. Various degenerations and tumors sometimes developed in the retained body of the uterus. In the majority of cases the operation was followed by a persistent foul irritating discharge, especially when atrophy had not previously occurred.

In 1900 Gilliam contributed his modifications of the Ferguson operation entitled "Round Ligament Ventrosuspension of the Uterus." The Watkins-Wertheim method by the vaginal route was developed and is quite satisfactory for moderate prolapsus with cystocele when the uterosacral ligaments are intact. Vaginal hysterectomy has been done by many, with narrowing of the vaginal canal. This was usually only temporarily successful, as sclerotic tissue under tension gives way in time.
About 1906 the Mayo’s developed their suspension operation by which vaginal hysterectomy is done and the broad ligaments resected and firmly sewn together as high up in the pelvis as possible. The bladder is attached to the superior border of the connected broad ligaments, and the vaginal vault is attached to the stumps of the broad ligaments. This operation with perineal repair is quite satisfactory in a large percentage of cases.

There yet remained, however, a certain number of cases in which none of these operations were safe, effective, and perfectly satisfactory. The need was apparent for a satisfactory operation that would elevate and furnish radical support to the apex of the inverted cone, formed by the sagging pelvic diaphragm, so that the apex of the cone is upward. In the pelvic diaphragm are included the uterosacral ligaments, and the true and false ligaments of the bladder. I will briefly mention four operations devised to meet these conditions.

In 1910 John D. Murphy, published a description of a method of fixing part of the uterus in the abdominal wall, that has some features in common with Kocher’s operation. It is, however, very different in one respect. Instead of leaving the entire body of the uterus in the abdominal wall, he split the uterus longitudinally and removed most of the body of the uterus leaving only two outer flaps that were spread out on the external surface of the recti muscles and sutured there. He advocated a Pfannenstiel incision, the aponeurosis of the oblique muscles covering the uterine flaps. The difficulty with this operation is that infection will often extend from the cervical canal up between the uterine flaps and the fascia. In fact, a large percentage of these operations require long drainage and are usually followed by a fistula that persists for some time. Furthermore, the cut surfaces of the uterine flaps are directly in contact with the fibers of the aponeurosis of the external and internal oblique muscles; there is no peritoneal barrier. Fascia and muscle do not unite readily.

In 1916 Dr. C. U. Collins of Peoria, Illinois, reported an operation somewhat similar to Murphy’s, by which a strip of the fasciae fibers of the aponeurosis of the abdominal oblique is transplanted into the uterine stump in such a way that it supports the remaining part of the uterus, and the uterine stump supports the pelvic diaphragm and makes a permanent fixation that can in no possible manner give way. It leaves the uterine stump completely invested with peritoneum, a most important consideration. It is necessary, for the performance of this operation, that the aponeuroses of the external and internal obliques have not been cut. Therefore, this operation cannot be performed when the patient has previously been subjected to laparotomy with a median incision.

In 1918 Dr. Jabez Jackson described an operation along similar lines in which a median incision is used. The operation is performed in a
manner similar to the Murphy operation, except that instead of anchoring the stump of the uterus between the recti muscles and spreading the flaps on the recti, a horseshoe shaped piece is removed from the middle of the uterus, leaving a small lateral portion down each side from each cornu to the cervix. After closing the cervix Jackson sutures the anterior and posterior peritoneal edges together forming a horn at each cornu. These horns of uterine muscle with the ends of the broad ligaments are brought out through openings in the recti muscles and sewn together above a portion of the recti muscles. He lays great stress upon leaving the broad ligaments attached so that the circulation of the ovary is not interfered with. By the use of one of these two operations it is possible to support the floor of the pelvis by permanent anchorage of the uterine stump to the abdominal wall in almost every extreme case of procidentia uteri.

If the uterus has been previously removed and there is prolapse of the bladder and rectum, the condition is much harder to relieve. The only point of support that is usable is the scar tissue formed at the site of the hysterectomy. The bladder is separated from the rectum as high as possible through the scar at the apex of the vagina. The knob of a curved elevator is placed in the opening in the vault of the vagina and while an assistant pushes the knob of the elevator up into the abdomen, the peritoneum in Douglas’ pouch posterior to the old scar is opened from above, and a dissection made between the scar tissue and rectum until the knob of the elevator is encountered. This permits the tip of the vagina to be drawn upward carrying with it the old scar that is usually adherent to the stumps of the broad and uterosacral ligaments and base of the bladder. Usually by the separation of some adhesive bands the tip of the vagina can be brought up between the recti muscles above the pubes. The scar tissue remaining from the previous operation is sewn to the fascia. Portions of the broad ligaments and the round ligaments are usually found to be more or less closely attached to the old scar. Two or three sutures can usually be inserted on either side attaching the edges of the recti muscles to these remaining portions of the broad and round ligaments. The openings in the vagina and peritoneum, posterior to the old scar, should be closed laterally and the abdominal incision closed in the usual manner.

The radical cure of procidentia is not permissible when the woman can possibly have children. But in cases where childbearing for any reason is impossible, and the aponeurosis of the oblique muscle intact, the operation of choice for the radical cure of procidentia is the Collins operation, with a Pfannenstiel incision.

In case a median incision has previously been made and the fascia cut use the Jackson operation with a median incision.

In case the uterus has previously been completely removed, the only radical operation that I have found successful is the elevation of the
old scar and the vault of the vagina, and their fixation in the abdominal wall.

The first step in either operation should be to grasp the cervix with a tenaculum forceps and push it upward against the anterior abdominal wall. By this means the operator can estimate, with a fair degree of accuracy, the result to be expected from such suspension. With the other hand on the abdomen it is easy to accurately estimate just where the implantation should be made. For the Collins operation it is necessary to determine this point before the abdominal incision is made. Should one elect to destroy the cervical mucosa by cautery, the cauterization should be done next. Care should be taken that the cauterization extends up above the internal os. Should there be a cystocele of the type that is really a hernia with thinning of the anterior vaginal wall, a cystocele operation may be done, with closure of the opening in the vaginal wall from side to side, narrowing the vagina but not shortening it. It is needless to say that the perineum should be repaired if necessary.

In making the abdominal incision for the Collins operation the skin and fatty layer should be cut down to the aponeurosis of the external oblique muscle. Then the aponeurosis of the external and internal obliques should be separated transversely and raised upward, exposing the recti muscles for a distance of three to four inches. One to four blood vessels are always seen coming out of the recti muscles and entering the aponeurosis; these blood vessels should be cut and tied. If they are torn the upper ends usually retract through the fascia and cannot be caught, and a hematoma is likely to form after the operation.

An illustration by Murphy shows the incision to be made one inch above the pubes. If the suspension is made at a point only one inch above the pubic bone there is usually trouble with the bladder afterward from lack of room. The higher the implantation is made on the abdominal wall the more room is afforded the bladder, and the less the possibility that loops of intestine will get caught in the space between the cervix and the pubes.

In women who have borne children the recti muscles are usually found to be separated for a space of about one inch. An opening through the peritoneum is made between these muscles, the uterus is delivered outside the peritoneal cavity, the tubes are removed or resected. If necessary, the upper portion of the broad ligament is separated from the uterus and attached to the under surface of the parietal peritoneum. The peritoneal opening is closed around the cervix and the recti muscles brought together above and below. The upper portion of the uterus is removed by transverse incision, leaving anterior and posterior flaps. A strip of the combined aponeurosis of the internal and external obliques is now placed in the notch and the flaps are sutured over. This leaves
the uterine stump completely invested with peritoneum and not only favors early attachment to the surrounding structures and union by first intention, but it protects all the surrounding structures from the extension of infection from the cervical canal. When possible the ovarian ligament and round ligament should be left in the flap and care should be taken that the ascending uterine artery is not injured, and the circulation of the flaps and the ovary interfered with. The edge of the upper fascia is then brought downward over the stump of the uterus and attached to the fascia below.

In the Jackson operation the same procedures are followed, except that the median incision is used, and then the central portion of the uterine body removed, leaving the round ligaments, ovarian ligaments, and a small strip of uterine tissue extending downward from each cornu. The anterior and posterior peritoneal edges of the uterine stump are brought together. Then a small portion of the inner edges of each rectus muscle, together with some peritoneum is placed between these two horns. The horns are brought together over this portion of the rectus muscles and sutured together. The abdomen is closed in the usual manner.

In doing either the Collins or the Jackson operation I think it much better to remove the tube or at least a section of the tube next to the uterus, than to bring the end of the tube into the abdominal wall. The cut end of the tube can be fastened in contact with peritoneum. If a Collins operation is to be done and tumors are present, or the uterus is large, the upper part of the broad ligaments may have to be severed, the greater part of the uterus removed, and more of the cervix brought up between the recti muscles. With the Jackson operation it is rarely necessary to separate any portion of the broad ligaments from the uterus except the tubes.

The treatment of the cervix is the most important step in doing either one of these operations. The entire lining of the cervix together with the gland bearing area should all be either dissected out or destroyed with the cautery. While making the flaps, the removal of the inner portion of the cervix is not a difficult procedure if a spatula-shaped knife is used, not too sharp for the circular dissection. The cervix is flattened, and the anterior and posterior walls of the remaining shell of the cervix are brought together when the surrounding structures in the pelvic diaphragm are placed in upward tension by the suspension. I have had better results when no sutures were used to close the cervix.

I performed the Murphy operation twenty-eight times. In every single case drainage was instituted, or had to be instituted. Nineteen cases had a fistula that persisted over four months, eight of these required operation for removal of fistula. In six cases the drainage stopped and the fistula closed in three months. Two cases were drained for only six weeks. I have no record of the other case after she left
the hospital. Sixteen of these patients were troubled with an irritating discharge afterward.

We have performed the Collins operation one hundred and nineteen times. Fourteen of the early cases were subsequently bothered with offensive discharge from the cervix. One recent case in which the cervix was apparently healthy, and in which the cervical membrane was not destroyed at time of operation, subsequently required cauteryization. Of these one hundred and nineteen cases not one has had drainage for more than four weeks. Ninety-two of them were classed as primary union, there being no drainage after five days.

We have performed the Jackson operation sixteen times. None of these patients have developed postoperative cervical discharge. None have required drainage for more than four days. The results from this operation have been as satisfactory as those from the Collins operation with the exception of slight pain that persists for some months. I attribute this pain to the compression of, and tension upon, the portions of the sensitive rectus muscles encircled by the uterus. In the Collins operation the uterine stump is supported by the only slightly sensitive fascia fibers and so no tension pain occurs.

I have attempted to perform suspension of the vault of the vagina, when vaginal hysterectomy had previously been done, twenty-two times. Twelve of these were entirely successful; four were successful after subsequent operation for narrowing of the vagina; three could not be anchored to the anterior abdominal wall at all and were anchored to flaps from the recti and oblique fascia with only fair results. With three I failed to make the dissection between the vagina and rectum.

The Sloan Clinic.

DISCUSSION

DR. M. P. RUCKER, RICHMOND, VA.—Dr. Sloan mentioned the fact that the question of subsequent pregnancies ought to be considered when we do one of these radical suspension operations. I recently saw a case of pregnancy in which a Murphy operation had been done, and the case presented a curious picture. She had had several pregnancies, each time having had lacerations, and at the last labor the repair work had broken down. The doctor in the case had just returned from Chicago, and in his desperation did the Murphy operation, pulling out the endometrium and stitching the two halves of the uterus in front of the recti muscles as described. The woman became pregnant and when I saw her she was about six months' pregnant. The fetal heart sounds could be heard distinctly. She went along another month after that, and the doctor was afraid she would have a skin rupture, so he split the skin and removed the premature baby which lived two or three days.

DR. RUFUS B. HALL, CINCINNATI, OHIO.—In treating most of these cases of procidentia uteri I have followed the plan of doing the Gilliam operation in child-bearing women, with repair of the pelvic floor. On the other hand, in women past the menopause, I have resorted to the Watkins interposition operation with repair of the pelvic floor. These cases in which a previous hysterectomy has been made and there is complete procidentia of the vagina and a pelvic hernia, are very trying,
and I was interested in the clear description the essayist gave as to the management of these cases.

DR. HENRY SCHMITZ, CHICAGO, ILL.—We all realize that the chief cause of prolapse of the uterus and vagina is a defect in the muscular pelvic diaphragm, especially the pubocelecygeal portion of the levator ani muscles, causing loss of support to the structures lying above it. Descent and finally complete prolapse are the inevitable result.

The principles of the surgical treatment are: A uterus in retroversion easily prolapses. The levator ani muscles must be dissected and coapted by suture to reestablish normal support of the organs lying above it. The nearer we can reestablish normal anatomic relations, the better will be the result of surgical treatment.

The cases should be divided into three groups: (1) Patients who are still in the childbearing period and desire offspring. In these we perform one of the modifications of the Gilliam operation and do a levator ani muscle suture with a posterior colporrhaphy. (2) Patients who have prolapse but are in the postmenopausal period of life. In these we perform a Watkins-Wertheim interposition operation and a levator ani muscle suture. (3) Patients who have practically a total atrophy of the muscles of the pelvic floor. In these we resect the vagina leaving a small canal behind for the purpose of drainage, but otherwise attach bladder to rectum and narrow the vaginal outlet as much as possible. I mention these procedures not to take away any of the credit or merit of Dr. Sloan’s operation. But we have followed these simple procedures and have been well satisfied with them.

DR. FREDERICK S. WETHERELL, SYRACUSE, N. Y.—That method which is best suited to the individual operator, the one which gives him the best results is the method he is likely to use. In a recent article in Surgery, Gynecology and Obstetrics, Graves speaks of doing the Oldhausen operation, using silk sutures, and claims to get brilliant results in cases of procidentia, by using that simple method. The simpler the technic, providing the final result is permanent, the better is the method.

DR. HERBERT W. HEWITT, DETROIT, MICH.—If I understood the author of this paper correctly, this operation was devised for patients at or near the menopause. That would exclude cases in which operations, like the Ferguson and Gilliam, might be considered. Dr. Sloan spoke of the Murphy operation. I have been doing in Detroit a modification of the Murphy operation which has been satisfactory and is simpler than the latter. Murphy split the uterus. In the modification operation I do not split the uterus. These patients are usually fat women and their uteri are small. This operation must be done in selected cases. Where the uterus is small and does not need to be resected, I grasp the organ, apply forceps to the broad ligament, and cut right down to the cervicocorporeal junction. I do not remove the ovaries or tubes, but sew the cut edges of the broad ligament down to the cervicocorporeal junction on each side. I bring up the uterus, sew the peritoneum around the cervicocorporeal junction, sew the rectus muscle to the corpus and suture the fascia over the fundus.

I have done fifty operations by this method and have been able to trace most of them. I have had but one recurrence, and this was in a patient who had a pre-existing ventral hernia. The operation should not have been done in this case, or in any case where the abdominal muscles are not in good apposition. One of my associates has operated on something over 100 cases by this method and has not had a single recurrence, and aside from the one case I mentioned I have had no recurrences.

DR. F. A. CLELAND, TORONTO, ONT.—There are many types of operation deal-
ing with cases of procidentia, and operations like the Graves type are satisfactory. I have seen Graves perform the operation, and he showed a number of postoperative cases. His results were excellent. The operation I have done principally for these cases of complete prolapse in old women is a modification of the Mayo technic. The only objection to the Mayo method is that insufficient attention is paid to the cystocele which usually accompanies these cases. By doing a radical operation on the cystocele like a radical hernia operation, approximating the pubovesical fascia, after doing a vaginal hysterectomy, and carefully attaching the round and broad ligaments to the walls of the vagina, the results in my cases have been eminently satisfactory.

DR. SLOAN (closing).—The operation I have described is not designed for the minor degrees of procidentia. If the pelvic diaphragm is not elongated and cone-shaped downward, you cannot bring the cervix up to the point at which you can anchor it. There are some old curved elevators still in existence with a handle and a knob on the other end. They are of assistance in these cases. After making an incision through the vaginal vault and putting the knob in the incision the assistant can manipulate the handle and give more aid than has been possible by any other means. The cutting of the broad ligament is a part of the Collins technic. Leaving the round ligament is our technic. The objection to cutting the broad ligament is merely destruction of a portion of the ovarian circulation and destruction of some of the blood supply to the flaps.

Dr. Hewitt spoke of ventral hernia. There is nothing that I know of that is of as much assistance in taking care of a low ventral hernia as the Jackson operation. The two horns of the uterus hold the recti muscles together. He spoke of leaving the body of the uterus. That was done in the old Kocher operation.

The point I tried to make was that in the Jackson and Collins operations we have the uterine stump completely invested with peritoneum, and the peritoneum is a barrier against extension of infection from the cervical canal into the abdominal wall. The Collins operation gives patients more comfort than any operation that we have tried, the Jackson operation is followed by some pain for a few weeks. The Collins operation is as easy to perform as an appendectomy. Nearly all work is done outside the abdominal cavity, and the results are permanent.

We do not advocate these operations in all cases. Out of 1643 hysterectomies, we have done the Jackson and Collins and Murphy operations only 63 times, making less than 10 per cent. The comfort experienced following the Collins operation is much greater than that following any other operations.
REPORT OF A CASE OF A LARGE INTERSTITIAL FIBROMA OF CERVIX—OPERATIONS

BY Rufus B. Hall, M.D., CINCINNATI, OHIO

REPORT this interesting case because of its rare occurrence. Many of the textbooks do not refer to this condition at all. It is mentioned very casually by Montgomery (Textbook of Gynecology) and by Kelly and Noble (Gynecology and Abdominal Surgery) the latter merely stating the fact that fibroids do occur in the cervix. Palmer Findley in his book, Diagnosis of Diseases of Women, refers to the subject more fully and describes fibroids as submucous, interstitial and subserous and gives an illustration of each. He says the subserous type may grow into the vagina or into the paravaginal connective tissue. I reported a case of the latter variety to this Association at its twelfth meeting in Indianapolis in 1899, and exhibited the specimen. One might infer, judging from the scarcity of literature that these growths were not of much consequence. But for one to develop as interstitial and of such a size as to cause severe pressure symptoms, is a rare occurrence and worthy of record.

The subject of this report, Mrs. W. A. T., aged forty-four years, was referred by Dr. John N. Ellison, Portsmouth, Ohio, on January 5, 1920. The patient was a poor, hard-working housewife, mother of nine children, the youngest being eleven years old. The patient always enjoyed good health until her recent illness and never had any serious sickness nor any unusual pelvic distress until some eighteen months ago. During this time the periods had been prolonged. Formerly they were two and a half and three days in length, recurring regularly every twenty-eight days, but for the last year or more the periods recurred every twenty-one or twenty-two days and continued six or seven days, and one period recently continued fourteen days. The periodical flow was more excessive, but did not amount to a real hemorrhage. Like many patients at her age, she thought her condition was all due to the approaching menopause, and did not consult Dr. Ellison until she had a retention of urine on December 29, 1919, a few days before her visit to me. At that time she did not consult him in reference to her tumor and irregular and excessive bleeding, but on account of the inability to empty the bladder. After examination, operation was at once advised.

When placed upon the examination table the tumor presented at the vulva so that the lips were separated for more than two inches. The patient was wholly unable to empty the bladder. The pelvis was entirely filled by a hard immovable tumor so that it was with great difficulty that a finger could be introduced into the vagina.

The tumor could not be pushed out of the pelvis. The cervix could not be located. The patient had a thin abdominal wall and through that, the fundus of the uterus could be palpated and two small fibroids not larger than one inch in diameter could be outlined upon the fundus. The patient was suffering greatly from pressure symptoms. The diagnosis was made of fibroid tumors of the uterus with the principal tumor in the anterior lip of the cervix. An operation was urgently needed and was performed the following day. It was decided to do just what was necessary to secure relief. When the patient was under an anesthetic, the examination showed there was no pedicle to the tumor. I decided to remove it
through the vagina if possible and to do a hysterectomy if necessary. By making an incision over the presenting part with a blunt dissector, the tumor was enucleated. The operation was exceedingly easy and almost bloodless, only one bleeding point requiring a ligature.

After the removal of the tumor, it was easy to determine that excepting the two small fibroids on the fundus the uterus was otherwise normal, and no further operation was necessary.

628 Elm Street.
CHEMICAL HYSTERECTOMY

BY W. WAYNE BABCOCK, M.D., PHILADELPHIA, PA.

For many years caustics have been used in the treatment of advanced carcinoma of the cervix. The late Dr. William Goodell popularized the use of chloride of zinc, packing the cavity left after the epitheliomatous tissue had been freely scraped away, with pledgets of cotton moistened with a solution containing 60 grains of chloride of zinc to the ounce of water. To prevent corrosion of the vaginal walls, a vaginal packing smeared with petrolatum containing bicarbonate of soda was also used. Despite the deep action of the caustic, severe secondary hemorrhage or peritonitis seems rarely to have followed the treatment. Considering that the tissue removed by the curette often formed part of the wall of the bladder or rectum, it is not surprising that vesicovaginal or rectovaginal fistula frequently followed the application of the caustic. More surprising was the decided but temporary improvement in the condition of many of the patients treated, and the exceptional apparent cure from what the surgeon believed to have been an advanced form of malignant disease.

In the caustic treatment of carcinoma of the cervix, the aim was to destroy malignant tissue and not to remove the uterus. In the adaptation of the method herewith suggested, the aim is to destroy and remove all of the disease-producing portions of the uterus in certain nonmalignant conditions. The endometrium of the cervix, corpus and cornu with a thick layer of the surrounding metrium is quickly sterilized and devitalized, and is expelled after some days as a sphacelus, looking very much like the uterus. The peritoneal covering remains with a thin layer of underlying muscular tissue; and as the large cavity rapidly contracts and becomes obliterated, there is left a fibrous mass without cavity or discharge, resembling an infantile uterus. Obviously, amenorrhea and sterility follow the operation but without impairment of the ovarian function, and the uterus is no longer permeable to gonorrheal or other pyogenic infection.

The operation offers a quick and very easy way of obtaining the effect of a hysterectomy in certain selected conditions. It may be used:

1.—To Quickly and Permanently Destroy Infected Metrium and Endometrium. In chronic gonorrhoea and other infections of the uterus that resist milder measures, the method quickly eliminates the infected tissue and prevents recurrence of the infection without the necessity of invading the peritoneal cavity. A patient has perhaps had both
fallopian tubes removed, but continues to suffer on account of a residual infection in the uterus. She dreads another abdominal operation, but welcomes a simple expedient that gives the results of a hysterectomy without an incision.

Again a patient has had a subtotal hysterectomy and a troublesome infected cervix has been left. The chemical removal of the infected cervical tissue will give the relief of the more difficult excision of the cervix.

In certain acute infections of the uterus, a chemical hysterectomy is to be considered. Puerperal septic metritis has such a terrible mortality that the obstetrician should turn to any expedient that offers a ray of hope. The bacteria pass deep into the uterine walls and the invasion of the peritoneum necessitated by the operation of hysterectomy seems but to spread the infection. Chemical hysterectomy as offering a most rapid depth sterilization of the uterus should be considered in this very fatal disease.

2.—To Produce Amenorrhea. In this field, chemical hysterectomy must compete with radium and the x-rays. When absolute permanency, absolute sterility or the eradication of an associated infection of the uterus are desired, the caustic method offers advantage over radiation. To avoid the disadvantages of the destruction of ovarian function, the zinc chloride may be used.

In selected cases of metrorrhagia not due to malignant disease, when it is also desired to destroy the uterine function, the chemical procedure has advantages. If it is desired to conserve, as far as possible, the uterine function, radium or the x-ray is preferable.

In the metrorrhagias accompanying advanced pulmonary tuberculosis, chemical hysterectomy is to be considered. In the form of metrorrhagia that sometimes follows bilateral oophorectomy or an insufficient subtotal hysterectomy, the caustic may be used.

3.—To Produce Permanent and Absolute Sterility. In mental and moral defectives, chemical hysterectomy is the simplest measure known to eliminate the chance of impregnation or of uterine infection. There is not the sentimental objection to the caustic that there is to the removal of the ovaries or uterus by operation.

In advanced tuberculosis or other serious disease rendering child-bearing undesirable or exceptionally hazardous, the chemical application is to be considered.

4.—To Eradicate Certain Inter- and Intrauterine Tumors. Recurrent uterine polyps, submucous fibromyomas and benign interstitial tumors lying close to the endometrium may be removed by chemical hysterectomy. Recurrent pedunculated tumors of low malignancy may be treated in like manner. We are not prepared to advocate this method for the treatment of adenocarcinoma of the fundus or other
malignant uterine tumors, unless treatment by accepted measures is refused by the patient.

TECHNIC

The patient is prepared and placed in position as for a uterine dilatation. Local or nitrous oxide or narcotic anesthesia may be used. The cervix and internal os are dilated sufficiently for the introduction of a uterine packer. The cavity of the uterus is explored and scrapings or discharge removed for laboratory study. A uterine packer preferably with an obturator is introduced well through the internal os, and the cavity of the cervix and uterus thoroughly packed with a narrow gauze tape impregnated with a saturated solution of chloride of zinc. During this procedure the vagina is protected by a strip of gauze impregnated with dry sodium bicarbonate that extends from behind the cervix out under the weighted vaginal retractor. The vagina is now so packed with other strips of the soda impregnated gauze that the cervix and the caustic tape issuing from the cervix, are completely surrounded.

The packing, including the caustic tape, is withdrawn in seventy-two hours or less, dependent on the amount of gauze used and the thickness of the uterine walls. If 15 mils or less of gauze are used the packing is removed in seventy-two hours; if 30 mils of gauze are used, in eighteen hours; if 60 mils, in four and one-half hours—the duration of the caustic application being equal to seventy-two hours divided by the square of the multiple of 15 mils of gauze that is used. Against this time of the application is checked the safe limits imposed by the thinness of the uterine walls. The duration of the caustic application should not exceed the number of hours represented by the thickness of the uterine walls in millimeters multiplied by two. Thus, with uterine walls only 3 mm. in thickness, the caustic should not be left in over six hours; with walls 6 mm. in thickness, not over twelve hours; 1 cm. in thickness, not over twenty hours.

Preparation of the Caustic Tape. Gauze tape about one centimeter wide is placed in a small, graduated, glass cylinder in a sufficient quantity of saturated solution of chloride of zinc to be thoroughly covered and impregnated. By moderate pressure with sterile, dry gauze sponges the excess of solution is blotted up so that it will not drop or run from the gauze. The graduated cylinder enables the surgeon readily to determine the number of mils of gauze introduced. In the introduction, the tape must not touch the vagina or external parts of the patient nor should it come in contact with sodium bicarbonate. It is also very important that the gauze pass through the internal os and fill all portions of the uterine cavity including the cervix. If only the cervical canal is treated, stenosis and hematometra may follow.
Preparation of the Alkaline Gauze. Four ply gauze strips measuring about two inches wide when folded are opened, impregnated with dry sodium bicarbonate powder, as we would prepare a plaster of paris bandage, refolded in packages of four and sterilized in an autoclave.

If it is desired to remove most of the vaginal portion of the cervix, the alkalinized gauze should be kept from the cervix by an appropriate pad of plain gauze or metal cup. Obviously, the operative procedure is about as simple as a dilatation and curetteage, and should not require over five minutes.

After-Treatment. If an opiate has been given for the operation, usually no further sedative will be required. Continued postoperative pain usually indicates some defect in technic, especially inadequate protection of the vaginal walls. Liquids may be given at once and soft diet after the second day.

The uterine slough will usually come away about the end of a week. Recurrent uterine colic may mark the expulsion of the mass. While some of our patients have been permitted to be out of bed after the fourth day, it is wise to keep the patient in bed one week, and under supervision for nine days.

Rarely is a secondary packing required. Marked secondary oozing is not usual, but should it occur, the patient should be put in the knee-chest position, a speculum inserted and the vagina carefully packed with gauze after dusting in five or ten grams of powdered alum. If the slough has not been expelled by the ninth day it should be removed by forceps or the finger, provided it is no longer attached to the uterine wall.

Chemical hysterectomy is presented as an additional measure for the removal of the essential parts of the uterus, but it is to be used with care and good judgment. It has a somewhat limited field and will not eliminate the use of radium in gynecology or the scalpel for hysterectomy. Obviously more dangerous than radium and therefore not even a competitor against the simpler forms of uterine bleeding, it has the advantage of permanency of action and the elimination of any associated intrauterine infection.

It is probably more certain than simple ligation of fallopian tubes or the use of x-rays or radium in producing sterility. Some surgeons may welcome this method as a means of escaping from an occasional very difficult or dangerous hysterectomy.

705 Medical Arts Building.

DISCUSSION

DR. AARON B. MILLER, Syracuse, N. Y.—I presume that if you should call on Dr. Ill and some of those who are familiar with the ancient history of gynecology, they will tell you they lived through the period of treating the cavity of the uterus with chloride of zinc, when cancer was present in the cervix. Dr.
VandeWarker and Dr. Goodell were among the first to institute this line of treatment, and you will find an article in the early volumes of the American Gynecological Society, bearing on this subject. It is interesting to see how a line of treatment of this character can develop, after a long period of time has passed. In the early history of the malignancies, before we had at our command the present modern methods of treating them, or of attempting to cure them, this treatment afforded a great amount of relief to patients with malignant disease of the uterus. The methods which Dr. Babeoek has suggested were the methods which were in vogue at that time, and I wish to corroborate what he has said in regard to the after-results. Neutralizing the vagina, and preventing injuries to it, tampons, saturated with a solution of sodium bicarbonate, were placed in the vaginal vault, to prevent the action of the solution of chloride of zinc, which was carried into the cervix on tampons or gauze. Where the malignancy was advanced, the necrotic tissue was curetted away, and the tags of tissue remaining were burned away by the actual cautery or removed by the scissors. Often the malignancy had extended to the vaginal walls anteriorly or posteriorly, about the bladder or rectum. There was little fear the treatment would do harm to these contiguous parts.

The point I wish to emphasize is this, that after packing the uterus with gauze saturated with this solution, it was permitted to remain from seven to ten days before its removal, after which the cast was thrown off leaving the parts clean to the eye. In some instances we got hernias, and had discharges from the bladder and rectum. In most cases, the discharges ceased, and the openings to these organs closed by granulation. At that time, we did not know the chemical action of this solution, as we do today, but after sterilizing the parts we did get a healing process, and the immediate symptoms were overcome. In many instances, the patients returned to their homes, and remained well for an indefinite period, free from discharges and odors. The impression went out following this treatment, that the doctor had been mistaken in his diagnosis, that these patients were not suffering from malignant disease. Others received the same treatment and have gotten well. Discharges were no longer present, odors were overcome, and the treatment was both salutary to the physician and patient, and it was a method in those days that offered much in the way of relief.

DR. FREDERICK S. WETHERELL, SYRACUSE, N. Y.—I would recommend to the members that they study the technic of Dr. Babeoek very carefully and also his mathematical calculations, before using zinc chloride. During the war or rather after it, during the cleaning up period, when we had so many hundreds of bone infections to deal with, I knew of two or three unfortunate occurrences following the use of zinc chloride in the injection of bone sinuses. Unfortunately a surgeon did not carefully read or understand the technic, and two or three cases when almost ready to go home, were taken to the operating room, injected, and promptly died on the table because this surgeon had not first applied a tourniquet above the point of injection. The cases should be carefully selected.

DR. HERBERT W. HEWITT, DETROIT, MICH.—I want to ask Dr. Babeoek three questions. First, what are the indications for doing this operation? Second, has he ever had any trouble with hemorrhage following this packing? Third, whether there is any chance of the zinc chloride penetrating the peritoneum and getting into the peritoneal cavity?

DR. JAMES E. DAVIS, DETROIT, MICH.—I would like to ask if this procedure can produce thrombosis and embolism.
DISCUSSION

DR. BABCOCK (closing).—I am glad Dr. Miller has referred to this early use of zinc chloride for carcinoma of the uterus. It is evident that Dr. Goodell popularized and perhaps modified, but did not originate the method. Of course, we are not at this time advocating the treatment for cancer.

In answer to Dr. Hewitt: The method is to be used when we have no safer or more effectual measure available to combat uterine hemorrhage, infection or fertility. For example, a recent patient was a girl with advanced pulmonary tuberculosis associated with draining uterine hemorrhages. Her pulmonary disease was so far advanced, that pregnancy would have been most hazardous, and the operation was adopted to stop the bleeding and insure sterility. Another patient, obese and not a good operative risk was not in condition after a gall-bladder operation to withstand an added abdominal hysterectomy. Chemical hysterectomy, in this case, enabled the patient to escape a second dangerous operation and the surgeon a difficult hysterectomy. A patient, now in the hospital has had recurrent uterine bleeding following an old gonorrheal infection. She has had one abdominal operation on the appendages and has been curetted twice without relief. She objected to another abdominal operation, but readily accepted the chemical measure.

For the mentally defective girl so subject to venereal infection and pregnancy I know of no better prophylactic measure than chemical hysterectomy.

As to the second question, I have seen no alarming hemorrhage following the operation, although in one patient there was sufficient oozing to justify a secondary vaginal packing. Unless one perforates the uterus or is very careless I do not think there is danger of a serious chemical peritonitis, and surely if the danger had been great it would have followed the caustic treatment of cancer of the uterus, where the uterus is often greatly thinned by scraping away the malignant tissue.

Zinc chloride is a powerful antiseptic that also coagulates and seals the lymph channels with which it comes in contact. The absence of sepsis is shown by the slight temperature reaction after the operation and the slight odor to the vaginal reaction and slough.

In reply to Dr. Davis: I know of no case of thrombosis or embolism to follow the use of zinc chloride in the uterus. I am glad that Dr. Wetherell has mentioned the possibility of death from chloride of zinc. In our use of zinc chloride to sterilize old sinuses from wounds of war, we found that the chloride was quickly converted into an innocuous carbonate or oxide of zinc by the blood. But from a pressure injection into sinuses, erosion into capillaries and entrance of the chloride into the blood stream might occur with sudden death. This occurs only when a strong solution is injected under pressure. Even when injected into an artery or vein, the chloride will be quickly neutralized and no general harm caused, if the circulation be assisted by a tourniquet for from two to five minutes. Obviously, this danger does not apply in chemical hysterectomy, for no forcible injection is used.
ENDOMETRIAL TISSUE IN THE OVARY

BY OTTO H. SCHWARZ, M.D., AND ROBERT CROSSEN, A.B.,
ST. LOUIS, MO.

THE presence of endometrial tissue in the ovary was regarded as a condition of unusual rarity until the recent work of Sampson appeared. Up to the time of his publication in the Archives of Surgery in November, 1921, there were less than twenty cases of this type reported in the literature. W. W. Russell was the first to report a case in 1899 while Pick in 1905 in Germany described four cases of his own and mentioned four others including Russell’s in the literature. Koch in 1911 reported a case associated with the presence of so-called psammoma bodies in the ovary. The finding of these calcified areas associated with this lesion has been noted by us in the present work and we will comment on its significance later. Additional cases were reported in 1919 by Norris, Cullen, Casler and Schwarz. Since the publication of Sampson’s first article, in the autumn number of the British Journal of Obstetrics and Gynecology, 1922 there appeared three articles by Blair Bell, Donald and Shaw, respectively. These articles collectively described seven cases. The latter two authors discussed the association of the lesion of adenomyoma of the rectovaginal septum as was previously pointed out in Sampson’s first publication. Bell and Shaw both emphasized the fact that the condition has been overlooked because in the later stages of the lesion the epithelium is lost and the tissue therefore cannot be identified definitely as endometrial in structure. Bell is inclined to believe it to be a congenital aberration rather than a metaplasia or cellular spill. Shaw feels with Sampson that the association of “tarry cysts,” as the Englishmen called them, shall prove to be of frequent occurrence. Janney, of Boston, in February, 1922, reported two cases of his own and discussed at great length a congenital theory as regards the origin of the lesion and associated this theory with a very thorough embryological study. He mentioned at the end of this article the appearance of Sampson’s work and stated that this would lead one to believe that the lesion was rather frequent. In November, 1922, Sampson’s most important article appeared. This paper dealt chiefly with the lesion in the ovary in its earlier stages in contrast to the first article which described chiefly the later stages of the disease. The points emphasized by Sampson in this article need careful study and only in this way can the full value of Sampson’s great contribution be appreciated. In this publication he mentions that he encountered
Fig. 1.—Path. No. 1624. Low power of cross section of entire ovary. In the left middle portion of the picture is seen a small hematoma 5 mm. in diameter superficially placed and having no deep connection with the ovary. Immediately above is seen a cavity filled with blood and lined by typical endometrial tissue. A similar cavity is found in the extreme upper and middle portion of the ovary. Note the adhesion in the upper left portion of the ovary. This adhesion contained much blood, stromal cells and gland tissue. The superficial nature of this lesion can be seen by the fact that it is well without the ovarian cortex in all places. This ovary was practically of normal size and was covered with definite adhesions.

Fig 2.—Path. No. 1624. Shows the characteristic endometrial lining of cavity. The lumen contains some clotted blood. This cavity is situated outside the ovarian cortex.
Fig. 3.—Low power hematoma mentioned in Fig. 1. Epithelial lining is not present in this lesion but the wall contains much old blood pigment, connective tissue cells and large mononuclear wandering cells.

Fig. 4.—High power of Fig. 3 showing structure of the wall.
the lesion in the ovary in a period of a year from May 1, 1921, to May 1, 1922, in forty-three cases in 170 abdominal operations.

After hastily reading this article, we consulted our files and began looking over old sections, and in going over several hundred slides we encountered several interesting lesions in this chance way. This convinced us definitely that the lesion must be quite frequent but we questioned whether these lesions were originally transplants resulting from the escape of epithelium or uterine mucosa from or through the fimbriated end of the tube. We also were much interested in the description of the life history of these lesions and we feel from our present study that we shall be able to demonstrate the correctness of Sampson's views as regards particularly the later changes in these hematomas. We had previously regarded the lesion as having its beginning from the germininal epithelium and the underlying connective tissue and were of the opinion that on account of the close relationship of the tissues involved it was not unreasonable to assume that under certain stimulation such a metaplasia could occur.

Unfortunately, we have been unable to study the pathological lesion at its best, that is, as it occurred in the abdomen at the time of operation. The material which we studied was all from specimens that had been fixed and handled more or less repeatedly and which in many instances had been mutilated by previous sectioning. Further, the operators who were responsible for the removal of the material we are sure in a large percentage of cases did not remove the ovary on account of this particular lesion and perhaps did not remove ovaries the appearance of which might suggest the lesion. We, therefore, could not hope to find the lesion with the same degree of frequency that Sampson did in his original publication. We felt, however, that if we were able to find it in any degree of frequency we would be able to study the various types of the lesion in sufficient number and be able, therefore, to comment on their characteristics.

Before taking up the study of our series, we shall briefly mention some of the more important points which Sampson has emphasized. He believes that the lesion occurs as the result of the escape of uterine mucosa or tube epithelium from the fimbriated end of the tube. The most frequent location where this material becomes implanted is the under and lateral surfaces of the ovary. He states his reason for this location by reason of the fact that the fimbriated end of the tube in most instances is in close connection with these areas. He mentions the culdesac as the second most frequent site and describes the implants there as primary, or secondary to a ruptured perforating endometrial cyst of the ovary. He describes hematomas of two types, namely, superficial and deep as they are situated on the surface or deep in the cortex of the ovary. The superficial hematomas are small,
Fig. 5.—Cross section of the ovary. The upper margin of the ovary can be seen as a lighter area just underneath the darker tissue. The larger area of dark stained tissue perforated by glands and showing a considerable cavity is a large endometrial mass superficially placed on the ovary. The ovary in this case measured $4 \times 3\frac{1}{2} \times 1\frac{1}{2}$ cm. and was made up chiefly of a collapsed cavity which had a yellow pigmented lining. We take it that the large cavity shown in the picture represents the above described lesion. The gross specimen in this case was not available.

Fig. 6.—High power of Fig. 5, showing lining of the cavity made up of a thick layer of stromal tissue in which the stroma cells were markedly swollen and the gland cells high in character and active. Structure appears edematous and contains blood in the stroma and in the gland lumen. The history was unavailable in this case but we take it that menstruation was about to begin.
Fig. 7.—High power of Fig. 5, showing the relation of the stroma to the underlying ovarian tissue and the swollen character of the cells in this case.

Fig. 8.—Illustrates a case in which there is a large plaque of endometrial tissue adherent to the surface of the ovary. This tissue is markedly congested, contains numerous glands and has the characteristic stroma. Other portions of this section showed endometrial tissue invading the ovarian cortex.
rarely larger than 5 mm. in diameter, frequently no larger than 1 mm. to 3 mm. in diameter. They are usually multiple and can be found in various stages of their development and retrogression. They are lined by epithelium similar to the uterine or tubular epithelium with or without stroma and almost always associated with hemorrhage in the underlying tissue. These structures may rupture and discharge their epithelial lining; if this occurs, the life of the cyst is ended and retrogression takes place. If the lining of the cyst is only cast off in part, then the cyst may close and reform and the perforation may be repeated. The perforation with its discharge of endometrial tissue
frequently leads to secondary transplantation on the pelvic peritoneum, the rectal, sigmoid and other structures, most frequently, however, in the culdesac.

Sampson describes the deep hematomas as arising from glands or tubules which have reached the deeper structure of the ovary and a hematoma of this type may in time perforate and when it does it may be of considerable size, several centimeters in diameter, 9 cm. we believe is the largest he describes. The hematoma, however, may increase so slowly in size that it may never rupture and ceases to grow after the menopause. Further, the epithelial lining of the hematoma may be completely cast off as the repeated reactions of menstruation and the life of the hematoma ceases, and if small may be completely absorbed. A most interesting reaction takes place in the tissue surrounding these hematomas. We take it that this description applies chiefly to those hematomas which do not rupture. As a result of the repeated reaction of menstruation, the blood accumulates in the cavity of these hemorrhagic cysts, and as there is no avenue of escape, some of it remains in the surrounding tissue. The blood disintegrates, resulting in a diffusion of blood pigment throughout the wall, which in turn is taken up by large mononuclear wandering cells which appear in large numbers and comprise the chief portion of the wall at this stage. Sampson refers to these cells as the endothelial leuкоeytes.

It may be well to mention here that in Sampson's first article he states that these cysts may be endometrial at the start or a hematoma arising from ruptured or atretic follicles possibly following ovulation or from an abnormal corpus luteum due to the invasion of epithelial tissue. He mentions that both Runge and Wolfe have demonstrated epithelization of ovarian hematomas by the invasion of the surface epithelium. These linings are described as low cuboidal and columnar in type and Sampson states that if due to the invasion of the surface epithelium a definite metaplasia must take place which makes the tissue appear to resemble the normal endometrium. Sampson in his conclusions mentions as the site of the development of these cysts the ruptured graafian follicle in which the endometrial tissue may have become implanted. In his last article in which he deals with the lesion chiefly in its earliest stage, he does not emphasize this as a frequent location merely mentioning the surface or cortex of the ovary as the site. We may say here that we have encountered four cases in which in the center of the corpus albicans there were present numerous gland tubules which were similar to uterine or tubule epithelium. In one instance there is a definite lining with the remains of old blood in the underlying tissue. These cases will be illustrated and further comments will be made in the accompanying legends. It is interesting
to mention while commenting on the peculiar lining of these old endometrial cysts that Novak although he illustrates beautifully certain types of ovarian hematomas, namely, the follicular, the corpus luteum and stromal types, does not describe a lesion with a picture similar to those of the old endometrial cysts whose wall is so studded with the large mononuclear wandering cells.

Our study consisted of the examination of 420 ovaries. Of these 256 specimens were taken from the files from which no gross specimens were available. In these cases in many instances only one section could be studied but in the remaining 164 cases numerous blocks were taken from one or both ovaries whenever we found, as we termed it, a suspicious area. As we have previously mentioned, under these circumstances we could by no means hope to find the lesion in the same degree of frequency that Sampson did, but felt that we might find the lesion in some degree of frequency sufficiently great to study the lesion in all of its stages. We decided to class into groups as follows:

In the first class were the superficial lesions which definitely contain endometrial glands and stroma and cysts lined with endometrium. Second, the hematomas of endometrial type. Third, ovaries with adhesions in which the adhesion consisted of blood, stromal tissue and occasionally included glands. Fourth, lesions in which there were numerous tubules in which there was no definite accompanying stroma. It may be stated in making this classification numerous specimens were discarded which could possibly have been placed in either group two or group four and some even in the first group, but we felt that the inclusion of these suggestive cases would warrant additional explanation and, therefore, add confusion. In the first group there were fifteen cases, in the second group there were eleven cases, in the third group there were eleven cases and in the fourth group there were eighteen. We feel that the cases described in groups one and two are absolutely of endometrial origin. In the third a large percentage of them can be considered transplants without any hesitancy. Whereas in group four the origin of the tubules must be considered before classification here would be definitely possible.

In the group of 164 cases in which the gross specimen could be studied more or less intact, there were eleven cases with endometrial tissue and seven with hematomas of the endometrial type showing a total of eighteen cases for this group. In studying the sections from the cases in which the gross specimens were not available, five cases with true endometrial tissue were encountered and four of the hematoma type. This shows very clearly a very much higher percentage of cases for the series in which the gross specimens were studied.

In the first group were placed those cases in which the endometrial tissue was found on the surface of the ovary, in the cortex of the
ovary or lining a cyst. These cases represented chiefly cases in which the endometrial tissue was limited to the surface of the ovary or involving only a very superficial portion of the cortex. The cavities connected with these cases were all very small and appeared to have either a direct connection with the surface or connected themselves with the surface by perforation. The endometrial structure in these cases was very well developed, the stroma quite characteristic and the glands very clear cut. There were four cases in which the endometrial tissue was found lining a cyst. These cysts were in each case of fair size, the smallest being 2 1/2 cm. in diameter and the largest 10 cm. in diameter. In each instance these cysts were lined by an epithelium which was similar to the endometrium and an occasional gland was found below the lining epithelium. The underlying tissue showed a definite stroma which was markedly congested and which showed the presence of blood pigment both microscopically and in the gross. In the gross these walls have a characteristic dirty, yellowish brown color with a comparatively smooth lining. In the wall one finds in addition to the stroma cells large wandering cells which are one of the chief characteristics of the hematoma type of this lesion in absence of the epithelium. Another feature of the lining is the connection of these cysts with the adjacent tissue. The line of demarcation between the tissue of the cyst wall and the ovarian substance can be readily distinguished. Although these cysts were found in the collapsed state, frequently there is a definite line of separation. The description made at the time when they were first received in the laboratory showed all of them to be filled with clotted blood. In one instance a definite perforation was found around which there was an area about 1 cm. in diameter covered with old blood and having a ragged appearance. The size of the perforation was about 3 mm. in diameter. This was in a comparatively small cyst 2 1/2 cm. in diameter. The study of these specimens rather definitely brings out their close association with the surface of the ovary and in illustrating this group it is one of the chief points we wish to emphasize particularly. In a word, the endometrial tissue appears on the surface of the ovary in such a way that it appears to be glued on and gives the impression that it only reaches a deeper situation after it has been present on the ovary for some considerable time.

In the second group, the group of hematomas we believe to be of endometrial origin, there were eleven cases. This group was most interesting because the structure of the wall in these cases is very characteristic and Sampson's descriptions are absolutely correct in this regard. We had unusual opportunity to study the character of such a hematoma because we found one in association with a case of
Fig. 10.—High power of the upper cavity in Fig. 9, showing a beautiful pattern of endometrial tissue. Note the tissue immediately below the endometrium. We previously described this as muscle tissue. We feel now that it is only a hypertrophy of the connective tissue in situ.

Fig. 11.—Shows superficial implant of stromal tissue on surface of ovary. Case from collection of Dr. George Ives.
real endometrial tissue, a case placed in the first group. This case is represented in our illustrations and it shows a comparatively small ovary upon which there is ingrafted definite endometrial tissue associated with this superficial hematoma. The hematoma is placed on the top of the surface of the ovary and is not in any way connected with the deeper structure. Its wall is unusually round and colored yellowish brown. Its lumen was filled with blood and on histological examination it showed only a blood-stained wall due to the diffusion of blood pigment cells of the connective tissue type and a

![Fig. 12.—Path. No. 1992. Cross section of ovary. The ovary in this case measured 3½ x 2½ x 1½ cm. In the upper portion of the picture is a follicular cyst. The lower large cavity which is not quite complete is a typical endometrial cyst. Note the dark area running around this cavity quite well seen in numerous places. This is due to hemorrhage underneath the epithelial lining in the compressed stromal tissue. To the left and in the middle of the picture near the periphery are three small cavities. These are lined by epithelium similar to uterine epithelium. The size of the endometrial cyst was 2 x 1½ x 1½ cm., and was lined by a dirty yellowish-brown membrane. There was an irregular surface with adhesions and old blood covering an area about 1 cm., in the center of which there was a distinct perforation 3 mm. in diameter.](image-url)
large number of cells mononuclear in type containing much blood pigment. These cells are the so-called endothelial leucocytes which have been previously mentioned by Sampson. This cavity was small and measured only 5 mm. in diameter. In studying the wall of the

Fig. 13.—Higher power of Fig. 12, showing the epithelial lining and showing the obscurity of the structure beneath it, due chiefly to the presence of marked hemorrhage.

Fig. 14.—Ob. Path. No. 2076. Shows a group of glands invading the superficial portion of the cortex of the ovary. There is a slight hemorrhagic reaction around these tubules but no stroma is present. This is the type of case that was placed in group four.

hematomas in this group as a whole, the pictures coincide exactly with that which we found in this superficially implanted hematoma. In going through the series a large number of hematomas were encountered, particularly a large number of follicular hematomas as
well as numerous corpus luteum cysts. We have never seen this reaction in any way characteristic in these two lesions. In fact, the walls of the corpus luteum cysts are notably free of blood pigment and the lutein cells in more or less state of preservation stand out clearly against the adjacent ovarian tissue. In the stromal hemorrhages one occasionally sees this same reaction, but the irregularity of the lesion and the fact that the condition is never well marked would lead to little confusion with the hematomas that were previously lined by endometrium. Another feature which is quite characteristic is their clear cut demarcation from the surrounding ovarian tissue. The hematomas in this group varied in size from $\frac{1}{2}$ cm. in diameter to 5 cm., several being about 5 cm. in diameter. They all showed in part this pigmentation and presence of the wandering cells and several of them very beautifully. In one instance we found definite endometrial epithelium lining one of them. This was in a cyst 2 cm. in diameter which was in the right ovary and the left ovary contained a beautiful example of an endometrial hematoma and was only $\frac{3}{4}$ of a centimeter in diameter. As we have previously mentioned, Novak in his very well written article on hematomas of the ovary, does not describe a hematoma of this character and as Sampson has previously stated this type of hematoma must be included as an additional entity. It may be stated that in every instance either the gross specimens or in those cases in which the gross specimens were not available there was a description of adhesions and clots about the ovary.

The third group consisted of ovaries which showed no hematoma or tissue of the endometrial type but about which were present adhesions with considerable amount of old blood and adhesions in which the stroma was very cellular, in other words having the appearance of endometrial stroma. Twelve cases were placed in this group. In several instances there was found associated with these adhesions definite epithelial tissue and in five cases there were definite gland tubules found included in the adhesions. In two of these cases in which glands were found, there were associated with them tiny nodules of calcification. We will speak of this condition later. We feel that in this group are included cases in which stromal tissue and gland tissue is in its earliest process of implantation. In some instances these plaques were quite large, as long as $\frac{1}{2}$ cm. and $\frac{3}{4}$ cm. wide. Usually, however, they were quite small.

The fourth group includes those cases in which gland tubules were found in the ovary in varying number usually well implanted in the cortex. These glands do not in any way resemble the germinal epithelium. They are very high in character and appear more like tube epithelium than the epithelium of the uterine type. They are
Fig. 15.—Case No. 33. From collection of Dr. George Ives. This picture shows a cyst with an epithelial lining in the center of a corpus albicans. This case also showed typical endometrial tissue on the surface of the ovary.

Fig. 16.—Surg. Path. No. 4668. Shows an abnormally adherent fimbriated end of the tube to the surface of the ovary. Throughout the left half of the picture can be seen glands in the substance of the ovary. The close connection of these glands with the fimbriated end of the tube is very suggestive that they were derived from the epithelium in contact with the ovary.
in some instance surrounded by a definite hemorrhagic area and there is blood within the lumen but this reaction is absent as frequently as it is present. In some instances these gland tubules are seen markedly dilated and containing some red blood cells within their cavity. As we have mentioned, they are most frequently found in the upper ovarian cortex but may be deeper. Glands of similar structure have been found in the superficial epithelium. In one instance a group of five or six such tubules was found implanted on the very superficial portion of the ovary well outside the tunica albuginea. There were four cases in which this glandular epithelium was found well situated in the corpus albicans and it is interesting to note that in two of

Fig. 17.—Ob. Path. No. 653. Shows three small calcified areas in an adhesion attached to the surface of the ovary. The nodule to the left is lined by typical glandular epithelium.

these cases there was associated with this epithelium true endometrial tissue in the ovary. Another interesting condition which we met with in one instance was the fact that the fimbriated end of the tube was abnormally adherent to the ovary. Immediately below this attachment and extending for some distance into the ovarian substance were numerous tubules of the type that we have described as characteristic of this group. This picture very strongly suggests the transplant theory for this type of lesion as well. We may say here that when the germinal epithelium is associated with adhesions of the vascular type it has a tendency to take on the appearance of the type of cell in these glands. Although we have seen this change not infrequently, we have never seen any gland formation immediately below it.
As Sampson has described the life history of the hematoma of the endometrial type, we feel that these tubules also undergo characteristic changes which finally obliterate them. We have found in association with these lesions six cases in which there was present a number of small calcified bodies closely associated with the glands.

Fig. 18.—High power of nodule to the left in Fig. 17. Shows connective tissue invading the gland lumen and surrounding the calcified area. Note the typical gland structure still remaining.

Fig. 19.—No. 1403. One entire surface was literally studded with small gland tubules without stroma. Numerous small areas of calcification are seen in this field associated with the glands. This patient was forty years of age and had never been pregnant. The ovary still contains a fair number of primordial follicles and several developing follicles were seen.
In several instances these calcified areas were very numerous. We have been able to demonstrate that these small calcified bodies have their origin primarily in the lumen of these tubules and our illustrations will bear this out. Two cases were encountered in which these calcified bodies were found in adhesions and in one instance this association with a gland tubule could be demonstrated. It might be said that these lesions occur in comparatively old ovaries, in other words, of the sclerotic type as in most instances there was present comparatively little functional tissue. Calcification in the ovary has been described by several writers and it has been chiefly described as occurring in the corpus albicans. Moskowitz described five cases one of which showed true bone formation. These were associated with the corpus albicans and were all several millimeters in diameter, the largest being a calcareous mass 1.7 x 1.3 x 1 cm. in diameter. Koch in 1911 describes calcified lesions in the ovary and terms them psammoma bodies similar to the psammoma bodies that are described in connection with the central nervous system. He finds these in the ovary associated with the corpus albicans, in neoplasms of the ovary and also in the case of endometrial tissue in the ovary. In this instance he pictures the calcification in the stroma but does not point out any association with the glands although several of the bodies are situated in close relationship to the glands. We feel that this is a method by which these gland tubules are obliterated in the ovary after menopause. It is also interesting that in the corpus albicans we find occasionally this same type of epithelium and although we were not able to demonstrate calcification associated with any of our four cases, we felt that perhaps the calcification that has previously been described in association with the corpus albicans may have their origin in such gland inclusions.

In connection with this paper, we are including two cases which have some bearing on the subject of endometrial tissue in the pelvic cavity as a whole and, therefore, have illustrated them and will include them in this paper. The one case is a fallopian tube in which we believe endometrial stroma could be demonstrated. In this case both adnexa were matted together with dense adhesions the tubes being very much enlarged and the ampulla of one dilated to 2½ cm. This tube was filled with a semisolid chocolate colored material. As the specimen was presented from outside sources no accompanying history was found. The endometrium shows a marked edema with the presence of blood cells in the stroma and in the gland lumen suggestive that menstruation was about to begin. The section through the diluted tube which contained the chocolate colored material showed a thin-walled tube not more than 3 mm. in diameter in its greatest
Fig. 20.—No. 1957. Entire tube wall showing plaque of tissue similar to endometrium. Case of hydrosalpinx. Cavity contained some blood. There is blood present throughout the tube under the epithelial lining and the epithelium was high in character; the picture suggested tubal menstruation. Inflammatory cells were not conspicuous in this specimen. There was some round-celled infiltration.

Fig. 21.—High power of Fig. 20, showing an area with the tissue resembling endometrial stroma. The cells are chiefly of connective tissue type, there being a small number of lymphocytes present as well.
thickness and everywhere lined by well-developed tube epithelium. This epithelium was unusually high and also there was a definite increase in cells below the lining; there was little or no evidence of inflammation there being only a small number of small round cells. The wall showed no inflammatory reaction. Throughout the extent of the lining of the tube there was present fresh and old blood very much similar to the lining seen in the hematoma in the endometrial cyst. The picture is very suggestive of tube menstruation and the structure of the tube as a whole has more the appearance of endo-

![Fig. 22.—Cross section of the appendix. Dr. Seelig's case. The lumen of the appendix is seen near the center of the picture. There is also some lining mucosa seen toward the upper right portion of the picture. This suggests that the appendix was turned just where this section was taken. Note the enormous thickness of the muscle tissue of the wall. The two cavities seen above and to the left of the lumen are lined with endometrial tissue.](image)

metrial tissue than that of the tube. In one point in the lining there was found a small area over which the lining epithelium was absent and which appeared definitely as endometrial stroma. We do not know what the nature of this tissue could be if it were not tissue that could be classified as of the endometrium. When we encountered this area we immediately examined the original block and cut numerous sections. Although these sections showed the same characteristic appearance of the tube, this same plaque of supposed endometrial
stroma did not appear in the sections although the large gland immediately below it could be identified. The area above was covered by a layer of epithelium which was absent in the particular section which showed the stromal tissue. We, therefore, felt that if this was endometrial stroma it occupied only a very small area. (Figs. 20 and 21.)

The other case was one in which endometrial tissue was found in the wall of the appendix and the appendix was removed by Dr. Major Seelig for a chronic appendicitis and we have not included any data concerning this case as Dr. Seelig wishes to report the case in full at a later date. The organ in this case was very definitely thickened, markedly adherent and surrounded by old blood. On section the wall was shown to be enormously hypertrophied. The peritoneal surface had been torn and could not be identified, but at the immediate periphery of the specimen one could demonstrate typical endometrial tissue entering the wall. There were numerous islands of endometrial tissue scattered throughout the wall and every section taken, some six or seven, showed this structure very characteristically. One section, which I unfortunately did not illustrate, shows the tissue in connection with the mucosa of the appendix. The muscular tissue of the appendix was markedly hypertrophied and there was a definite
seantiness of lymphoid tissue throughout. There was no inflammatory reaction in the appendix, it was comparatively free of anything that suggests even chronic inflammation. We feel that this case is of particular interest on account of the muscle tissue hypertrophy. When Sampson's paper came out describing endometrial transplants in the culdesac associated with hemorrhagic cysts in the ovary, we were struck with the fact that in connection with these lesions there was no description of a markedly hypertrophied muscle tissue. The cases described by Cullen in which the pelvis is literally glued together by the lesion always showed a well-developed, smooth, muscle tissue accompanying the endometrial glands and stroma. It can, therefore, be easily explained then in the appendix and if this applies to the appendix it applies elsewhere that in the presence of these penetrating glands the tissue in situ, namely, the muscle tissue and connective tissue, undergo marked hypertrophy and in this way the lesion that Sampson has described can be considered an earlier stage of the type of lesion that Cullen has so extensively described. In the case which was reported by me several years ago of endometrial tissue in the ovary, we described the tissue immediately surrounding the cyst as hypertrophied, smooth, muscle tissue. This should be described only as the hypertrophied connective tissue of the ovary immediately surrounding the lesion. Some regard the peculiar stroma of the ovary as smooth muscle, but most texts refer to it as ovarian connective tissue. In its appearance, however, it resembles smooth muscle tissue and stains similar to smooth muscle tissue with Van Gieson's stain. We believe W. W. Russell in the description of his first case in 1899 made a similar description as regards his case. We believe this now to be a hypertrophied ovarian connective tissue which surrounds this lesion and not similar to hyperplastic uterine muscle which surrounds the lesion of so-called diffuse adenomyoma of the uterus.

Since writing the above, our attention has been called to an article by Blair on ovarian hematoma in the September number of Surgery, Gynecology and Obstetrics. He refers to an article by J. V. Meigs of Boston who reported in July, 1922, sixteen cases which he collected from the material of Dr. Graves. He enumerates various theories as regards the origin of these lesions in the ovary and apparently emphasizes that a metaplasia of the germinal epithelium takes place in some instances. The lesions were for the most part of the hematoma variety in which there was definite endometrial tissue. This writer apparently is convinced of the frequency of the lesion. The cases are reported with case histories and microscopic descriptions of the lesions. The diagnosis was in each instance confirmed by Mallory, pathologist of the Boston City Hospital.
We wish to state that we are indebted to Dr. Crossen for the opportunity of studying much of his material in this series. We also wish to thank Dr. George Ives for supplying us with some of his material.

SUMMARY

We feel we have been able to study a sufficient number of cases of endometrial tissue in the ovary to allow us to observe the lesion in most phases of its life history. The frequency with which we encountered the lesion in our series leads us to believe that it is quite common. However, its real frequency can only be determined by the surgeon who is familiar with the lesion in all its phases and studies his own material while fresh and also microscopically. Under such circumstances Sampson’s figures as regards the frequency of the lesion should be duplicated easily. The lesion in the stage which represents a hematoma surrounded by a wall containing old blood, connective tissue cells and large mononuclear wandering cells without any epithelial lining can be easily overlooked. Sampson’s picture describing this late stage is very characteristic. We have failed to observe this lesion in connection with definite lutein and follicular hematomas in various stages although we observed these conditions in considerable numbers in our series. Occasionally there was a somewhat similar appearing lesion in small stromal hemorrhages, but this occurred in a rather irregular manner and never in the same characteristic way in which it was constantly observed in connection with the hematomas supposedly of endometrial origin. The germinal epithelium of the ovary in the presence of adhesions particularly associated with hemorrhage may simulate tube or uterine epithelium. We have observed this frequently but we have not observed the formation of gland tubules beneath such an area nor have we observed any characteristic stroma beneath the germinal epithelium.

We believe that in the case of chronic subinvolution of the uterus with no other lesion present in the wall of the uterus, in the production of the lesion of diffuse adenomyoma of the uterus the glands invade the wall primarily, and that the hyperplasia of the myometrium develops subsequently. That such hyperplasia could occur from glands invading the peritoneal surface is well illustrated by Seelig’s case with the lesion in the appendix. Accordingly, we feel that the muscle tissue so well developed in the late stages of adenomyoma of the rectovaginal septum, the type of cases so well described by Cullen, may have its origin in this manner.

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WASHINGTON UNIVERSITY, SCHOOL OF MEDICINE.

DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICH.—This presentation should call to our minds the logic used by Dr. Deaver yesterday, that in medicine we can frequently criticize one another for our limitations, but if we are to be thoroughly prepared our subject is of enormous size. This presentation this morning brings to our attention the work of the clinician who has gone into the laboratory to enlarge his knowledge of a clinical subject. We need just this kind of work all the time to amplify the exact knowledge of the clinician. In this presentation there is the correlation of pictures. This promises help, to understand from further work just how we are to recognize the gross pathology of these conditions when the abdomen is opened. It may be asked, is it of any consequence? If there is a menstrual reaction in the appendix it must have clinical significance. If this is in the ovary, it must be of clinical significance.

The outstanding things in connection with this work from the standpoint of the gross pathology, are the changes so far as we are able to recognize them from the work of Dr. Schwarz, which appear upon the surface of the ovary, and usually the appearance is that of a cyst or hematoma, or also perhaps in general terms a displaced tissue, a graft as it were.

Coming to the microscopic conditions, we could very logically argue the question as to what is the explanation. Dr. Schwarz has already covered that in saying that there is a possibility we have to deal with germinal cell inclusions. We are all familiar with that type of change. We may consider, as he has mentioned, the germinal follicle which goes on to luteal formation. All these have to be considered and for practical purposes are not so important as the study of the gross pathology, so that we can make clinical applications of this work. If this occurs in 10 per cent of our cases, surely we have a new pathology to be written concerning the ovary.

There is a great field for clinical research, and when we talk about the laboratorian and the clinician being apart, it is perfectly absurd to think of them as being separate workers. The laboratory worker ought to be constantly enlarging his knowledge of clinical things; the clinician should be constantly going into the laboratory and ought to be able to read within a limited degree the microscopic pathology of the specimens he has removed.

DR. FRANCIS REDER, ST. LOUIS, MO.—Some years ago I presented a paper before this Association on "Premenstrual Appendicitis," by that I mean, an attack of appendicitis preceding the menstrual period by two or three days. Many physicians have diagnosed this condition as an ovarian pain, which it is not. The slides thrown upon the screen clearly demonstrate to me the correctness of my diagnosis in these cases. The endometrial tissue demonstrated microscopically in the appendix explains to me the attacks of appendicitis shortly before menstruation. With removal of the appendix the attacks of pain cease.

DR. JAMES E. SADLER, POUGHKEEPSIE, N. Y.—I want to emphasize what Dr. Davis has said. I presented to Dr. Sampson one of the four cases in which one of the locations of this lesion was in the appendix. It was due to our local pathologist (Dr. Carpenter), in association with the pathologist of the State Board of Health, that this pathologic condition was noted.
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My case, not only had its original inception in the right ovary but the appendix microscopically showed a distinct lesion, and four inches from the ileocecal junction there was a distinct obstruction, which showed the characteristic endometrial tissue described; therefore, the discussion made by Dr. Davis brings home to us emphatically the fact that there is no divorcing the clinician from the laboratory man, and that one is dependent upon the other.

DR. WM. S. BAINBRIDGE, N. Y. CITY.—The association clinically between a diseased right ovary and appendicitis and the likelihood of premenstrual appendicitis was pointed out by the late Dr. A. J. McCosh, who often called attention to the anatomic relationship of the blood vessel of the right ovary and the appendix.

DR. EDWARD J. ILL, NEWARK, N. J.—I want to ask, if this is endometrial tissue, why does not the cavity empty in the uterus?

DR. EDWARD A. WEISS, PITTSBURGH, PA.—This study of Dr. Schwarz makes me feel that we have been lax in our observation and study of this type of ovarian pathology. Studies like this bring out splendid clinical observation just as years ago, Cullen made a careful investigation of all fibromata in the Johns Hopkins clinic and found a surprisingly large number of adenomyomata that had been classified as fibromyoma.

The finding of endometrial tissue in the ovary in association with hematoma presents an interesting phase of clinical deductions and I gather that Dr. Schwarz does not consider hematoma as an endometrial reaction. May I ask the cause of the hematoma we so frequently find in young women? Is the bleeding a secondary affair?

DR. SCHWARZ.—The blood is associated with menstruation.

DR. WEISS.—The ovarian hematoma I have found to be of much clinical importance. Not infrequently they are of particular interest from a bacteriologic standpoint and have been found to be of particular virulence and should not be regarded as a simple hematoma or slight infection. I would like to ask Dr. Schwarz whether he has made observations on the bacteriologic findings of these ovarian hematomata.

DR. JAMES E. DAVIS, DETROIT, MICH.—I would like to ask Dr. Schwarz to speak of the analogy existing between this condition and aberentia of the mammary gland. The aberentia we find in the interstitial portion of the oviduct or horn of the uterus, the glands being carried out beyond the lumen. When you make a cross section of the horn of the uterus you will find gland formation.

DR. SCHWARZ (closing).—In the first place, I took up this study to confirm the microscopic findings of Sampson. Sampson in his very voluminous article which appeared in the American Journal of Obstetrics and Gynecology in 1922, reports his cases in great detail. He goes over many case histories and points out distinctly the relation between the clinical and the pathologic sides. Therefore, I refer you to his article.

As to the question of Dr. Ill, these hematomas are frequently closed cavities and blood does not escape except when there is perforation. I wish to call his attention to the fact that the endometrial glands are of the serous type and one would not expect mucus in these cavities. Only the cervical glands secrete mucus.

As regards the question of Dr. Weiss, we have made no bacteriologic study, but we feel there is no connection with infection. For instance, in the case where the appendix was riddled with endometrial tissue, there was no evidence of any inflammatory reaction.

As to the glands which Dr. Davis referred to in the uterine horn, so-called cornual
adenomyoma of the uterus may be derived in two ways. They may be derived, in the first place, from the proliferation of the lumen of the interstitial portion of the tube, and in the second place, they may occur after a transplant has taken place at this point with secondary invasion of the wall. Previously, when the cause of adenomyoma of the uterus was so much discussed, there was one type which had a direct connection with endometrium, and the other type closely related to the serosa. There was frequently no stroma in the subserous type. I believe Sampson has suggested that this type may result from the implantation of tubal epithelium around which there is no accompanying stroma.
ABDOMINAL HEMORRHAGE FROM RUPTURED GRAAFIAN FOLLCLE CYST

BY DAVID HADDEN, M.D., F.A.C.S., OAKLAND, CAL.

THAT abdominal hemorrhage from a rupture of a cyst of the ovary or a graafian follicle is comparatively rare, is emphasized by Emil Novak, in a paper from the Gynecological Department of the Johns Hopkins University in 1917. In that article he records only forty reported cases, including his own, up to that year. In order to add the following case to the records as well as to emphasize the similarity of such a pathology to an acute appendix, I am presenting this history.

Miss C. U., aged twenty-eight, a Russian, in good general health prior to the attack, complained of severe acute abdominal pain with vomiting. For four days prior to the attack she was badly constipated and the evening before, was given an enema by her mother. Shortly afterward she was seized with acute abdominal pain, vomiting followed and persisted until morning, when I first saw her.

Physical examination showed a tender and rigid right side with the signs most marked in the region over the cecum. The left abdomen was flaccid with no tenderness. The temperature was 100 with a pulse rate of 87; the white cell count 10,500 with 78 per cent polynuclears.

Pelvic examination showed a normal uterus and no indication of ovarian complications.

A right-sided gridiron incision was made and upon opening the peritoneum the abdomen was found full of bright blood. Realizing that the appendix was not the site of the hemorrhage I made an investigation of the pelvis. The right ovary was healthy but the left, found in proper position, was bleeding very freely from a ruptured graafian follicle cyst about a half inch in diameter.

The appendix presented some indication of a chronic inflammation but not of sufficient severity to account for the right-sided rigidity and tenderness. The bleeding of the ovary was controlled and the appendix removed. Recovery was uneventful.

Questioning the patient more fully after operation in order, if possible, to determine the cause of the injury since the time of the attack was postmenstrual, I found that the tip used in giving the enema was the vaginal type of black rubber of large caliber, and that the patient experienced considerable pain on the left side upon its insertion.

The rate of bleeding from the ruptured follicle was of such degree that in time the patient would certainly have presented symptoms of abdominal hemorrhage, but the primary symptoms were those of a beginning acute appendix.

OAKLAND BANK OF SAVINGS BUILDING.
TWO CASES OF RECURRENT CYST ADENOMA OF OVARY

By David Hadden, M.D., F.A.C.S., Oakland, Cal.

In reviewing the literature on the subject of papillary cystadenomas of the ovary I find few references to cases in which a recurrence has followed operation.

It is generally recognized that the condition is frequently bilateral, and may develop in the second ovary notwithstanding the fact that at the primary operation that ovary seemed normal, and that a complete removal of ovaries and uterus is advisable.

Another fact that stands out, rather negatively than otherwise, is the uncertainty as to whether or not the papillary masses when exposed to contact with the peritoneum, will develop independently of the ovarian structure. The advice given is, in every case possible, to remove the cyst without rupture or even puncture for reducing the size of the mass, as the danger of such transplant is great. Yet the literature does not seem to bear out such a liability in the majority of cases and the reported cases place those that do transplant in the group of cysts of a carcinomatous nature.

There is a rather marked absence in the literature of case reports where a second operation has followed for a recurrence, what condition was found and the final outcome.

A brief description of two cases may be of interest and value.

In 1917, Mrs. A., aged fifty-seven, was referred to me by an internist. She had a tremendously distended abdomen and the abnormal contents were crowding down on the uterus, bladder and rectum, interfering seriously with function.

In the spring of the same year she had a gall bladder operation by one of our best surgeons, at which time no pelvic disturbance presented. She returned to him a few months later with an enlarged abdomen caused by an ovarian cyst. The cyst was unruptured and was removed without disturbing its contents. Recovery was uneventful. Within the next three months the abdomen gradually increased in size until in December, when I saw her, the pressure was practically unbearable.

Believing that I was dealing with a recurrence of the papillary growths probably arising as a general peritoneal involvement, and realizing that the fluid material was probably gelatinous and could not be removed by tapping, I opened the abdomen.

The whole abdominal cavity was filled with an enormous amount of thick gelatinous masses that had to be scooped out by hand. When sufficient of this material was removed, the tumor itself presented the appearance of a mass of fibrous tissue spreading throughout the abdominal cavity, but all the strands having their origin in the pelvis, and this connective tissue closely enmeshed with the jelly.

The tumor had recurred on the side from which the ovary had been removed, had burrowed its way between the layers of the broad ligament and practically
replaced the uterine structure. The left ovary was not involved. I removed the mass from the pelvis as completely as possible going well beyond its limits on the peritoneum. The anterior surface of the rectum was the only peritoneal structure involved that I was unable to remove. The pelvis presented on completion of the operation all the vessels and the ureters exposed without peritoneum covering. A loose gauze pack was placed to keep the intestines away from the raw surfaces, the ends protruding through the vagina. This gauze was removed some days later and a radium application was made to the surface of bowel through the vagina. The abdominal wound closed without drainage, healed by first intention. The patient has been and is now, in splendid physical condition. In this case there was no evidence whatever of any papillary transplants on the general peritoneum.

The second case came into my hands last December. The woman was forty-three years of age and the mother of one child. She gave a history of an operation thirteen years before for a growth in the abdominal wall.

In April of 1922, she was operated upon in New Mexico for a cyst of the right ovary. The husband reports that at that time the abdomen was found filled with gelatinous masses and that the tumor arose from the right ovary. The surgeon gave him no hope for complete recovery, as he expected the papillary masses would recur from the general peritoneum.

This patient was comparatively well for six months when the abdomen began to enlarge rapidly and she complained of severe pain in the left upper abdomen. For six weeks prior to consulting me, she had submitted to the new fangled treatment originated in our adjoining city and now attracting so much general attention. Her husband realized that her condition had grown progressively more serious during these weeks and finally persuaded her to consult me.

Operation the next day showed the tremendously distended abdomen filled with thick gelatinous material. The filiform projections of the tumor, almost like a mass of seaweed, were running all through the cavity but with no attachments to the general peritoneum. The left ovary was the site of the growth. The uterus was normal and the right broad ligament not involved.

Complete hysterectomy with drainage through the vagina comprised the operation. The condition of the patient making her a bad operative risk, the complete removal of the gelatinous masses was made impossible. However, over five gallons was scooped out. For some weeks these masses continued to work their way through the vagina.

An application of radium was made in the vault about a week after operation. Some four weeks later a vesicovaginal fistula developed. I do not feel that the radium can be blamed in this case, but rather that the general breaking down of the tissue due to the decomposing masses of gelatinous material which were being extruded from time to time was the cause, some of these masses being as large as a fetal head.

Last May I repaired the fistula and obtained primary closure. The tissues of the vagina and vault presented at that time a perfectly healthy appearance.

I feel that these cases are interesting mainly from the standpoint of showing no peritoneal transplants, and also that operative procedures are to be considered as by no means hopeless.

OAKLAND BANK OF SAVINGS BUILDING.
THE USE OF LOCAL ANESTHESIA IN HANDLING SEPTIC CONDITIONS WITHIN THE ABDOMEN

BY ROBERT EMMETT FARR, M.D., MINNEAPOLIS, MINN.
Attending Surgeon St. Mary's Hospital

I BELIEVE it will be accepted as a fact that at the present time the use of local anesthesia is largely limited when dealing with septic conditions within the abdomen to such operations as simple drainage of abscesses, on the one hand, and on the other, to attempt saving cases in extremis in which the giving of general anesthesia would be especially hazardous in the surgeon's judgment. My reasons, therefore, for presenting this message are as follows:

First, I believe that limiting the use of local anesthesia to the classifications mentioned above is due in part to the failure of surgeons to realize the facility with which it may be employed.

Second, I believe that the use of local anesthesia offers, in the majority of cases, a better chance for the patient.

Third, I have offered this contribution in the hope that the recitation of some of the alleged advantages of the method in the presence of abdominal sepsis and in addition a more or less detailed description of the technic which has resulted in satisfaction in our hands, might be the means of bringing to a class of patients a greater degree of protection than they have had in the past.

Problem Presented.—The problem presented may be tritely stated as follows: The institution of surgical treatment in any given case of intraperitoneal sepsis demands conservation of the patient's resources to the fullest extent compatible with meeting the surgical indications and this demand may, in certain instances at least, be best met by the employment of the local anesthesia method. In its final analysis the surgical treatment of acute, subacute and chronic intraperitoneal infections may be considered only an effort on the part of the surgeon to assist Nature, first in resisting infection and second in eradicating its results and causative factors. Such assistance is inevitably accompanied by an attack upon the tissue of the patient which must necessarily further reduce his vital forces. Unfortunately also surgical attack is usually followed by general sequelae which are more or less depleting in their effects.

Nature's Efforts.—In analyzing Nature's efforts to meet the onslaught of sepsis, the factor of rest stands out most prominently. The localization and isolation of the septic process by the laying down of a defensive wall of immunity, combined with the development of gen-
eral bodily defenses, are immediate and constant characteristics of Nature’s battle. Splinting of the abdominal muscles, decreased diaphragmatic excursion, inhibition and later the reversal of peristalsis, the formation of viseero-viseeral and viseero-parietal adhesions, obstipation, the posture assumed, general bodily rest and elimination from the economy of the products of sepsis with all possible dispatch, are technical points in Nature’s strategy. When local conditions permit, septic products are, through Nature’s efforts, drained through the abdominal wall or into some hollow viscus and Nature has, in this manner, saved many lives. Such evacuation of septic material is almost invariably accompanied by an improvement in the patient’s condition and while this act is practically always a late manifestation of disease and indicates, as a rule, that for some reason appropriate treatment has been withheld, the fact remains patent that, in instituting drainage, Nature has most carefully conserved the remaining resources and has not in the slightest degree reduced the patient’s resistance in carrying out this protective operation. On the other hand, it is perhaps impossible to apply surgical treatment or, in other words, to assist Nature surgically in its effort to combat sepsis without, at the same time, insulting and injuring the patient’s economy, both locally and generally, and while it cannot be denied that Nature must frequently be offered surgical aid, it is our duty when rendering assistance to imitate, as far as it lies within our power, Nature’s effort in carrying out the same procedure or in meeting the indications as best we can.

Medical Management.—Such factors as the intelligent assistance of Nature in the preoperative management, the time at which surgical intervention should take place, the operative procedure to follow and the amount of surgical manipulation to be employed have, of course, a most important bearing in the management of abdominal sepsis.

Surgical Management.—The surgery of abdominal sepsis is practically always the surgery of necessity. Likewise the presence of sepsis always increases the hazard in a case in which a surgical operation is to be performed. In a broad sense, therefore, if we accept the dictum that local is safer than general anesthesia, its use should offer us a means of meeting the demands here with greater safety, which becomes especially important on account of the inherent increased risk.

Disadvantages of the Method.—It must be admitted that the use of local anesthesia in abdominal sepsis presents certain disadvantages. Among the most important of these, speaking generally, is the increased likelihood of encountering psychic incompatibility, as it is well known that certain individuals develop an unfavorable mental attitude when afflicted with sepsis. Again the presence of sepsis offers locally a field which is decidedly more sensitive than normal, therefore demanding the most perfect anesthesia it is possible to obtain. Furthermore, the use
of local anesthesia restricts one's operative maneuvers to a certain extent to one particular area. Whether the latter factor is a disadvantage or not will depend largely upon circumstances. Our preference has been to curtail our operative work as much as possible in the presence of acute sepsis at least.

**Advantages of the Method.**—Some of the advantages (aside from its safety) of the local anesthesia method as we see them may be tabulated as follows: Speaking generally there is a lessened expenditure of physical energy and the liability to bodily trauma is reduced. There is a greater opportunity for retaining fluids within the system and the tendency to postoperative complications affecting the lungs, heart, kidneys and liver is decreased. Locally, there is a better opportunity to conserve energy and assist Nature by reducing manipulations and therefore local trauma. There is less tendency to soiling and less necessity for speed, allowing a more refined technic and more complete work. (As an instance of this latter point I might state that since our present technic has been perfected we have not failed to find and remove the appendix in every case of acute or subacute appendicitis in which we have operated.) However, in acute abdominal sepsis operating by the fractional method has found splendid application, the different procedures often being looked upon as minor operations without great objection on the part of the patient. After operation the principle of general and local rest may be carried out with more thoroughness when the method has been used. The manner of transporting the patient, the absence of nausea and vomiting, the exercise of the patient's self-control, all tend toward the conservation of vital forces. Locally, the added possibility of rest during the early postoperative hours is one of the most marked advantages. The reduction of the tendency of the intestine to travel into and away from the septic field after an operation under local anesthesia is without doubt of the greatest advantage to the patient.

**The Manner of Applying the Method.**—Following these generalizations it is my desire to illustrate in some detail the technic of the method as applied in the treatment of abdominal sepsis. Time will permit only the recital of a few general principles and perhaps the introduction of a sufficient amount of illustrative matter to make clear some of the important steps in the necessary strategy to be employed. It is hoped that in presenting these principles and details certain of the advantages mentioned above may be elucidated.

Former contributions have dealt with the extreme care with which patients should be handled when using the local anesthesia method and I can do no more than reiterate the admonition that in general the utmost caution should be used in handling the septic case before, during, and after operation, carrying out all of the details demanded by a simple case with a superlative degree of attention. Fluids, anodynes and
hynotics, careful transportation to and from the operating room, as well as a refined operative technic are especially indicated.

The actual performance of an operation by the local anesthesia method in the presence of sepsis merits a more detailed discussion. One must bear in mind that in acute or subacute sepsis, at least, the patient may be in a highly nervous mental state and meet this condition by the judicious use of drugs, of which morphine is the most satisfactory. Most unfortunately this drug is often indicated for other reasons than the alleviation of nervousness and may thus be used for a two-fold purpose. One must not forget that every bodily movement may cause the patient local distress and that active or vigorous movements are often the means of disseminating septic collections to uncontaminated portions of the abdominal cavity. Again one must remember that it is quite impossible or impracticable to anesthetize completely the entire abdominal cavity by the means of local anesthesia and that when operating under this method one must most scrupulously avoid manipulations which transmit painful impressions to unanesthetized areas. Certain factors must guide one in choosing the form of local anesthesia technic to be used. The feasibility of changing the position of the patient upon the operating table must be considered. Paravertebral and extradural anesthesia are for this reason often contraindicated. One must so plan and conduct all procedures that all overt acts may be prevented and see that emergencies resulting from inadvertance are not allowed to convert a method chosen for its safety into one which is, if anything, more dangerous than the method for which it is a substitute.

It may be well to bring a fair proportion of these cases to the operating room fairly well narcotized, although this is by no means necessary in most cases. Direct infiltration or infiltration block along or near the line of incision is the method of choice. Every precaution is taken to inhibit entirely the muscular reflexes. Provision is made for tilting the patient into any desired position by means of the worm drive mechanism without delay, commotion, or added discomfort. Retraction of the elastic type is used. Perfect exposure and illumination are insisted upon, the cooperation of the patient is engaged and pressure and unnecessary traction avoided. Suction replaces sponging and the opportunity to reduce the spread of the septic process during and after operation, which the use of the local anesthesia method offers, is utilized to the fullest extent.

For the purpose of illustration it may be well to consider meeting the surgical indications of some of the various types of abdominal sepsis—acute, subacute and chronic, by the local anesthesia method. Obviously only a few leads can be presented, as a description of the method of treating even a small percentage of the septic conditions found within the abdomen is far beyond the scope of this paper.

For the purpose of illustration we may consider appendiceal abscess.
If possible the abscess is drained through an incision made through a directly infiltrated area. The vaginal, rectal or abdominal wall may be incised. In case the abscess is opened through the abdominal wall the gridiron incision is made and two pairs of number four retractors inserted. The pus is evacuated by suction and following this the appendix most carefully searched for. It will always appear in the wall of a primary abscess and when found, its base and mesentery may be clamped and ligated, or the clamps only may be applied and allowed to remain in situ for a day or two.

Should one find it necessary to traverse the free peritoneal cavity the following technic is to be recommended: The abdomen is opened as above and the retractors inserted, after which one leaf of the abdominal wall is gently but firmly elevated by means of a strong flat retractor, and a number of long narrow salt sponges inserted until the free cavity is completely protected. The wall adjoining the abscess is next elevated and a subperitoneal infiltration made along a line beneath which the adherent bowel is to be separated, after which the abscess is opened and dealt with. After evacuating the abscess the abdominal wall is once more elevated and the gauze packs withdrawn, in an order the reverse of that in which they were introduced. During this procedure the omentum will usually be attracted into the field and we advise anchoring it in the most protective position by means of a few catgut sutures. This technic may be applied to an abscess of any variety located within the abdominal cavity. It may generally be accomplished without pain and with the minimum hazard to the patient.

The silent field, the absence of visceral excursion and the avoidance of haste are marked attributes of the local anesthesia method during operation, but its greatest advantage presents during the post-operative period.

Thus after completing a most painstaking operation which offers to the crippled patient the maximum protection, both generally and locally, there seems to be no question that the conditions following an operation under local anesthesia leave the patient in the most ideal status to meet the indications. There is less depletion. The lungs are clear. The heart, liver and kidneys have been injured to a less degree. The patient is conscious and able to cooperate and thus can control bodily movement. Therefore there is no tossing about, no struggling, no accidental removal of dressings or drains, no inadvertent ingestion of food or of water. To my mind, however, the greatest advantage offered by the local anesthesia method in these cases relates to the actual field of operation. Visualize, if you will, the local conditions within the abdomen at the completion of a skillfully performed operation carried out along the lines detailed herein. Ordinarily with the viscera remaining in the exact relations in which they were left at the completion of
the operation only slight opportunity is offered for the spread of infection beyond the immunized field. The assistance required by Nature has been contributed with the maximum protection to the organism and the minimum of local and general trauma.

On the other hand, can we, when general anesthesia is used, feel assured that the visera will remain in the approximate relations they occupied at the completion of the operation? Repeated vomiting and retching and even a moderate amount of bodily movement will have a tendency to carry infection from one part of the abdomen to another through the to and fro excursion of the small intestine and omentum. The assurance that one may, in a large percentage of cases, avoid or greatly reduce the chances of spreading infection is therefore considered of the utmost importance.

As an instance of acute abdominal sepsis perforated ulcer may be mentioned. The manner of handling these is extremely simple as a rule, under the local anesthesia method. Adequate blocking of the abdominal wall causes a most remarkable relaxation as well as a cessation of pain. Negative pressure is easily obtained. Finding of the ulcer is usually not difficult and the appropriate procedure may usually be carried out without adding general anesthesia. Acute appendicitis, cholecystitis and salpingitis are amenable to treatment by the same method.

More chronic conditions, where adherent masses are to be dealt with, may be found somewhat more difficult to manage and yet with perfect relaxation, proper tilting of the operating table, visualization, gentle severing of adhesions as they are encountered, and a utilization of the principle of releasing the pathologic masses before attempting to elevate them, it is surprising how much may be accomplished with local anesthesia in the treatment of subacute and chronic infectious processes.

In conclusion therefore, may I suggest that the many advantages of the local anesthesia method be more often offered to patients who are afflicted with abdominal sepsis, and in closing may I express the hope that the suggestions offered in this paper may aid others to some degree in coping with these problems which demand every artifice which surgery can produce.

1645 Hennepin Ave.

DISCUSSION

DR. ROBERT T. MORRIS, NEW YORK CITY.—Personally, I find I have a subconscious sympathy for the patient, and with local anesthesia find myself working more slowly and deliberately than otherwise I would have done. In typhoid perforation, where a complete operation may occupy less than a minute I use local anesthesia, also sometimes for patients with cardiac disease, but for the most part the tendency is to work more slowly and incompletely under local anesthesia.
ACUTE PANCREATITIS

BY LEWIS F. SMEAD, M.D., TOLEDO, OHIO

ACUTE surgical conditions of the pancreas may have two general divisions; those dependent upon factors peculiar to and inherent in the digestive functions of the pancreas and those definitely of an inflammatory nature. In the first group we have acute hemorrhagic pancreatitis, better designated as acute pancreatic necrosis. It is a condition not essentially inflammatory. The more severe cases end quickly in death or in recovery after massive gangrene, sloughing and suppuration. The milder cases recover promptly by a process of absorption and fibrosis. In the second group we have acute pancreatitis which is definitely inflammatory in character. It is comparable to the suppurative and nonsuppurative inflammations of the parotid gland.

It is the purpose of this paper to consider these two types of pancreatitis and to report cases of each.

CASE 1.—Mrs. M. S., a moderately heavy individual, age forty, began two weeks before the onset of her more serious trouble to have attacks of moderate pain in her upper abdomen. Three days before her death the patient suddenly developed a very severe epigastric pain with vomiting and continuous eructation of gas. The pain was more severe than the average gall-bladder colic and was not easily relieved by morphine. She had never had any previous attacks suggesting biliary disease but had been troubled with gas and pain after eating.

The patient was apparently in great distress. Her skin was cold, clammy, and cyanotic. The respirations were frequent but the lungs were clear. The temperature was 96; and pulse 150, scarcely palpable at the wrist. The abdomen was moderately tender in the whole epigastrum but more so on the right. There was only slight rigidity. No tumor was present in the upper abdomen but there was some distention. The white blood count was 33,000 and the polymorphonuclear cells 90 per cent. No sugar was present in the urine.

When the abdomen was opened under local anesthesia a large amount of coffee-colored or blood-tinged fluid escaped and many small areas of fat necrosis were visible in the omentum. The patient’s general condition was so precarious that exploration was impossible. Drains were inserted and the abdomen closed. Death occurred in six hours and autopsy was refused.

Operation was ill-advised in this case. Every form of treatment will be found unsuccessful in the fulminating cases of pancreatic necrosis.

CASE 2.—Mrs. H. P. age twenty-three, quite fat and the mother of three children. During the summer of 1917 she had numerous attacks of upper abdominal pain. On Nov. 10, 1917, while at work, she was taken with very severe pain in the epigastrium and vomiting. The patient came under observation at the hospital on Nov. 12. Her temperature was 99.4, pulse 110. She was quite ill but not in great shock. The abdomen was distended and tender but no tumor was palpable in the epigastrium. There was no jaundice and no sugar in the urine.
Within the abdomen was found a large amount of brownish red fluid, and in the omentum and over the peritoneum were many areas of fat necrosis. Below the pylorus, overlying the head of the pancreas, extending along the greater curvature of the stomach and even involving the transverse colon, was a large, hard, nodular mass with many clots and much gangrenous looking tissue. On palpation it felt not unlike a large carcinomatous mass. The lesser peritoneal cavity was opened with difficulty because of the extensive involvement. A finger was pushed into the mass in several places and into the region of the head of the pancreas. Large gauze and rubber tube drains were inserted to the mass and into the lesser peritoneal cavity. Many stones were removed from the gallbladder and that organ drained.

The patient reacted well. The drainage from the region of the pancreas was enormous in amount, very purulent and very irritating. There was much sloughing of fatty tissue. With the separation of the larger pieces there were frequent severe hemorrhages. The latter occurred at intervals for weeks and nearly cost the patient her life. One hemorrhage came on as late as the tenth week after operation and was so severe that the patient's pulse reached 160. The temperature ranged from 101 to 104, and the patient was very septic for weeks. Frequent bowel movements were troublesome for the first ten days after operation but were due to a colitis and not to a pancreatic insufficiency. She showed no sugar in the urine at any time. The patient left the hospital after sixteen weeks with a pancreatic fistula which closed within a few months.

In 1923 the patient was seen with an acute cholecystitis. A stone was removed from the cystic duct and she has been entirely relieved. At this operation the adhesions in the upper abdomen were so dense that little could be made out regarding the pancreas. At this time she had no sugar in the urine and the blood sugar was normal.

Of course it is perfectly evident that such a case as this could not recover without operation.

Case 3.—Mrs. G. L., stout woman, age forty-three, and the mother of two children. Seventeen years ago, after the birth of a child, she had a severe attack of pain and soreness in her upper abdomen. Since that time, at intervals of a year or so, she has had a series of mild attacks of epigastric pain followed by a severe attack, usually with mild jaundice. For weeks before her admission to the hospital she had been having mild attacks with slight jaundice, vomiting, much gas, indefinite food distress, and a loss of twenty pounds in weight. Two weeks before coming to the hospital she had a severe attack. On careful questioning she was unable to say that it was different or more severe than the four other serious attacks which she had experienced.

At the time of her operation she was entirely free from pain, but had a little soreness in the gall-bladder region. There was no palpable mass. The temperature and pulse were normal.

On opening the abdomen the gall-bladder contained many stones and was considerably thickened. In the head of the pancreas was a hard, dark, nodular mass about three inches long. There was no free fluid in the peritoneal cavity. In the gastrohepatic omentum, just above the pylorus, was a large confluent area of fat necrosis. The gall-stones were removed and cholecystostomy done. Drains were placed to the pancreas and to the lesser peritoneal cavity. The mass in the pancreas was not disturbed.

This was considered to be a case of acute hemorrhagic pancreatitis which had occurred two weeks before operation and from which the patient was recovering.
Following the operation no discharge came from the pancreas and the gall-bladder fistula closed in three weeks. She remained well for four months when she again had several mild attacks of pain followed by a very severe one. Two weeks after this her abdomen was again opened. There were no stones in the gall-bladder or common duct. There was no new area of pancreatic necrosis and the former area had undergone absorption and fibrosis. It was still palpable in the head of the pancreas but was much smaller and was firm and not nodular. There was no free peritoneal exudate and no evidence of fat necrosis, new or old.

The gall-bladder was removed as the probable direct or indirect cause of the trouble and she has remained entirely well. Since the removal of the gall-bladder and the exploration of the gall ducts this patient has had two attacks similar to her old trouble. They have consisted of several mild attacks of pain and soreness followed by a severe attack. There has been no jaundice. In other words, this patient has not been relieved by cholecystectomy.

Twice during her first admission she had a trace of sugar in her urine but there has been none since.

Case 4.—Mrs. M. T., a rather slightly built woman, thirty-one years of age, the mother of two children. Two weeks before her present illness she had a severe attack of tonsillitis followed by soreness in her knees and ankles. Within a few days she was taken with a sudden, severe pain in the epigastrium, radiating to the back and with vomiting. Similar attacks continued for two weeks, occurring every two to three days and lasting several hours. There was moderate temperature, continuous soreness and the patient felt quite ill. She was admitted to the hospital after a severe attack lasting three days. Her temperature was 99.4, pulse 116, and the white blood count was 12,000. The whole upper abdomen was moderately tender. The skin was dry and slightly jaundiced. The urine contained no sugar. The symptoms and physical signs suggested acute cholecystitis but the diagnosis was uncertain. She was in much pain, looked ill, and was losing ground.

On opening the abdomen there was no free fluid. The gall-bladder was slightly thickened and edematous but contained no stones. About the common duct and in the retroperitoneal tissue around the head of the pancreas there was much edema. The pancreas itself was swollen to several times its normal size. It was not dark or nodular and there was no fat necrosis.

Cholecystostomy was done and drains were placed to the pancreas and to the lesser peritoneal cavity. The pancreatic tissue was not incised but the peritoneum about the head of the gland was opened with the hope of draining the edematous retroperitoneal lymph spaces. Bile drainage continued for three weeks but there was no purulent discharge from the pancreatic area.

The patient had no more attacks of pain and her general condition improved promptly. She has remained entirely well to the present time.

The etiology and pathology of acute pancreatitis is important because an understanding of it will be necessary before we shall be able to lay down the principles on which the condition may be intelligently treated.

In the inflammatory type of acute pancreatitis the infection reaches the pancreas most frequently along the lymphatic channels from a diseased gall bladder or from a peptic ulcer. It may also reach the pancreas as an ascending infection through the lumina of the bile and pancreatic ducts. Less commonly it is carried by the blood
from some distant focus or during a general systemic infection. Involvement by contiguity from an adjacent infection, usually a peptic ulcer, is possible.

The acute inflammatory type of pancreatitis is of less surgical interest than pancreatic necrosis because it is not often operable. The cases occurring in mumps and as catarrhal jaundice should not be operated. When operable the treatment of the inflammatory type of acute pancreatitis consists in prolonged drainage of the gall-bladder of common duct, removal of all sources of infection, as a diseased gall-bladder, an appendix, or a peptic ulcer. Pancreatic abscesses must be drained and an occasional pancreatic stone removed. It has been suggested that the pancreas be set at rest by giving an antidiabetic diet and by the administration of alkalies and also that pancreatic ferments be given to carry on pancreatic digestion.

Acute hemorrhagic pancreatitis is a sudden, massive necrosis of a considerable part of the pancreas. The area of necrosis is sharply separated from the uninvolved tissue and is accompanied by hemorrhage into the pancreas and surrounding lymph spaces. The peritoneal cavity, during the acute stage, contains a brownish or bloody exudate. In the fat about the pancreas, in the omentum and elsewhere, there are yellowish white areas of fat necrosis. These are due to the escape into the tissue of the fat splitting ferment of the pancreas. Fat necrosis indicates "some grave alteration of the pancreas," and is always present in acute hemorrhagic pancreatitis.

The real nature of pancreatic necrosis has not been determined. It has generally been considered to be due to the digestive action of the trypsin of the pancreas set free by some injury to that organ of a chemical or bacterial nature. The trypsin exists in the pancreas only as trypsinogen, a substance with no power to injure tissue. Within the duodenum, however, the trypsinogen is converted by the action of enterokinase into trypsin. The real problem then, on this theory, is to find what converts the trypsinogen into trypsin while still in the pancreas and how that agent reaches the pancreas.

Experimentally, acute pancreatic necrosis has been produced by injecting into the pancreatic tissue and into the pancreatic duets certain irritating substances such as acids, alkalies, toxines, suspension of bacteria, artificial gastric juice, zinc chloride, ferments, bile salts, etc. On the other hand, the condition has been produced by the ligation of the pancreatic duct during active digestion and by direct trauma to the pancreas. It should be noted that in the pancreatitis produced by the ligation of the pancreatic duct and by trauma, bile, duodenal contents, and infection can play no part.

In man the only substances which can reach the pancreas by its ducts are bile and duodenal contents. If bile is to enter the pancreatic
duct from the common bile duct, the two channels must join before they enter the duodenum. We must also assume that something obstructs the diverticulum of Vater below their junction thus shunting the bile into the pancreatic duct. Opie reports a case in which a small stone in the diverticulum of Vater produced such an obstruction and Archibald suggests that it is due to a spasm of the sphincter at the diverticulum of Vater. He also suggests that the spasm may be due to some irritation such as an ulcer or hyperacidity.

Flexner has shown that bile, rich in bile salts, especially taurocholate, is more irritating to the pancreas than normal bile. He has also demonstrated that mucin in bile tends to lessen its irritation. It has also been proved that infected bile will cause pancreatitis when normal bile will not.

Given then an obstruction at the diverticulum of Vater, a concentrated, infected bile, poor in mucin, and an increased pressure within the ducts and we have the stage set for an attack of acute hemorrhagic pancreatitis according to the bile theory.

This theory undoubtedly does explain some cases of pancreatic necrosis but not all of them. It cannot explain cases when the common bile duct and the pancreatic duct enter the duodenum separately; and even if they do join in the diverticulum of Vater it is probably rare for the anatomic condition to be such that a small stone or a spasm of the sphincter can convert them into a continuous channel. Granting proper anatomic arrangements and it is still doubtful, according to recent experiments, whether sufficient pressure is exerted in the duct of Wirsung to drive normal bile into the pancreas with enough force to cause pancreatic necrosis. However, while proper anatomic and physical conditions may be rare, yet the cases of pancreatic necrosis are equally rare and we have in addition to the action of normal bile that of the more irritating concentrated bile and of the infection it carries.

Closely allied to the bile theory of pancreatitis is the theory that the injection of duodenal contents into the pancreatic ducts might be responsible for the condition. It contains ferments capable of converting trypsinogen into trypsin and experimentally when injected into the pancreatic ducts it will cause pancreatic necrosis. Against this theory is the fact that it has been impossible to drive fluids from the duodenum either into the duct of Wirsung or Santorini. However it has been suggested that when the common bile duct and the duct of Wirsung unite in the diverticulum of Vater, a gall-stone passing into the intestine might so paralyze the sphincter as to allow a reflux of duodenal contents from the duodenum. In certain cases of acute pancreatic necrosis gallstones are known to have recently passed into the duodenum.
Another theory of the etiology of pancreatic necrosis and one which fits in well with the clinical circumstances is that the activating agent is an infection entering the pancreas through the lymphatic channels, most commonly through those from the gall-bladder or liver but also through those from the appendix, stomach, or duodenum. The infection is supposed to cause enough injury to the pancreatic tissue to set free a substance capable of activating the trypsinogen and thus starting the process of destruction. In this connection it should be noted that leucocytes and bacteria within the pancreas may produce a ferment with the power of activating the pancreatic secretion. The original inflammation is relatively so small as to be entirely lost in the massive process which follows.

Against this theory is the fact that the pancreatitis is not always associated with a demonstrable infection in the gall-bladder or elsewhere and that the passage of an infection from the gall-bladder and other organs through the lymph vessels to the pancreas involves the supposition of a retrograde flow in the lymphatic channels. If we admit the possibility of lymph-borne infection activating the pancreatic secretion we must also admit the possibility of a blood-borne infection doing the same thing. Experimentally of course it has been impossible to produce pancreatic necrosis by infection through the pancreatic lymphatics.

Gallstones and infections of the gall-bladder and gall ducts have been found in a very large percentage of the cases of acute pancreatitis and it seems highly probable that they are an important factor in the etiology. Whether it is due to the bile entering the pancreas or to the infection reaching the pancreas by the lymphatic vessels remains to be decided.

The profound shock and the early deaths occurring in acute hemorrhagic pancreatitis are probably due to the absorption of autolyzed pancreatic tissue. Experimentally when such tissue has been injected into the peritoneal cavity of a dog, shock, early death, and other symptoms, as in acute pancreatic necrosis, have occurred. Of course we must not lose sight of the fact that we have a massive and sudden destruction of tissue in the immediate neighborhood of the large sympathetic ganglia.

The diagnosis of acute pancreatic necrosis is difficult and is usually made at operation or autopsy. It is most often mistaken for acute trouble in the gall-bladder or ducts or for an acute perforation of the stomach or duodenum, occasionally for acute appendicitis or acute ileus.

It is well to remember that there are severe cases and relatively mild ones. The severe cases with their extreme pain, profound shock, subnormal temperature, cyanosis, coma, and early death have been
generally assumed to be typical of acute hemorrhagic pancreatitis and the fact that there are mild cases which cannot easily be distinguished from attacks of cholecystitis, has not been sufficiently emphasized.

There are no pathognomonic signs or symptoms of acute pancreatic necrosis. The cases are often difficult because they frequently occur in patients who have had recurrent trouble in the gall-bladder or stomach and in patients too ill to give definite information.

The pain of pancreatic necrosis comes on rather suddenly and is overwhelming in character. It is continuous but varies in intensity. It is not easily relieved by morphine and the patient seems to be in great distress. It is located in the epigastrium but is often felt across the back. The tenderness and rigidity when seen reasonably early are not so marked or extensive as in perforating ulcer. They are mostly above the navel and extend to the left of the mid-line. The extension of the epigastric tenderness over the mid-line to the left side is an important sign and carefully observed may lead to a diagnosis of pancreatitis. Of course if the case is seen late when peritonitis has developed it will be useless as a specific sign of pancreatitis. When the tail of the pancreas is involved there may be tenderness in the left costovertebral angle. The abdominal respiratory movements are not entirely abolished but deep breathing is impossible. The vomiting is a very constant symptom and is very persistent and frequently associated with much eructation of gas. It is never fecal until general peritonitis has developed. The abdomen is usually flat with some distention above the navel. There is not often a clear cut tumor mass but rather an indefinite transverse resistance in the upper abdomen due to the enlarged, deep-seated pancreas. Early in this condition the temperature is subnormal but later with the beginning peritonitis it is increased. The pulse is weak and the patient shows many more signs of shock and collapse than in perforating ulcer or acute gall-bladder disease. The dull, leaden paleness and sunken features of shock combined with cyanosis give a peculiar appearance. Movable dullness can sometimes be made out in the abdomen although the amount of fluid is usually not sufficient for this. It may be useful to remember that in early perforations of the stomach or duodenum some gas usually escapes into the peritoneal cavity and can with certainty be made out by x-ray. Its presence might easily differentiate between acute pancreatitis and perforating ulcer.

In these very acute conditions of the pancreas sugar in the urine, diarrhea, and the various laboratory tests of pancreatic insufficiency are not of much value from a diagnostic point of view.

The treatment of acute hemorrhagic pancreatitis is surgical. Mild cases however often recover without operation. The custom of not operating upon cases of acute cholecystitis is undoubtedly responsible
for the failure to discover many moderate cases of acute pancreatitis. The object of surgical intervention is to provide drainage for the toxic products of pancreatic degeneration; to avoid the immediate extension of the necrosis and to prevent future attacks.

How much we can accomplish in checking the rapid intoxication in acute hemorrhagic pancreatitis by drainage to the pancreas during the early stages of this disease, we do not know. It has been stated and supported by good experimental work that the bloody peritoneal exudate found at operation is harmless. Incision or blunt punctures into the necrotic pancreas are of doubtful value or expediency. All collections of encysted fluid in and about the pancreas should certainly be evacuated. This will include drainage of the lesser peritoneal cavity. As absorption of toxic material is largely through the retroperitoneal lymph spaces, drainage should be established by incisions through the peritoneum about the necrotic pancreas when local conditions permit. Drainage, of course, is used not only to prevent the immediate absorption of toxic substances but to give exit later to the massive products of gangrene and suppuration which usually develop in the extensive cases of pancreatic necrosis. Whether it is possible by operation to prevent the further extension of this pathologic process we do not know. It is probable that the extent of the necrosis is determined in the first few minutes of the trouble and that no further tendency to extension exists. However, if injection of bile under pressure from the common bile duct into the pancreatic duct is the etiologic factor in pancreatic necrosis, drainage of the gall-bladder or common duct will remove this pressure and prevent the further extension of the pathologic process. Archibald has suggested that the pressure in the common duct may also be relieved by cutting the sphincter which closes the diverticulum of Vater as it is his theory that a spasm of this muscle is an essential factor in the increase of pressure in the ducts.

The prevention of future attacks of acute hemorrhagic pancreatitis consists chiefly in the elimination of infections from the gall-bladder and ducts of the liver, as well as that from a peptic ulcer or a diseased appendix. Whether we believe that the disease is due to injection of bile into the pancreas or results from infection carried to the pancreas through the lymph channels, the infection is an all important factor.

The actual operation for acute hemorrhagic pancreatitis will consist in evacuation of the peritoneal exudate, drainage of the area of pancreatic necrosis and of the lesser peritoneal cavity, incision into any collection of fluid in or about the pancreas and drainage of the gall-bladder if the patient’s condition will permit. Removal of stones from the common duct and excision of the gall-bladder will rarely be
DISCUSSION

justified in acute pancreatitis. However, cholecystectomy is much more certain to prevent further attacks of pancreatitis than cholecystostomy. Drainage of the gall ducts should be prolonged for several weeks if possible. Permanent drainage of the gall-bladder into the stomach or duodenum by cholecystogastrostomy or cholecystenterostomy is not a good procedure for acute pancreatitis. Archibald’s operation of cutting the sphincter at the diverticulum of Vater through an opening in the duodenum has not been generally accepted by the profession.

SUMMARY

(1) Acute surgical conditions of the pancreas include the noninflammatory pancreatic necrosis and true inflammatory pancreatitis.

(2) Acute pancreatic necrosis is probably due to activated pancreatic ferments escaping into the pancreas and surrounding tissue.

(3) The activating agents may be bile, duodenal contents, or infection.

(4) The frequency of gall-stones, and infections of the gall-bladder and ducts is certainly significant.

(5) The cause of the profound shock is absorption of autolysed pancreatic tissue.

(6) The most helpful diagnostic points are the severity of the pain, the collapse, and the extension of the epigastric tenderness to the left.

(7) The object of surgical intervention is to remove dangerous toxic substances, prevent the extension of the pathologic process, and avoid future attacks.

227 Michigan Street.

DISCUSSION

DR. FREDERICK S. WETHERELL, SYRACUSE, N. Y.—I should like to report a case I had recently of acute pancreatitis. From an etiologic standpoint, this case was interesting, in that the patient was just eight days over her crisis from a rather mild lobar pneumonia. She was seen by her family physician because of abdominal pain, was given morphine, and seen again eight hours after that. I saw the case with him, and the clinical picture and physical findings were those of an acute cholecystitis. The patient was immediately sent to the hospital. There an internist saw her. No urinalysis was made during the attack of pneumonia or up to the time of her admission to the hospital. Further examination with better facilities in the hospital disclosed an abundance of sugar in the urine which led us to think of the possibility of pancreatitis. The abdomen was opened by a transverse incision and extensive white plaques, postperitonally, were seen. An attempt was made to explore the lesser omental bursa through the epiploic foramen, and great difficulty was experienced in getting in there, and all the tissues were extremely friable. A large drain was inserted into the omental bursa and the abdomen closed. The patient died in twenty-four hours. At autopsy there was no evidence of any kind of obstruction of the pancreatic ducts, no cholelithiasis, but very extensive fat necrosis throughout the abdomen.
HEPATITIS IN ITS RELATION TO INFLAMMATORY DISEASE OF THE ABDOMEN: A CLINICAL AND LABORATORY STUDY


Clinical Discussion (Dr. Heyd)

In considering hepatitis we shall define that form of hepatitis that is associated with, or sequential to, the more chronic inflammatory diseases of the abdomen, particularly those affections involving the right upper quadrant and the appendix. Abscess, infarct, and embolism of the liver as complications of suppurative conditions, either in the abdomen or elsewhere, are not included. We refer specifically to the low grade inflammatory changes in or about the small bile radicals, the interlobular septa, the perportal veins and intrinsic degeneration of the hepatic cells.

We have recognized for a number of years a cholecystic toxemia which manifests itself by changes in organs quite remote from the liver. During this period of time we have also been impressed with the macroscopic picture of the liver in patients operated upon for chronic disease of the biliary tract. There was a well founded idea that many of these cases show definite liver changes, either subsequent to infection of the gall-bladder or coincident with gall-bladder infection. From time to time in checking up our after-results we have been impressed with the clinical fact that those patients who showed gross demonstrable changes in the liver at laparotomy were those least benefited by surgery. We are convinced that there are certain types of liver change that are associated with chronic abdominal infection, and which render the patient somewhat of an invalid even after successful surgical intervention.

Peterman reported that in 130 unselected cases of gall-bladder disease admitted to the surgical service of Barnes Hospital, St. Louis, Mo., there were 82 cases of undoubted liver involvement. Of these 69 were "enlarged" or "edematous," five showed adhesions alone and eight were "atrophic" or scarred. We have drawn attention to the fact that at autopsies made on patients suffering from simple gastroduodenal ulcer there were always present more or less advanced hepatic lesions. MacCarty and Arnold Jackson stated that in a series of 58 cases studied in relation to hepatitis 81 per cent showed chronic inflammation. The livers were studied independently of any knowl-
edge of the condition of the gall-bladder. Peterman, Priest and Graham\(^6\) regularly produced experimental cholecystitis by injection of organisms into the lumen of the gall-bladder after ligation of the cystic duct and vessels. An associated hepatitis was invariably found associated with the cholecystitis.* Fuetterer\(^7\) was able to recover bacteria injected into the portal vein two minutes later in the bile. Chareot (quoted by Ehret and Stolz\(^8\)) produced biliary tract inflammation and later cirrhosis of the liver with marked hepatic changes by ligation of the common bile duct in rabbits and guinea pigs. Adami has demonstrated that under normal conditions colon bacilli may be present in the blood stream and eliminated from the liver in apparently normal bile. It is doubtful, however, if bacteria can pass through a normal liver on account of the high bactericidal power possessed by the liver tissue. It would appear more probable that there must be some inflammatory changes in the liver itself to allow bacteria to traverse the liver substance. An injection of microorganisms in the appendiceal vein is followed by hepatitis and cholangitis while surgical infection of the liver by way of the portal system has its clinical pathology well demonstrated in the septic pyelophlebitis following gangrenous appendicitis.\(^9\) This is essentially an acute septic process and a mechanism of liver injury with which we are not concerned at this time.

Werelius\(^10\) in discussing high intestinal obstruction has brought forward experimental evidence that in all drained duodenal loops bile secretion stops before death. It is possible that with the cessation of biliary secretion the other hepatic functions are simultaneously terminated and death is the result of liver insufficiency. As a corollary, the liver insufficiency is directly due to liver exhaustion following the absorption of the toxic substances which accumulate within the lumen of the obstructed gut.

The question naturally suggested is, what is the route by which the liver is injured in these cases. There is no anatomic connection between the arterial blood of the gall-bladder and liver, the only canalicular system common to both organs in the lymphatic system. There is also no anatomic route from the appendix to the gall-bladder except through the intermediate agency of the portal system and the liver. The liver may be infected presumably in five ways: (1) hematogenous infection; (2) by means of the portal system; (3) through the lymphatics and (4) from contact with contiguous pathologic organs; (5) ascending infection by way of the bile ducts.

We have extended our study to the microscopic examination of specimens of liver removed during the course of operations for acute and chronic appendicitis, ulcer, and carcinoma of the stomach. In

\(^*\)Nine out of the nineteen experimental dogs died of a general peritonitis. The hepatitis might possibly be due to the peritonitis rather than the cholecystitis.
a few traumatic cases we have studied the liver for purposes of obtaining a normal control. The observations were made preponderantly in cases of gall-bladder disease. It has been our custom, however, to remove the appendix through a high right rectus incision and advantage has been taken to study the liver in the course of operations for acute and chronic appendicitis, as well as all pathologic conditions affecting the gastroduodenal segment. The study, so far as the liver itself was concerned, embraced a careful inspection of the liver in regard to: (1) size, shape, deformities, disproportion in lobes, changes in color as well as differences in the color, contour and texture between the right and left side of the liver; (2) the character of the anterior border with estimation of friability; (3) the presence of crenation, retraction and dimpling of liver tissue; (4) changes in the surface of the exposed portion of Glisson’s capsule, the presence of subcapular infiltration, fibrous tissue replacement, adhesions, stellate cicatrices, wrinkling of liver surface, opacity of Glisson’s capsule with infiltration or thickening of falciform or round ligament and fibrosis at umbilical notch,—in short, partial or complete Glissonitis; (5) the presence of adhesions about the gall-bladder and central fissure, an increase in fibrous elements about the gall-bladder notch, widening of area of opacity on either side of gall-bladder by fibrous tissue replacement, etc.

It has been our custom to remove two to three pieces of liver tissue in each case. The first section removed was usually from the neighborhood of, or adjacent to, the gall-bladder, the second piece from the superior surface of the right lobe and about 5 cm. distant from the gall-bladder, and less frequently from the superior surface or anterior border of the left lobe, depending upon the accessibility of this portion of the liver. It may be stated that when we found macroscopic liver changes present these pathologic changes were uniformly distributed throughout the right lobe of the liver, and at the same time there was always evidence of the same pathologic process in the left lobe but ordinarily of less intensity than in the right lobe. It occasionally happened that the liver changes were much more marked than the associated pathology in the gall-bladder, appendix or stomach. In other words, the changes in the abdominal viscera were quite minimal as compared to those encountered in the liver. Insofar as the gall-bladder was concerned as an etiologic factor in hepatic change it did not seem to make much difference whether stones were present or absent. The essential elements were apparently: (1) chronicity of the infective processes; (2) the persistence of a certain degree of intensity of the offending agent—chemic or biochemic. In catarrhal types of appendicitis and cholecystitis the evidence obtained from inspection of the liver consisted in a thickening of the capsule, with
occasional adhesions, with thickening of the anterior border, with crenation, swelling and surface dimpling. In localized gall-bladder disease the changes in the area of the gall-bladder region were more intense than elsewhere, and the quality of the change varied inversely with the distance from the gall-bladder. In these cases the microscopic examination of the liver section would show subcapsular lymphocytic infiltration and intercellular lymphatic infiltration. If there were an acute inflammation in the appendix or gall-bladder disease, leucocytic infiltration would be merged with lymphocytic infiltration. When the abdominal condition was essentially chronic the surface changes on the liver would become more marked and more diffuse, together with an increase in the size of the liver. The liver was grossly enlarged in about 50 per cent of the cases and the enlargement when present was confined in about 90 per cent of the cases to the right lobe and particularly the outer and posterior half of the right lobe—the quadrate and caudate lobes not participating in gross enlargement. Microscopically the liver changes in the more chronic cases represented an advance in pathologic intensity with the chronicity of the abdominal condition. Uniform fibrosis was more marked, loose connective tissue would be found in abundance about the bile ducts and portal veins, bile stasis would be more apparent with hyperplasia and budding of immature bile ducts. Leucocytic and lymphocytic infiltration would extend between flattened and distorted liver cells. Many of the latter would show vacuoles and disintegration, occasionally intra- and intercellular pigment, with some fatty degeneration and hepatic cell destruction, rarely hyperplasia of blood capillaries and an increase in syncytiial cells of Kupffer. Apparently, so far as we could observe, there was no definite parallelism between the gross and qualitative liver changes and the pathologic condition of the associated abdominal condition. In some cases it was apparent that the force of the affection was spent on the originally infected viscus remote from the liver; in other cases the force of the offending agent apparently exerted its greatest injury on the liver with minimal changes in the extrahepatic viscus which many times was showing a well established repair.

The liver 11, 12 is a complete biochemic laboratory which, interposed between the portal and systemic circulation, transmutes the food into energy value. It is the chief of the metabolic work shops and regulates body metabolism by enzyme action. Some of the enzymes are intrinsic and elaborated by the liver itself and others are extrinsic and brought to it from different viscera by the circulation. Hess and Serege 13 ascribed various functions to different portions of the liver. It is interesting to recall that Silvestri 14 and others attempted to specialize liver function in regard to the right and left lobes of
the liver. It has been a frequent observation that when the liver is enlarged in diabetes the right lobe is more uniformly affected, while in Banti's disease and other splenomegalias it has been observed that the left lobe participates more particularly, while tropical liver abscess is almost exclusively on the right side. The work of Glenard and Serege lends emphasis to this contention for in their experiments the left lobe of the liver is intimately connected with the stomach and spleen, while the right exhibited more definite relationships with the pancreas and small intestine, and the ordinary form of interstitial cirrhosis manifests itself most markedly on the left side. The injection of staining fluids into the spleen invariably produced discoloration of the liver limited to the left lobe while injections into the superior mesenteric veins, as a rule, stained the right lobe of the liver more than the left.\textsuperscript{15}

The liver has an unusual vascular supply, an arrangement of afferent and efferent blood that is found in no other organ in the body.\textsuperscript{16} The spleen and kidney perform their specific functions in the presence of a large supply of oxygenated blood. The liver, to the contrary, performs its functions with a blood that, except for a relatively very small amount of arterial blood supplied by a minor portion of the hepatic artery, is entirely of a venous type. Two-thirds of the arterial blood via the hepatic artery is diverted to the gastroduodenal, pyloric, supraduodenal and cystic arteries. One has only to compare the arterial blood of the liver with the arterial blood sent to the spleen or kidney, the latter two organs performing their functions in the presence of an adequate or ample oxygenated blood. The liver, on the contrary, performs all of its functions upon the blood that is essentially nonoxygenated, as the liver cells receive blood only from derivatives of the portal vein, the hepatic artery supplying the walls of the blood vessels, the bile ducts and the liver capsule. It has not been definitely demonstrated whether any of the hepatic arterial blood goes beyond the interlobular septa; such transference of material from arterial blood to hepatic cells must be by osmosis and not by anatomic arterial canaliculi as the hepatic artery has no paralleling veins. Again, the venous blood entering the liver is diverse in its source and different in quality from ordinarily considered venous blood. The portal blood represents (1) from one-sixth to one-eighth of the splenic venous blood, deprived of most of its oxygen after passage through the spleen; (2) the mesenteric venous blood is surcharged with products of absorption from stomach, duodenum, pancreas, small intestine and the major portion of the large intestine. On the other hand, the hepatic veins carrying the blood from the liver to the vena cava, in addition to the above moities, has the venous equivalent of the hepatic arterial blood.
The functions of the liver are diverse and obscure but certain activities may be predicated at this time. The liver concerns itself with (1) the maintenance of a proper blood sugar level through the glycogen metabolism. In this activity there is apparently a reciprocal relationship with the pancreas. (2) The metabolism of protein as evidenced in the formation of urea, purin and amino-acid metabolism and the ammonia balance; (3) the metabolism of facts—the liver acting as a reservoir for fat storage; (4) the secretion and excretion of bile. In this connection its activity is manifested as a filter capable of removing broken down cellular detritus coming from the spleen; (5) elaboration of fibrinogen; (6) depurative function in destroying biotic elements and detoxifying biochimic or gastrointestinal deliterants.

The liver possesses marked regenerative properties. Since every liver cell is identical with its fellow it follows that there is no specialization of special cell groups for varied or specific purposes. Each cell the moment it is fully formed can function with all its properties. No other organ in the body exhibits such pronounced regenerative capacity. The rate of the repair of the liver is so rapid that fully 800 grams of liver grows in seven to nine days. Mann was able to excise 70 per cent of the liver with complete regeneration within a few months, the regeneration being so rapid and ample that there was no liver deficiency produced. In addition, a sufficient number of bile duets could be ligated so that 70 per cent of the biliary secretion was occluded without any impairment of liver function. The ligated portions of liver tissue undergoing connective tissue deposition and producing the histologic picture of biliary cirrhosis while the unligated portion of the liver underwent hyperplasia and regeneration so that hepatic function was undisturbed. MacMaster and Rous have determined that three-quarters of the ducts of the liver substance in dogs and monkeys can be obstructed without pigment or cholate accumulation and that tissue icterus did not result when nineteen-twentieths of the liver substance was placed in stasis.

Under stress of additional work other viscera undergo hypertrophy: the liver, however, makes up for deficiency of function by hyperplasia—a biologic characteristic preserved by no other organ in the human body. Any liver degeneration brought about by any offending agent induces two distinct changes in the liver. The one is fibrous tissue replacement, the other hepatic hyperplasia with compensatory degeneration. Widal contends that the liver exerts marked protopexic functions in its ability to transform peptones—proteases and disintegrating protein substances being found in the portal circulation during digestion. In the failure of this function there would escape into the general circulation some of these materials, producing a
Crise Hémoclasique, a syndrome due to a disturbance in the colloid balance of the blood and characterized by leucopenia, fall in blood pressure, increased blood coagulability and diminution in the refraction index of the blood serum. The application of this idea to clinical medicine suggested itself as a test for liver deficiencies, in that it would seem probable that the protopexic function would be diminished in liver disease and various hepatopathies might be clinically estimated by the loss of this function. "In the few instances of sudden death following Talma operation Kretz attributed the fatal outcome of the sudden flooding of the circulation with substance which otherwise would have been detoxified in the liver. These deaths must, therefore, be considered analogous to those that occurred in Eek fistula in dogs." 36

Central necrosis of the liver is in some way related to pancreatic activity. A liver injured in some way seems to be hypersensitive to trypsin and clinically we have found the coexistence of central necrosis and pancreatic fat necrosis, a condition that has also been observed experimentally. According to Fischler 27 death in central necrosis of the liver results from a flooding of the circulation with liver biproducts due to the action of trypsin and represents a death from split protein intoxication.

In studying the collective work of the abdominal surgeons* at the New York Post-Graduate Hospital in connection with gall-bladder surgery we were early impressed with a series of deaths and complications that could in no way be attributed to the factors that ordinarily produce death in this class of surgery. The character of these mortalities or some of the complications which ensued and did not result in death led us to believe that there was a gross disturbance in the protective function ordinarily exerted by the liver. We began to study these cases with greater care from the clinical and biochemic standpoint as well as the occasional necropsy findings. One ordinarily expects that when a mortality follows an operation upon the external biliary passage that it would be associated with the development of shock, hemorrhage, cholema, gastric dilatation and later possibly the development of peritonitis, the latter being the most infrequent lethal complication.

Eliminating the deaths that might be properly attributed to any or all of these causes there still remained a small group of mortalities that could not be explained upon the basis of any one of these causative factors. We have been careful to eliminate the possibility of renal complications and in the case groups about to be reported this factor was not present, as the preliminary urinary and blood

*Services of Dr. John F. Erdmann, Dr. Edward W. Peterson and Dr. Charles Gordon Heyd.
study had assured us as to the physiologic competency of the kidneys before operation. However, with the development of "hepatic insufficiency" there was manifest the blood and urinary findings highly suggestive of an acute irritative nephritis. These cases represented apparently properly selected individuals capable of sustaining the traumatism of a laparotomy. They all exhibited manifest disease of the gall-bladder or external biliary passages, or of the appendix or of ulceration or cancer of the gastrointestinal tract. We have been able roughly to classify three main types of clinical conditions that have occasionally followed laparotomy directed to the cure of pathologic affections of the abdomen. The first type presents a clinical picture of a postoperative vasomotor depression of an extreme degree and occurring too late to be interpreted as surgical shock. The patient ordinarily has been behaving quite as usual following an operation of cholecystectomy or drainage of the common duct. At the end of twenty-four to thirty-six hours, without any apparent reason, the patient passes into a pronounced state of vasomotor collapse, with cold, clammy extremities, wet, moist and leaking skin, a very much stimulated mentality and a facial expression not unlike the facies of fear. The condition is not associated with dilatation of the stomach and there has been ample evidence of kidney function. The intravenous administration of a ten per cent solution of glucose, 1000 c.e., every four to six hours, and continuous Murphy proctoclysis with tap water has usually brought about a recovery. It is interesting to note that when this type of complication occurs it has usually been in cases that have had a previous operation upon the gall-bladder, and at the second operation have had drainage of the common duct with palpatory or manual manipulation of the pancreas. For want of a better explanation we have interpreted this type of picture as due to some pancreatic toxin or ferment as the result of the surgical trauma with inadequate liver detoxification.

A second type of clinical picture occurs after a varying period of time, usually the fifth day, in patients who have had a comparatively simple gall-bladder operation but who have been chronically jaundiced. A normal convalescence has been progressing up to the time of the onset of a slight degree of somnolence. They may or may not have lost large quantities of bile through external drainage. They slowly become stuporous and in the course of twelve to twenty-four hours pass into coma. The temperature rises to 103 or 104; kidney function has been adequate previously. There is no evidence of infection with the abdomen and the condition is not one of dehydration following too rapid loss of bile through the drainage tube. Nor has there been any increase in the obstructive cholangitis if this were
present previous to operation. We have here a condition not unlike
the coma of cholemia in a patient who is adequately drained and who
has had no further increase of obstructive jaundice. We have fed
these patients their own bile, either by allowing them to drink it or
by giving it by stomach tube and have not prevented the fatal out-
come by these procedures. This condition is essentially a coma, oc-
curring in a patient with a diminishing obstructive jaundice. Are we
dealing with a frank case of liver exhaustion similar to the terminal
stages of a portal cirrhosis or an acute yellow atrophy of the liver?

Less frequently we have observed a third type of clinical picture
that supervenes immediately after operations on the gall-bladder. This
type is infrequent and it is interesting to note that it has occurred
after rather simple types of operations on the biliary apparatus. This
lethal complication has terminated, however, a long history of gall-
bladder or biliary duct infection. These patients, as a rule, have not
been jaundiced. The clinical onset is characterized by the onset of
coma almost immediately following operation. The patient ordinarily
does not recover from the anesthesia, a fact that should be noted.
The temperature rises to 104 or 105, with marked acceleration of
pulse, usually subsultus tendinum, earphology and talking delirium,
and more rarely marked motor excitation. Chemical tests of the blood
before operation demonstrated that kidney function was adequate and
within normal limits. Spinal puncture after the onset of coma has
revealed an increase in fluid under pressure, cell count of 10 to 15 per
eubic mm., with two plus globulin reaction and negative Wassermann
examination.

Whether the liver is primarily at fault in the three clinical condi-
tions that I have outlined we do not know. The liver reacts to long
continued or habitual toxic irritation by two pathologic processes, one
the degeneration of liver cells and the other the proliferation of con-
nective tissue. These processes apparently go on simultaneously, and
as to which is secondary is of academic interest only. Certain it is
that degenerating areas are replaced by connective tissue and in-
tracellular material, and that by replacement or contraction there is
atrophy of liver parenchyma. It does seem reasonable, however, to
assume that they are in some way associated with liver dysfunction.
In their terminal manifestations they simulate in many ways the
clinical conditions that are observed in diseases of the liver where
there is a manifest loss of liver function. It is interesting to speculate
whether there are not conditions of liver insufficiency which give a
variety of minor symptoms, or that may exist without any symptoms
for a long period of time by reason of the marked regenerative prop-
erty of liver tissue. From the viewpoint of surgical prognosis may
we not claim that these unrecognized cases of hepatitis are the cause
of some of our unexplained mortalities and that contribute much to the morbidity that sometimes follows apparently the most successful type of surgical intervention? We believe that when an infection is once initiated within the abdomen and its course is chronic that the liver reacts in a variety of ways, but always with some degree of hepatic degeneration, and that in a certain proportion of cases surgical intervention in these cases is associated or followed by death due primarily to hepatic insufficiency.

**PATHOLOGIC DISCUSSION (DR. MACNEAL)**

The liver, as has long been known, is subject to acute purulent inflammations, secondary to severe purulent disease in the intestinal tract or in the gall-bladder and bile ducts. In the former instance the infectious agent evidently passes into the tributaries of the portal vein, frequently with evidence of thrombophlebitis, and reaches the branches of the portal vein in the liver substance, giving rise to multiple abscesses. When the primary disease is in the bile passages, on the other hand, the infection appears to ascend along the tributaries of the hepatic duct and the lymph channels accompanying these ducts, giving rise to multiple abscesses similarly distributed as in the first instance, but often containing brownish pus discolored by admixture of bile.

It is also well known that the liver is subject to very profound alteration of its structure as a result of slowly progressive inflammatory change, finally resulting in great diminution of the specific liver parenchyma and a more or less marked increase of the fibrous tissue of the capsule and the interlobular trabeculae. The etiology of these changes, which are designated by the general term, cirrhosis, is still somewhat obscure. In the atrophic cirrhosis of Laennec, the liver may become very small before death takes place. Here the injury is thought to be derived from the digestive tract, reaching the liver through the portal vein, and in some instances alcohol appears to have acted as the toxic agent. Contrasted with this is another well defined type of cirrhosis, which follows upon chronic bile stasis and prolonged inflammation of the bile passages, known as biliary cirrhosis. Here there results an early interlobular and intralobular overgrowth of connective tissue, proceeding from the vicinity of the bile ducts. After a time such a liver also shrinks and becomes nodular, finally resembling the liver of atrophic cirrhosis.

It is also well established that the liver participates in a great variety of general diseases, especially the severe infections and intoxications. In the acute stage of these one finds a round-celled infiltration of the interlobular connective tissue, degenerative changes
in the liver columns, focal necrosis, or even massive necrosis of the liver substance.

Even in the absence of serious disease, the liver tends to become firmer with age, the interlobular and intralobular framework becoming gradually thickened while there is a relative or even absolute diminution of the parenchymatous elements with advancing years.

If the above statements be accepted as a hasty presentation of the better established conceptions in regard to liver inflammations, it will be evident that, in the present discussion, we are dealing with the more delicate shades of hepatic alteration, not those seen at autopsy in the body dead of severe infection, local or generalized, nor those of advanced atrophic cirrhosis, but rather those slighter alterations in the liver which have given rise to no clearly recognizable symptoms or signs, but may be regarded as accidental or incidental anatomic findings in patients whose abdomens have been opened on account of active or quiescent disease of variable degrees of severity, affecting other organs. Under such circumstances an etiologic diagnosis of the liver condition is extremely hazardous and only the very bold may be expected to recognize with assurance in an individual instance a clear-cut relationship between the liver changes and the changes in other abdominal viscera. Without additional evidence one should regard the observations only as suggestive of such a relationship. In a field as obscure as this, however, even suggestive observations are of some value.

The liver alteration visible to the eye of the operator is usually an enlargement of the organ with rounding of its margins. The enlargement is often general but frequently the right lobe or a portion of the right lobe near the gall-bladder may be disproportionately enlarged. One may also see opaque bands of fibrosis in the liver substance near the gall-bladder. This enlargement is evidently in part due to excess of fluid in the liver, congestion and edema, especially when there is an active inflammatory lesion in the gall-bladder or in the portal territory. In many instances and especially when the enlargement is localized, it is evidently the result of growth of liver substance. Apparently pressure of the body wall and of the internal organs influences to some extent the form of this overgrowth. In a minority of instances, the liver appears smaller and firmer than normal, suggesting an early atrophic cirrhosis. This condition may be regarded as a later stage of the process. Liver changes belonging in this category are so constantly observed in association with disease of the gall-bladder that a relationship between the two groups may be accepted as established.

Under the microscope one sees, in the soft swollen livers, a general dilatation of the vascular channels and a rich infiltration of the con-
nective tissue trabeculae by lymphocytes and smaller numbers of polymuclear leucocytes. (Fig. 1.) In the more acute inflammations, the endothelial lining of the capillaries may be visibly thickened. In the irregularly enlarged livers, the microscope reveals definite fibrous thickening of the connective tissue trabeculae and usually an excess of small bile ducts in this tissue. Lymphocytic infiltration of it is more or less marked, apparently depending upon the presence or absence of exacerbation of the inflammatory process. Liver lobules of irregular form and arrangement may be recognized and they doubtless indicate actual growth of liver substance. The firm smaller livers reveal, under the microscope, a still more marked excess of fibrous tissue in the trabeculae. (Fig. 2.) Here the lobules may appear compressed with only narrow vascular channels. One may willingly agree
that these three pictures represent stages of a single process, beginning with an acute phase of congestion, edema and exudation, going on to hyperplasia of liver tissue with repeated subsidence and recrudescence of the acute phase and eventually leading to marked over-production of connective tissue, by contraction of which the parenchyma becomes irregularly compressed (Fig. 3). It should be noted, however, that even when the appendix has shown evidence of prolonged severe inflammation with adhesions all about it, or when the gall-

![Image](https://example.com/image.png)

**Fig. 2.—**No. 25128, female, aged twenty-four: operative diagnosis, appendicitis, chronic; cecum mobile; operation, appendectomy, cecoplication. Gall-bladder negative except for more than normal vascularization. Sections of liver show considerable thickening with trabeculae of Glisson's capsule. Fibrous tissue is dense and hyaline, contains only a moderate excess of round cells. There is a moderate amount of brown pigment in the liver cells. The picture resembles the early stage of biliary cirrhosis but the hyaline character of the trabeculae shows that the process has existed for many months. Pathologic diagnosis; moderate biliary cirrhosis. *(B)* Bile ducts. *(V)* Portal branches.

bladder has been the seat of similar long standing severe inflammation, the liver has not exhibited the very advanced diffuse alteration characteristic of atrophic cirrhosis (Fig. 4). Indeed the liver appears to withstand remarkably well the insults repeatedly coming to it from these sources, so that one is impelled to look farther for the explanation of the origin of more serious hepatic disease. The im-
Importance of general disease, such as syphilis, tuberculosis and prolonged suppurations of distant parts as causes of liver pathology, is not, therefore, eclipsed by the observations on hepatitis now under consideration. It is, however, quite possible that chronic gall-bladder suppuration might, of itself, induce a high grade of cirrhosis, but certainly such an association appears to be relatively infrequent.

BIOCHEMICAL DISCUSSION (Dr. Killian)

We have been fortunate in being able to study from a chemical point of view the last six cases of the third clinical group of Dr. Heyd.

![Fig. 3. No. 24682, female, aged fifty: Operative diagnosis, cholecystitis, subacute; cholelithiasis, appendicitis, chronic; operation, cholecystectomy, appendectomy. Gall-bladder opaque, white walls, markedly thickened; contains 150 calculi sulphur colored. Sections of the liver show marked thickening of the fibrous trabeculae and occasional dense collections of round cells. Hyperplasia of bile ducts. Pathologic diagnosis, chronic interstitial hepatitis bearing some resemblance to that of Laennec's cirrhosis. (B) Bile ducts. (V) Portal branches.](image)

Of outstanding interest has been the observation that these patients show a carbon dioxide combining power markedly increased above the normal, representing 81 to 100 volumes per cent (Table I). This has not been due to the previous administration of alkalines and the condition has been designated chemically as an alkalosis. So far as its fatal outcome is concerned it is much more pernicious than an
acidosis. Of the six cases recently studied four terminated fatally and all of these were instances of chronic disease of the gall-bladder with simple operations. It has been determined that this increased

<table>
<thead>
<tr>
<th>Threshold of Alkalosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid $\times 10^{-3}$</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>Alkaline</td>
</tr>
<tr>
<td>CO$_2$ combining power</td>
</tr>
</tbody>
</table>

An increase in the carbon dioxide combining power toward 80 indicates an alkalosis; the reverse, an acidosis.

---

Fig. 4.—No. 28833, male, aged forty-six: operative diagnosis, cholecystitis, subacute; cholelithiasis, appendicitis, subacute; operation, cholecystectomy, appendectomy. Gall-bladder dirty brown color; about 400 fine sulphur colored calculi. Pancreas, abnormal hardness. Sections of gall-bladder muscle bundles irregularly thickened; in some places the muscle layer attains thickness of 1 mm. Sections of liver show very definite increase in fibrous tissue in the trabeculae of Glisson’s capsule. The fibrous tissue is dense and evidently of considerable standing; contains an excess of round cells with very conspicuous bile ducts. Pathologic diagnosis, chronic interstitial hepatitis, evidently of biliary origin. (B) Bile ducts. (V) Portal branches.

carbon dioxide combining power is associated with a decreased hydrogen-ion concentration, and hence a true alkalosis exists.

For the observation of the chemical changes in the blood coincident
### Table II

**Chemical Blood Changes in Diseases of Liver and Gall-Bladder**

<table>
<thead>
<tr>
<th>NO.</th>
<th>PATIENT</th>
<th>AGE</th>
<th>SEX</th>
<th>NON-PROTEIN N</th>
<th>UREA N</th>
<th>URIC ACID</th>
<th>SUGAR</th>
<th>GLYCO-SUGAR</th>
<th>CHOLESTEROL</th>
<th>FIBRIN</th>
<th>CHLORIDES</th>
<th>CO₂C.P.</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.D.</td>
<td>38</td>
<td>F.</td>
<td>54.7</td>
<td>10.1</td>
<td>4.2</td>
<td>0.093</td>
<td>20.4</td>
<td>0.146</td>
<td>0.53</td>
<td>47.1</td>
<td></td>
<td>Cholecystitis. No jaundice.</td>
</tr>
<tr>
<td>2</td>
<td>N.M.</td>
<td>52</td>
<td>F.</td>
<td>46.0</td>
<td>22.1</td>
<td>4.1</td>
<td>0.227</td>
<td></td>
<td>0.428</td>
<td>0.350</td>
<td>80.5</td>
<td>98.0</td>
<td>Cholecystitis. 24 hours after operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>38.5</td>
<td>19.1</td>
<td>3.6</td>
<td>0.093</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49.0</td>
<td>Na H CO₃ given by rectum.</td>
</tr>
<tr>
<td>3</td>
<td>M.K.</td>
<td>60</td>
<td>M.</td>
<td>45.0</td>
<td>16.3</td>
<td></td>
<td>0.150</td>
<td>0.290</td>
<td>0.357</td>
<td></td>
<td></td>
<td></td>
<td>Na H CO₃ discontinued. HCL by mouth.</td>
</tr>
<tr>
<td>4</td>
<td>L.Z.</td>
<td>57</td>
<td>F.</td>
<td>40.5</td>
<td>11.9</td>
<td>3.7</td>
<td>0.082</td>
<td>20.4</td>
<td>0.932</td>
<td>0.475</td>
<td>46.2</td>
<td></td>
<td>One week later.</td>
</tr>
<tr>
<td>5</td>
<td>H.T.</td>
<td>28</td>
<td>F.</td>
<td>40.7</td>
<td>11.0</td>
<td>3.7</td>
<td>0.091</td>
<td>16.0</td>
<td>0.545</td>
<td></td>
<td></td>
<td></td>
<td>Ca. of liver. Marked jaundice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37.5</td>
<td>11.7</td>
<td>3.3</td>
<td>0.098</td>
<td>0.182</td>
<td>0.364</td>
<td></td>
<td></td>
<td></td>
<td>Cholecystitis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44.1</td>
<td>12.3</td>
<td>3.7</td>
<td>0.098</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Marked jaundice. Obstruction of common bile duct.</td>
</tr>
<tr>
<td>6</td>
<td>A.J.</td>
<td>42</td>
<td>F.</td>
<td>43.6</td>
<td>14.4</td>
<td>4.3</td>
<td>0.300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>47.1</td>
<td>Two weeks after removal of obstruction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Three months later. Patient improved.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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with diseases of the liver and gall-bladder, seventeen cases have been studied, of which twelve are reported in the table (Table II). It will be seen that in many of these cases the nonprotein nitrogen exceeds the upper normal level of 30 mg. per 100 c.c. The urea nitrogen on the contrary does not show a corresponding increase, in fact, in some instances it is subnormal. These findings would indicate a corresponding increase in the rest nitrogen. Little is known concerning the nature of the compounds constituting the rest nitrogen of the blood, but we believe an intensive study of the nonprotein nitrogen partition of the blood will tell us more than we know at the present time concerning liver function. The normal uric acid content of the blood is from 3 to 4 mg. per 100 c.c. In a few instances an increase in the uric acid is noted. There are many reasons for attributing this increased uric acid to a mild secondary impairment of renal function. The normal blood sugar ranges from 0.09 to 0.120 per cent. In many cases of gall-bladder disease we find a mild hyperglycemia from 0.140 to 0.200 per cent. Associated with this increased blood sugar is an increased activity of the blood diastase. It is well known that the pancreas regulates the activity of this blood enzyme and an inhibition of pancreatic function entails an abnormal diastatic activity. Apparently, then, the increased blood sugar sometimes encountered in gall-bladder disease may find its cause in an associated disturbance of pancreatic function. On the other hand, in two cases we have found slight hypoglycemias. The reason for these hypoglycemias remains still a baffling question.

An increase in the cholesterol content of the blood has been observed in cases of obstruction in the biliary tract whether this obstruction is due to calculi, new growth or other mechanical means. The findings of Case 5 are of particular interest in this connection. At the time of entrance to the hospital this patient showed a blood cholesterol of 0.952 per cent and this was associated with a pronounced jaundice. At laparotomy it was found that during a previous operation for gall-bladder disease the common bile duct had been resected. The gall-bladder was drained by means of a rubber tube into the duodenum. Two weeks later the cholesterol had diminished to 0.545 per cent and three months after operation had reached 0.182 per cent. At this time the patient showed but slight evidence of jaundice.

Since the liver has been regarded by some authorities as the site of formation of the fibrinogen of the blood, the fibrin content of the blood was studied in some cases. A few of these results are reported in the table. The normal fibrin content of the blood varies from 0.2 to 0.5 per cent. It will be seen that the figures fall well within the normal limits. These findings are of interest inasmuch as many of these cases manifested a delayed coagulation time. The calcium con-
tent of the blood sera of these patients was also determined. The calcium was found to be normal. This fact, however, does not contraindicate the use of dilute solutions of calcium chloride to decrease the coagulation time because for the process of clotting ionizable calcium is essential. When the total calcium of the blood serum has been determined there is no means of ascertaining the amount of this element that is ionizable. The chloride content of the blood was found to be normal except in those cases showing an increased CO₂ combining power. Here a decrease of the chloride concentration was noted.

BIBLIOGRAPHY


DISCUSSION

DR. GEORGE W. CRILE, CLEVELAND, OHIO.—I would like to ask a few questions. First, whether during the time these observations were made the temperature ranged high or low. Second, whether the pathologist noted any relation to the changes that take place in the intracellular structures of the blood vessels, the connective tissue, etc. Third, whether he noticed a change in the stainability of the cells of the liver themselves, and whether the acid alkali balance changed.

I saw many pale areas in the liver which might possibly be thus interpreted.

DR. JAMES E. DAVIS, DETROIT, MICH.—I want to ask one or two questions. First, whether lysis of cells in the liver tissue has been controlled; or, in other words, how long after removal of the tissue was complete preservation established?

It is a common observation in general septic conditions within the abdomen to see not only changes similar to the ones we have had pictured in the liver but in the spleen, in the kidney, and in a lesser degree in other tissues. I should like to ask if any observations have been made as to whether the conditions were primarily in the liver or did they show first in other tissues?
DR. W. WAYNE BABCOCK, PHILADELPHIA, PA.—I should like to ask a question with regard to the calcium content of the blood, which usually does not show a reduction corresponding with the reduced coagulation point. Nevertheless, the intravenous use of calcium chloride has been advocated in hepatic and pancreatic disease with a tendency to hemorrhage, and Dr. William J. Mayo had called our attention to the fact that following the use of this drug, operations for these conditions have shown a lessening in mortality of 50 per cent. Is this injection of real value?

In a few cases, using 200 to 500 c.c. of a 2 per cent solution of calcium chloride, I have seen marked improvement follow, but was the improvement due to the calcium? In a supposedly hopeless case of hemorrhagic pancreatitis and in a case of sudden collapse after cholecystectomy the patients rapidly revived after the injection. The dilute solution seems safer to use and less prone to cause a severe reaction than the concentrated solution usually employed. It is possible that our patients would have improved from a simple saline injection.

DR. HEYD (closing).—We found out that there was a difference in the staining affinities in liver cells, alkalization showing in the protoplasm. I personally carried the specimens to the laboratory within two or three minutes after completion of the operation. They were in an excellent state of preservation. We have used calcium chloride in gastric hemorrhage and in chronic jaundice. We have used both the 2 per cent and 5 per cent solution and, as a rule, after the 5 per cent as after the 2 per cent obtained the same reaction.
DIVERTICULA AND DIVERTICULITIS

BY JEROME M. LYNCH, M.D., NEW YORK CITY, N. Y.

DIVERTICULITIS and diverticulosis have been frequently mentioned in medical literature for the last sixty years, but little attention was paid to this condition until Graser’s paper appeared.

Sir Charles Ball, in the early eighties, described several cases that had come under his observation or had been seen by his associates. A remarkably good drawing is shown in his book of a specimen he removed at autopsy. He tells us that while pathology is not infrequent, he felt there was no reason why a diverticulum which became inflamed should not have the same pathology as appendicitis; and, in substantiation, relates a case brought to one of his colleagues, in which an inflamed diverticulum became attached to the bladder, resulting in a fistula.

 Practically nothing has since been written that goes any further than Ball, though one must appreciate the lucid and instructive paper of Telling, and the learned contribution of Edwin Beer.

And while almost every paper published on this subject considers the cause, I do not find any additional light since Telling’s paper appeared.

Diverticula have always been divided into the true and the false. The true diverticula, accepted as of congenital origin, contain all the coats of the bowel and usually occur in certain areas where diverticulation is physiologic; that is, in the region of the fundus of the stomach, the duodenum and the cecum. As you know, the fundus of the stomach is developed as an outgrowth from the dorsal border, its origin being somewhat similar to that of the cecum. In the region of the duodenum there is an outbudding to form the pancreas and the liver. About the last of the first month of fetal life a diverticulum appears on the posterior limb of the U-shaped tube, which later goes to form the cecum and appendix.

Later on, the cecum, when it becomes differentiated from the appendix, is developed by diverticulation. Another diverticulum which frequently remains to give trouble is that which is known as “Meckel’s,” which is the remnant of the neck of the yolk sac. This occurs in about 2 per cent of cases; but the importance of diverticula of the colon is confined to that variety which is supposed to be acquired.

The factors that are supposedly the cause of diverticulation are, so far as they have appeared in the literature, increased pressure within the bowel, weakening of the muscular tone of the bowel wall as a whole, in fact any factor which brings about weak spots in the bowel through which a herniation of the mucosa might occur; also excessive fat.
All seem to agree that increased pressure within the bowel is the most potent contributing cause of diverticulosis. Without due deliberation, this would seem to be a natural inference; but, on more critical study one is not inclined to take this for granted. It seems unique that gaseous distention of the bowel should be segmental and especially pronounced in the region of the sigmoid. My own experience is that gaseousness is more pronounced in the cecocolon than in the sigmoid.

It has been shown that when the bowel ruptures under pressure, it is always in the long axis; it would therefore seem that if the pressure was sufficient to cause herniation of the mucosa we might expect rupture instead of herniation.

Since diverticulosis occurs more frequently in people over forty, writers seem to infer that the weakening of the muscular tone, a frequent accompaniment of old age, must necessarily be a potent factor in the formation of diverticuli.

There are many cases in the literature of diverticulosis in children, and while this is not proof of congenital origin of diverticulosis, it is significant. We have all seen cases of megacolon where the conditions are such as have been assigned as causative factors in diverticulosis; but in no instance, to my knowledge, has diverticulosis been found associated with megacolon.

The influence of obesity by bringing about a general weakening of the muscleature and providing a series of spots of lowered resistance to pressure from within, especially opposite the appendices epiploicae, allows the mucous membrane to herniate through these weak spots. Bland-Sutton has pointed out that the submucous fat is continuous with that of the appendices epiploicae and so exerts a directly predisposing effect on these hernial out-pushings. In addition to this, Telling has suggested that where the blood vessels penetrate there is a relative weakness of the muscular wall, and that as the blood vessels are constantly subject to change in calibre, herniation might occur at this point. He does not mention, what seems to me, the most important fact, that wherever a blood vessel penetrates muscular tissue it is surrounded by a connective tissue tunnel. We all know that there is a great variation in the quality of connective tissue in individuals, and that as connective tissue holds all the muscular bundles together and influences the tone of muscle we might infer that diverticulosis is the result of a poor quality of connective tissue, which by easily giving way under pressure might permit herniation of the mucosa.

This, however, offers a fertile field for investigation. Lewis has pointed out that extension of the intestinal glands of Lieberkuhn through the muscularis mucosa in relation with lymph nodules, is a common occurrence during fetal life. The distal diverticula with the fork-shaped glands are primary submucous glands, which become surrounded by lymphoid tissue, and he believes that it is quite possible that these
In support of this is the fact that in many instances diverticula have been found in a number of young children and this should offer some support to the congenital theory of diverticulitis.

I do not wish it understood that I believe that I have proved or disproved anything. I do feel, however, that there is almost as much support on one side as the other, and I hope by offering some proof of the congenital origin of diverticula I may stimulate investigation as to the cause of this very interesting condition. In my opinion, causes so far assigned to diverticulosis should be accepted with some reserve. Is it not much more reasonable to suppose that the glands of Lieberkuhn have so deeply penetrated the bowel beyond the usual depth that they form pockets, which, under pressure, plus a poor quality of connective tissue, may give rise to herniation of the mucous membrane and form diverticula? Taking for granted the presence of diverticula, one can readily see the possibilities of a secondary pathology. This may be brought about by bacteria passing through a very thin membrane. Here we have leading from the inside of the bowel narrow necks ending in dilated, flask-like pouches outside of the intestine. The outside or dilated portion is formed of mucous membrane and peritoneum.

At first the sac may be so thin as to permit the bacteria to filter through, resulting in a local peritonitis without perforation, or as happens in appendicitis, the sac may rupture, giving rise to a local abscess or a general peritonitis.

Owing to a low grade inflammation with ulceration, we may have a proliferation rather than a destruction of tissue, resulting in a tumor formation somewhat similar to that seen in hyperplastic tuberculosis and ending in a stenosis of the bowel. This is not an infrequent occurrence and is one that is often mistaken for carcinoma. In this type of inflammation, which leads to the formation of a definite, tumor-like mass, in which the diverticuli are buried in fibrous tissue, it is impossible (except microscopically) to distinguish between benignancy and malignancy.

It has been stated that the fact that a history can be obtained of long standing trouble on the left side, which perhaps has been substantiated by proctoscopic examination, it is evidence of diverticulitis rather than carcinoma. This is an error. In the first place, one can never tell when a carcinoma may become implanted on any chronic inflammation. I have known carcinoma to become ingrafted on structures that I have observed for ten years. And I have known of many instances, four in my own practice, where both carcinoma and diverticulitis co-existed.

In the 116 cases seen at the Mayo clinic, malignancy was found in 14. In 12 of my cases, 4 were malignant.

The formation of adhesions between the sigmoid and other visera,
such as the small intestine and the bladder, not infrequently happens. In one of my cases a patient was sent to the hospital suffering from intestinal obstruction; at operation we found a diverticulum had become adherent to a loop of small intestine and the inflammation from this contact was the cause of the obstruction. In another case a loop of small bowel had become incarcerated in a hernia, and though this woman had had diverticulosis (probably of long standing), it was only discovered because of the obstruction.

The sigmoid is the most variable organ in the body. It may attain an enormous size. This gives it a wide range of mobility, so that it may become adherent to any organ to which it may reach. I have seen it adherent to the cecum, appendix, bladder, uterus and broad ligaments. With this fact in view we can readily imagine that, in case of diverticulitis, it might form, not alone adhesions, but also abscesses. No one of these, however, would prove as far-reaching and serious as its attachment to the bladder. And this, unfortunately, happens not infrequently. The first evidence of trouble may be, as has happened twice in my practice, the passage of gas through the penis, followed later by feces and pus. A case of adhesion of different loops of the sigmoid to one another, with the co-existence of severe inflammation resulting in the matting together of the sigmoid eventually followed by obstruction, came under my observation in one instance. This patient had hallucinations and delusions which immediately cleared up after an ileostomy had been performed. She died a year later from carcinoma. I was able to obtain an autopsy, which showed a carcinoma engrafted on an old diverticulum.

Perforation of the diverticulum occurred in a patient I saw in consultation. In this instance I was able to make the diagnosis of diverticulitis previous to the perforation. I suggested at the time a colostomy. This was refused and a week later perforation occurred with general peritonitis and death.

Many cases are recorded of perforation of a diverticulum, but not in all cases are they necessarily fatal. Just as in appendicitis, the acuteness of the onset and the virulence of the infection are very often determining factors in the subsequent course of the disease.

A diverticulum may become distended from fecal matter and the feces become inspissated without resulting in ulceration, and subsequently from a twisting of its pedicle become detached from the bowel to roam around the abdominal cavity as a foreign body.

Telling reports a case of metastatic suppuration in the liver in one instance. Severe hemorrhages, the result, I imagine, of ulceration involving a small artery, occurred in a case of diverticulitis I saw in consultation.

Chronic inflammation of the mesentery, with thickening and shortening of this attachment resulting in angulation and deformity has
been known to follow diverticulitis of the sigmoid. Of course this occurs in other conditions, as I have seen it happen in nonspecific inflammation of the colon and there is no reason why it should not occur in the specific infections. Indeed, when I come to think of it, the formation of intramural abscesses in the nonspecific inflammations are of frequent occurrence. In fact, perforation occurred in one case I recall.

The clinical aspects of diverticulitis are duplicated by appendicitis, except that the symptoms are located on the left instead of the right side; so-called left-sided appendicitis.

The differential diagnosis between diverticulitis and nonspecific inflammations of the bowel, with metastatic abscesses, followed by sigmoiditis, may be difficult. However, in the majority of cases, these can be distinguished by a proctoscopic examination supplemented by the x-ray. In the majority of instances the nonspecific inflammation of the bowel is limited to the mucosa, so that there is little difficulty in separating one from the other.

Peritonitis occurring on the left side as a result of pelvic inflammations and ovarian strangulation may be difficult to distinguish, particularly if the sigmoid has become adherent to the adnexa; but the diagnosis can usually be cleared up by a vaginal examination.

Dysentery may, but is not likely to be confounded with diverticulitis. Examination of the stool will show ameba if present.

The acute fulminating type, which is not infrequent, especially when associated with a constricting carcinoma, may give no previous warning of the existence of any pathology until a rupture of the bowel takes place. Two very interesting cases of this description were recently reported in the British Journal of Surgery.

We must always bear in mind the possibility of such happenings as the result of constricting carcinoma, without diverticulitis; but this same ending has occurred in nonspecific inflammation.

In nonspecific inflammation we usually have a history of long standing diarrhea, with blood and pus in the stools, and as the symptoms are much more acute and the diarrhea prolonged there is ample time to distinguish between the two.

As tuberculosis of the bowel is usually secondary to tuberculosis in some other part of the body, and as a patient suffering from tuberculous colitis loses flesh very rapidly, it is not commonly confounded with diverticulitis. There is a form of tuberculosi, namely hyperplastic, which we find difficult to differentiate from both peridiverticulitis and carcinoma. Indeed, only in a microscopic examination can we put confidence.

One thing that has impressed me is the fact that though diverticulosis occasionally involves the entire colon, I have never seen, nor can
I remember that it has been mentioned in literature that diverticulitis has occurred in any region but the sigmoid. I do recall one instance of intussusception which was the result of an inverted diverticulum of the cecum and this brings up a very interesting problem as to why pathology so frequently follows diverticulosis in the sigmoid. I believe it is due to the great size, mobility and frequent change of position of this organ, and possibly injury, due to hard fecal matter, may be the root of inflammation in this region. Again, the greatest pressure is exerted in the region of the sigmoid, it being forced into the pelvis where the diaphragm is fixed.

Treatment.—The treatment of diverticulitis should be conservative. When an acute abscess occurs the same treatment applies as in any other part of the abdominal cavity. A stoma is always indicated preliminary to any radical procedure, and it is needless to mention that it should be placed as far as possible from the seat of inflammation. A stoma, by directing the fecal current, prevents further infection, allows the patient to recuperate and puts him in the best position for subsequent radical procedure.
CUTTING THE ILEOCECAL FOLD AS A ROUTINE MEASURE IN THE OPERATION FOR APPENDICITIS

BY GEORGE F. CHANDLER, M.D., F.A.C.S., KINGSTON, N. Y.

EVERY active physician or surgeon often sees a patient with symptoms referable to the alimentary tract that bring to his mind a definite condition located in the right iliac fossa.

The patient states that she has vague distress in the abdomen before or after eating. Food doesn’t seem to make much difference, but she is troubled with gas, or a feeling of fullness from time to time which may often be relieved by “breaking up gas,” as she expresses it. Constipation is present as a rule and the appetite often is excessive. There is also an occasional feeling of weight or a certain amount of tenderness which is increased to actual pain at times in the right and lower part of her abdomen. The patient does not look very healthful and is usually inclined to be of the type we speak of as having nervous irritability commonly known as neurasthenia.

On questioning it will be found that for the past few years there have been attacks of sharp pain, usually lancinating in character, to the right of the navel followed by some soreness which is attributed to colic from some indiscretion in diet. These attacks of pain have occurred at any time of the day.

The patient has never been awakened at night by a sharp pain in the epigastrium so characteristic of ulcer of the stomach, nor ever noticed that she is bloated an hour or more after eating, as in cholecystitis.

On physical examination, after eliminating lesions of the gall bladder, ureter, pelvis, etc., everything will be found normal except that there is an area of tympany, unusually extensive, over the cecum, with some gurgling, and on deep pressure in this region a tenderness which will often make her wince. What is to be done for such a case?

A diet of thoroughly cooked food, the refusal of raw milk, soups and greases, with some form of alkaline therapy, and attention to the bowels may relieve, but as a rule these cases are not benefited much by treatment. They go from doctor to doctor in search of relief.

Dr. Alfred Taylor, in a very able paper read before the Quiz Medical Society of New York, stated that one out of every five fetuses examined showed that this number of individuals were born with bands or cobweblike membranes and the like in the region of the ileocecal valve. In other words, the so-called Jackson’s membrane, Lane’s kink and other abnormalities seem to be present as a result of imperfect
development (before birth). Some authorities claim that they are the result of inflammation.

These abnormalities have been elucidated by Dr. William Mayo. The point that I am trying to bring out is that the symptoms these patients have are due to a mechanical fault, therefore the treatment logically must be mechanical in nature.

Dr. A. Rendle Short says, "We are coming to look upon the stomach and intestines as resembling a canal system with lock-gates connected by telephone, so that the state of traffic at one lock has an influence upon the rate at which boats are allowed through the locks above and below." According to Keith, there are seven sphincters or locks in the alimentary canal guarding the stomach and intestines, besides one at the junction of the pharynx and esophagus: (1) the cardia; (2) the pylorus; (3) the duodenojejunal flexure, with a special nerve-supply; (4) the ileocelecal "valve"; (5) the transverse colic sphincter; (6) the pelvirectal; (7) the anus.

In describing the ileoceleal valve it can be said that it is formed by an intussusception of the end of the ileum through an opening into the cecum with an overdevelopment of a fold of mucous membrane at its end. The intussusception is, of course, slight normally and the valve normally should be competent, with the fold of mucous membrane dropping over the end of the ileum, so as to protect it against the gas pressure formed by the digestion resulting from bacteria in the large intestine.

Dr. P. C. Coffey states that in some cases where there is marked constipation and gas dilatation of the cecum, a reverse peristalsis is set up, the normal intussusception thereby being reduced and the valve interfered with to such an extent that it allows the fetid gas of the large intestine to push back into the ileum producing reverse peristalsis in the small intestine also. Such patients, of course, have a great deal of distress.

These cases have been called "chronic appendicitis" or "recurrent appendicitis," for want of a better name, and are generally known to the laity as "appendicitis" without qualification. The patients frequently make their own diagnosis.

On studying the end results following the operation for such a condition as is usually performed, from the statistics of several well-known operators, I find that about 50 per cent to 60 per cent are permanently cured, 25 per cent bettered, and about 15 per cent to 25 per cent are not improved at all. At the hands of poor operators the percentage of failures must obviously be greater.

Up until about three years ago I had at least one-quarter or more of my cases return to me, and while they apparently were glad to be rid of their appendices, still I could not persuade them to say that they felt any better. I had removed the appendix, freed up a Lane's kink, if it was present, attended to the mechanics of a Jackson's membrane,
complicated the cecum if necessary, and could not see why some cases made an excellent recovery and cure while others did not.

I read a good many authors, experimented with glove fingers and rubber tubes, and finally came to this conclusion: That the fold, triangular in shape, containing some fatty tissue, which extends about an inch or more along the terminal end of the ileum, extending to the cecum, interfered with the proper function of the valve; that this fold kept the ileum from freely protruding into the cecum enough to allow the fold of mucous membrane to properly close the opening. Cunningham, in the last edition of his "Anatomy," calls this the ileocecal fold. It has been called the "bloodless fold of Treves," also, the ileoappendicular fold of Jonnesco.

I therefore began to cut this fold in the following way: By placing an artery clamp on the ileal side and another on the cecal side, with a pair of scissors I cut right through to the junction of the ileum with the cecum. In other words, cut from the middle of the base of this triangular fold to its apex and tie off each free segment with cat-gut, and remove the clamps. There is little vascular supply in this fold.

I now do this as a routine procedure in all cases of appendicitis that have not become gangrenous, and since the adoption of this little practice I have yet to have one patient return without benefit from the operation.

Of course, there are several factors that might be considered in my case. Practice makes perfect, and I probably disturb the patient less than I did some years ago. Possibly my diagnosis is better than it used to be, but still the results have been so markedly better in a sufficient number of cases now to make it worth while attributing the benefit to this act.

I have suggested this method to three or four other surgeons, the idea appealed to them and once having started it they now feel that they have not completed an operation for appendicitis without cutting this fold. They agree with me that it is mechanically correct, and the results are bearing out my contention.

I do not claim that this has never been done before, for probably it has, but I have never read of its being done as a routine. While it is a very little thing, still sometimes very far-reaching results come from simple acts.

11 East Chestnut Street.

DISCUSSION

DR. ROBERT T. MORRIS, New York City.—Many patients have symptoms referable to the right side of the abdomen. Often enough inertia of the ascending colon is the factor. Sometimes there is the long cecum described by Wilms that causes trouble. Fibroid degeneration of the appendix commonly disturbs the mechanism of the bowel on the right side. In view of these facts it would be
difficult to determine in advance the need for cutting the ileocecal fold. I cut this fold occasionally but have not been impressed with its importance to such a degree as that expressed by Dr. Chandler.

DR. HUGO O. PANTZER, INDIANAPOLIS, INDIANA.—In our investigation of the etiology of disease we are not giving due attention to anatomic irregularities. These occur, both congenital and acquired, in all parts and organs of the body, but congenitally abound in the abdominal cavity. During their embryonal growth in one cavity, the many organs grow each into varying form, size, direction and arrangement, and then, what is particularly distracting, all reach out simultaneously for their part of the common peritoneal covering. No wonder, then, that complications result in displacements, incursions, torsions and disarrangements, involving parts of, or whole, organs.

These anatomic irregularities obviously entail, first, impaired physiologic function, recurring in attacks of varying frequency, until nature establishes a tolerance of them; secondly, they become the seat of infections and their sequelae. In dealing with such cases clinically, we are still remarkably remiss. For instance, when an operation in the adult discloses such congenital imperfections, upon questioning the patient or family, "Has this person been much disturbed in early infancy, and later years," almost invariably, we receive an affirmative answer. I am convinced the time is coming when such cases will be truly recognized and treated in infancy, instead of being attributed to nervous temperament, etc. I would further emphasize, that, as physicians, we should develop the delicate sense of touch of the blind man. This will enable us to outline and detect the sensitive erratic area, better than by the x-ray.

Dr. Morris has spoken of neurasthenia as separately associated with such cases. Neurasthenia here is consequent upon such anatomic conditions, and should be regarded as a symptom rather than as a complicating entity.

DOCTOR JEROME M. LYNCH, NEW YORK CITY.—It is quite possible that there is something in what Doctor Chandler has said; "that it may be occasionally necessary to cut the ileocecal fold because of its interference with the proper closure of the ileocecal sphincter;" but as a routine measure it seems to me dangerous and unnecessary, as in this region the lymphatic supply is abundant. Also, there is some difficulty after cutting this fold in covering up the raw surfaces, and there is also danger that the adhesions following this procedure may nullify the object for which the operation was performed.

DR. ROBERT E. FARR, MINNEAPOLIS, MINNESOTA.—I believe Dr. Chandler is too modest in his statement with regard to the number of cases of chronic appendicitis which are cured. I would put it at about 30 rather than 60 per cent. Coffey investigated a large number of these cases, and says that 70 per cent of them were not cured.

I have nothing to add of a constructive nature excepting perhaps one point in relation to a hobby of my own. I have now something over 100 cases where I had to open the abdomen to determine the condition, and I left it to the patient and applied the physiologic test; in the case of a right ovarian cyst, a chronic appendix, a gall bladder or a chronic appendix in relation to the right half of the abdomen, I have made traction upon the various suspected organs and tissues and have had my patient state whether or not I was reproducing the symptoms. In a surprising number of instances I have been able to obtain most satisfactory results. I have done an operation which has seemed to better meet the indications and I feel that the method is worthy of a further trial.
DISCUSSION

DR. FRANCIS REDER, ST. LOUIS, MISSOURI.—I am going to dwell only on the diagnosis. Dr. Farr has just referred to a part of this clinical picture. Dr. Pantzer in passing his hand over the abdomen lightly and gently says he is able to diagnose such conditions. Dr. Pantzer may be able to do so, but there are some physicians who may not. I have tried in repeated cases of obscure lesions of the abdomen to determine whether we had to do with an appendix lesion, a gall bladder lesion, or other lesions affecting this clinical syndrome and have not been able to establish a differentiation. However, there is one point that has served me most excellently in determining whether the clinical picture is confined to the right iliac fossa; whether or not I can exclude gall bladder or duodenal lesions. The introduction of the finger into the rectum, hooked over a distinct fold of mucous membrane, known as the valve of O’Beirne, will, upon gentle traction, elicit a pain characteristic of a chronically diseased appendix. The removal of the appendix when this sign is positive invariably cured the patient.

DR. CHARLES P. NOBLE, PHILADELPHIA, PENNSYLVANIA.—I wish to say a few words not so much on the paper itself, as on the principle upon which it rests. In other words, this paper deals with the mechanics of surgery. I believe as long as surgeons continue to be mere mechanics in their thinking, they will never get very far, they will be only better or poorer mechanics. But that is not being a surgeon, because surgery should rest on principles and not on mechanics or mere technic. Operative surgery is merely the details of how we operate, not why. The main difficulty in the way surgeons have approached their work for years is that they have left out the major premise. In other words, they have been dealing with mechanics, instead of with the principles of surgery. The principle at stake in the paper is: why do not these patients recover when you operate on them? No matter how nice an operation you do, the patient still has the constitution he was born with, and this may have become damaged by local disease. This point has been left out of surgical writings for years.

I was educated before this too limited point of view came into being, and I did not realize what had come about until some ten years ago. The younger members of the profession who have been educated in late years have not been taught what we were taught forty years ago concerning the constitutional factor in disease. They have been dealing only with sickness, when they should have been dealing with sick people. The major premise is the sick man, and in considering merely mechanics, the younger men have left out the major premise from their thinking.

DR. CHANDLER (closing).—I see that Dr. Pantzer agrees with me on anatomic irregularities. Dr. Lynch hates to think nature makes any mistake. I dislike to think so myself, but I have called your attention to the circulation around the rectum as being ideal if we walked on all fours. One person out of every four or five is born with the condition of which I have spoken and the question is what to do for it. I am offering a suggestion.

Dr. Farr quotes Coffey as saying only about 30 per cent of appendicitis cases get well after operation. I claim that the reason for this is because the surgeon did not do the operation I have described. If surgeons performed this operation, a much larger percentage of their patients would get well, and that is the object of my paper.
REPORT OF A CASE OF CARCINOMA OF BASE OF APPENDIX

BY MAGNUS A. TATE, M.D., CINCINNATI, OHIO

Mrs.—consulted me on November 6, 1922. She married 35 years ago, and had two children (both normal labors) and one miscarriage. Twenty-five years ago both ovaries were removed, probably for cystic degeneration. She had had intermittent fever, heart trouble (?), and two years ago a slight paralytic stroke involving the left arm and face. The facial paralysis gradually improved and there remains now only a slight drooping of the mouth.

Her mother died of smallpox, and father of pneumonia, no history of cancer or tuberculosis on either side of family.

The patient is now sixty-three years of age. Aside from occasional abdominal distention she was in fair health until six months ago, when there appeared an uneasiness in the lower abdomen accompanied by occasional pain. This pain became very severe and constant for the past month. Weight, which was 146 pounds six months ago, has dropped to 126. Appetite is poor; there is marked constipation with alternating diarrhea, and now and then she has passed what she thought to be clotted blood; urination is frequent but without pain. Her daughter (in a private conversation) stated that her mother is failing very fast, and that at times is so feeble that she can walk only a short distance, and is then so out of breath that they are afraid that she will fall or have another stroke. Also she has become so apprehensive and nervous that she frequently bursts into tears, and for the past week has not eaten in quantity the equal of one meal.

In appearance the patient is very anemic, and waxy. Her hair is grey, thin and lusterless, eyes somewhat sunken, eyesight poor, teeth very good for a woman of her age, no enlargement of the neck, chest sounds normal, heart action irregular, rate 110, a slight murmur (probably hemic), but no valvular lesion. Pulse is feeble, blood pressure systolic 98, diastolic 58, and temperature normal. The abdomen is quite flabby, but the rest of the body thin; entire muscular system is very flabby, and in the lower quadrant to the right of median line a pronounced mass (the size of a large fetal head) could be easily detected on palpation and without giving much pain, giving to touch a peculiar feel, doughy in spots, and at other places very hard, with a distinct flat sound on percussion, and auscultation negative.

There was a second degree perineal tear, no prolapse of the anterior or posterior wall, the usual cervical tear of a multipara, and an atrophic uterus. Nothing was detected in the lateral vaults, and vaginal secretion was negative. A few small external hemorrhoids were noted, and nothing pathologic higher up could be felt by fingers or seen by the proctoscope. The patient was sent to the hospital for further study and examination. Wassermann test was negative.

The urine was cloudy, specific gravity 1.015, faintly acid, and contained no albumen, acetone or sugar, a trace of indican and no diacetic acid. Microscopic examination showed numerous large flat epithelial cells, a great amount of mucus and no casts.

X-ray findings revealed no stones in gall-bladder; kidney normal in size, shape and position, and the urinary tract free from kink or stone. Injection test of Colon showed contour and caliber to be normal throughout, except an irregularity at tip of cecum. A marked tumor mass (outlined below the shadow of right kidney) appeared to be above cecum and in front of ascending colon.
The intestinal canal was thoroughly cleansed by repeated doses of castor oil, and on succeeding days, by many enemas. The resulting stools very large in amount, did not contain any blood, but many hard scyballous masses, much mucus and the odor was very foul. The pulse rate and blood pressure remained about the same, but the pulse volume seemed to improve.

If the ovaries had not been removed I would have pronounced the mass to be of ovarian origin, either cystic, dermoid or parovarian. The site of tumor, rather firmly fixed, made me believe that it was connected with the cecum, but the nature of the mass I was not able to state, other than I believed it to be malignant.

The patient was kept in the hospital seven days before operation, which was performed on November 14, 1922. On opening the abdomen (right rectus incision) we were somewhat astounded to find the lower abdomen apparently negative; no tumor mass was present on inspection as was expected from our physical examination and interpretation of x-ray plates. Both ovaries and tubes were absent, and the uterus was small and freely movable. On lifting up the cecum, however, its caliber was found to be markedly increased in size, thickened and flaccid, somewhat like that of a large bladder. Pulling up this flaccid portion of cecum the appendix was found to be very hard and about the size of one's first finger, three inches in length, entering at its base into a mass circular in outline, which was somewhat larger than the face of a watch. The macroscopic appearance of the circular mass, and base of appendix was that of malignancy, and a few large glands in and around the cecum were also noted. The location of this carcinomatous mass was to the side of the cecum, involving the lower third of the appendix, interfering with the normal passage of fecal contents and gas, which gives an explanation of the presence of the tumor mass as found on repeated palpation, and shown on x-ray plates. The apparent disappearance of this tumor mass (as noted on opening abdomen) was the result of the cleansing of entire intestinal canal during the preoperative hospital stay.

The question at this time was (considering the patient's physical condition) how the case should be handled from the surgical standpoint, and three methods suggested themselves to me. First, a removal of the entire cecum, part if not all of the ascending colon, and about six inches of ileum, followed by an anastomosis of the ileum to the transverse colon, which would have been ideal and logical under ordinary circumstances. It seemed to me, however, that any extensive operation at this time could have only one outcome, namely death on the table, or at best within a day or two.

Second, to close the abdomen without attempting any surgical relief, and a third procedure, which I adopted, was as follows: A circular incision was made around the growth, removing the entire mass, and a goodly portion of the flaccid walls of the cecum. The line of circular incision was freely cauterized, the seared edges were brought together, taking up the slack of cecum, and leaving the entrance from the cecum into the ileum apparently free. The abdomen was rapidly closed without drainage. The specimen was found to be an adenocarcinoma.

The succeeding four days were very anxious ones, as the patient’s general condition was one of profound shock and collapse, but from the fifth day on a constant but slow improvement noted, and she left the hospital in four weeks from the day of operation stronger and in better physical condition than she had been for the past six months. One month later she was referred for deep x-ray therapy, and has now received eight treatments.

It is naturally too soon to make any prognosis whether or not the disease was partially or wholly eradicated at operation, or whether the deep x-ray infiltration has been of material benefit, but the patient seems to be making slow progress, eats and sleeps fairly well, has daily bowel movements which are painless, is up and
CARCINOMA OF BASE OF APPENDIX

about the house, takes short walks, and now and then an automobile ride. She, however, complains of an uneasiness in the right side, is extremely nervous, but up to present time no tumor mass can be detected on palpation.

DISCUSSION

DR. HUGO O. PANTZER, INDIANAPOLIS, IND.—I had a collateral experience in the last few weeks in a patient who had similar condition. I found a mass of almost calcareous feces, removed partly by most assiduous efforts before operation, and the balance after operation. My patient had a widely diffuse inflammatory swelling in the wall of the upper ascending colon, with abscess area and rectal temperatures from 99.5° to 102°.

DR. JAMES E. DAVIS, DETROIT, MICH.—Just a word before Dr. Tate closes the discussion. I have just inquired where the tumor was primary, and he told me he thought in the appendix. That is an interesting statement in connection with this case. Cancer of the appendix is not very malignant, but it does produce obstruction which, of course, will very readily kill the patient. This thought may have some bearing on this case.

DR. RUFUS B. HALL, CINCINNATI, OHIO.—I want to say a word especially in reference to the operation performed by Dr. Tate. Excision of the colon in this case would have been a typical operation. An ideal operation was not made. Why? Because this patient was paralytic, almost dead, regardless of her physical condition. With this operation she got well and is likely to live a few years more. With a radical operation she would have died on the table or within a few hours. Dr. Tate displayed good surgical judgment in the management of the case.
FULGURATION OF HUNNER ULCERS

BY H. DAWSON FURNISS, M.D., F.A.C.S., NEW YORK CITY

THE cause or causes of Hunner ulcers is still obscure, though the most widely accepted idea is that there is some relationship between them and focal infections. Hunner thinks there is also a connection between ureter stricture and this form of ulcer, but as he believes the commonest cause of stricture to be focal infection, the stricture and the ulcer might be, according to this view, a common result, and not an instance of ulcer dependent upon stricture.

These ulcers, while not common, are not infrequent. The history is usually so characteristic that a diagnosis can often be made on it alone. This is frequency, diurnal and nocturnal, of almost clock-like regularity, pain when the bladder reaches a definite degree of fullness, and pain on urination. The urine is generally pus and blood-free, though a few cells, both red and white may be found on careful examination.

Unless a brilliantly lighted cystoscope is used, these ulcers are often missed, but with proper illumination they can be readily seen. There may be one or more scattered over the bladder wall; stellate scars of old, healed ulcers may be seen, leading one to think that at times there is a spontaneous cure, and also that new ulcers may develop in other locations.

The typical ulcer appears as a reddened area, round or oval, varying in size from 0.5 to 2 cm. in diameter. The central portion is denuded of epithelium and may show a slight whitish deposit in the center. On the periphery of the ulcer is seen a network of radiating arterioles. Occasionally these ulcers show a marked edema and may be 3 to 5 cm. in diameter. I have never seen one with granulations, as are found in tuberculous ulcers and ulcerative cystitis. The visible portion is only a small part of the bladder lesion. There is marked thickening of the bladder wall, due to round cell infiltration, often extending to and involving the peritoneum. On over-distending the bladder one can see these ulcers bleed.

Treatment.—Resection of the bladder is a formidable operation. It is difficult to determine just how much to resect as the ulcers are more difficult to see at operation than with the cystoscope. For this reason one is apt to resect an insufficient amount or overdo it. Also there is no assurance that new ulcers will not occur.

To avoid a major operation that did not hold forth any more hope of cure or freedom from recurrence than resection, several urologists
decided upon fulguration as a possible means of curing these ulcers. Kretschmer was the first, as far as a cursory review of the literature has shown, to publish his results. In *Surgery, Gynecology and Obstetrics* he reports a number of cases that had been greatly benefited. I understand that A. B. Cecil has treated a number with marked temporary relief. In fact they get so much benefit that they willingly return for a second or third fulguration upon recurrence. Kreutzman in the *California State Journal of Medicine*, April, 1922, reports a patient relieved of several years’ pain by fulguration.

Kretschmer, Rathbun and Hyman (personal communications) have used fulguration with more or less success. Their opinions and mine are almost identical, so instead of quoting each, I shall in my conclusions, consolidate our opinions.

*Technic.*—To properly fulgurate these ulcers the anesthesia has to be good, either general, spinal, or sacral block.

Spinal anesthesia would be ideal except for the relatively high mortality. Under general, except when profound, the vesical reflex is not abolished, and when sufficiently deep, the respiratory excursions are embarrassing. Personally, I prefer sacral block. This gives complete and prolonged anesthesia, with an absolutely quiet bladder. The bipolar current has been used in all. Fulguration can be done through either an air or water distended bladder. With the water cystoscope the bladder capacity should be determined before anesthesia, and should not be exceeded, for troublesome bleeding will be provoked. The ulcer can best be seen through a brilliantly lighted cystoscope, and it is well to have an interexchangeable observation lens to locate the ulcers in difficult cases, and to check up on the degree of fulguration.

I prefer fulgurating through a Kelly cystoscope (or some modification), with the patient in the knee-chest posture. The patient should be taught this posture before operation as the preliminary injection of scopolamine and morphine, and the excitement of an operation may cause some difficulty in getting the proper position.

In the knee-breast posture the active electrode should be in contact with the ulcer before the current is turned on. If away, there is sparking and the bladder is burned, with the development of sufficient smoke to obscure vision. When in close contact there is desiccation only.

The tendency, I believe, has been to fulgurate too lightly. I am sure that the results in the patients whom I have burned deeply and extensively, have been the most satisfactory. My practice is to burn the visible portion deeply, and one-half to one and one-half centimeters beyond, lightly.
Postoperative Course.—There is usually immediate relief of the old pain and the bladder capacity increased one to two-fold. In a few days cystitis is apt to develop, and with this marked frequency. The patient should be put on urotropin before and after fulguration to lessen or prevent infection. Should infection develop irrigations with boric acid solution and instillations of argyrol are helpful.

In ten days to two weeks there is discharge of small amounts of slough, and perhaps some bleeding. It is four to seven weeks before the bladder lesion is completely healed.

Results.—Seven patients with Hunner ulcer have been fulgurated. Three of these had had resection of the bladder for ulcers, and the ulcer found after operation was either a new development or due to failure to resect sufficiently wide, the latter being the more probable. Since fulguration, nine to twelve months ago, they have had no recurrence of pain or ulcer.

Three patients had fulguration alone; two are free of the old ulcer pain and have normal appearing bladders; one has two small ulcers, pain at times, but on the whole is greatly benefited.

One was fulgurated through a suprapubic incision. This patient had an ulcer involving the left side of the trigonum and fundus, fully 2.5 x 3.5 cm. The operation was done in March and except for a small ulceration noted in July and persisting only a week, and a similar recurrence noted in September and disappearing within a few days following the application of the silver nitrate stick, her bladder has looked almost normal. She has felt greatly relieved, but at times has pain almost as severe as before operation.

One was fulgurated three times, three twice and three once, the best results have been in those fulgurated through the air distended bladder. I think this may be explained by the fact that the fulguration was more thorough and that the diathermic effect extended to a greater depth.

Conclusions.—Kretschmer, Rathbun, Hyman and I concur in these:

All possible foci of infection should be removed.

Resection is a formidable operation with at times spectacular and at times dismal failures.

Fulguration is a simpler method of dealing with the problem and should be tried first.

The results are frequently most gratifying. At least, temporary relief can be counted upon, and if there is recurrence the ulcer can be fulgurated again. The willingness of the patients to submit to second and third fulgurations is a convincing testament of the relief they receive.

Until something better is discovered we shall continue fulguration.

In reviewing my own results, I find that the greatest relief and
best looking bladders are those in which the fulguration was the most thorough, and performed under sacral anesthesia through the air distended bladder.

With increased experience and perfecting of technic I feel we can anticipate even more satisfactory results than those already obtained.

54 East 48th Street.

DISCUSSION

DR. FRANCIS REDER, St. Louis, Missouri.—Possibly a bladder ulcer is of the Hunner type when, after you have opened the bladder you are unable to demonstrate it. That is what I encountered once. A woman, thirty-two years of age, had been in the hands of a specialist for two months and was making no progress. She became dissatisfied and fell into my hands. I saw the specialist and talked with him about the case. He presumed the condition was a Hunner ulcer. She urinated almost every half hour, day and night, suffered severe pain in her bladder, and was rapidly becoming depleted in strength. The specialist cauterized the ulcer on two different occasions. I performed a cystostomy with the intention of excising the ulcer. The ulcer was supposed to be on the left lateral wall, more anteriorly than posteriorly. Carefully examining every fold of the bladder I was not able to find the ulcer. There was an extremely hyperemic condition of the bladder mucosa. The bladder was drained for three weeks. This was eight months ago, and so far she has been free from pain. The desire to urinate is still quite frequent, two or three times at night, and about four times during the twelve hours of the day; otherwise she is in excellent condition and has taken on weight.
BLINDERS WANTED IN SURGERY

By Robert T. Morris, M.D., F.A.C.S., New York, N. Y.

The third or pathologic era of surgery emerging from the second or anatomic era possessed the vices of its virtues. The eagerness of the surgeon to dispose of bacteria and their products allowed him to forget the patient. His interest was centered more distinctly upon a newly acquired art based upon a fascinating revelation in science that related to the microbe and its works.

When we opened the abdominal cavity it seemed desirable to "expose all of the pathology" according to a colloquialism which became current and like many other phases ran a malignant course. We forgot what a patient might do with his own internal resources and we deliberately and conscientiously set to work to remove bacteria and their products from the peritoneal cavity. Now if we stop to think for a moment and if in addition to thinking we try out the practical plan of pouring a pint of milk into the peritoneal cavity and then try to wash it or wipe it out we shall be brought face to face with a realization of the fact that we are washing or wiping the patient's life away with no possibility of our getting the last drop of milk that is spread over the peritoneum.

If we remember further that pus in the peritoneal cavity is frequently sterile or nearly so and that bacteria are at work in the tissues rather than in the pus itself we shall be pleased to remember what we already know. It was this matter of "exposure of all pathology" under the protection of aseptic methods of work and of kindly anesthesia which allowed the surgeon to see too much. It introduced the need for the use of blinders in surgical work. Some of our patients with appendicitis abscess recovered without surgical operation at the hands of old-time physicians who did not believe in operations for this disease. The mere fact of recovery of a single one of these patients called for explanation. Having arrived at this explanation we were then in a position to see if some principle could not be evolved which would be applicable for more cases of the same sort, in whole or in part. As a matter of fact the surgeon's work in these cases consisted in his becoming a diplomat and making compromise between Nature's methods and his own skillfully applied art.

The surgeon who employed the testimony furnished by the recovery without operation of an appendicitis patient with abscess and who carried this up to the fixed point of a new principle found himself born into a new era in surgery. The new era was the fourth or
physiologic era of surgery. In this era the patient was given "home rule," in other words is turned over to his own natural resources with the least degree of surgery which will suffice for that purpose.

During the height of development of the third or pathologic era (the surgeon seeing too much and needing blinders), appendicitis patients with wide infection were being treated in Boston by multiple incisions and extensive use of gauze drains inserted between loops of bowel, after removal of pus or infected peritoneal content. In Baltimore at the same time patients were actually being eviscerated for the purpose of allowing a thorough wiping, washing and otherwise cleansing of the peritoneum. In New York at this same time patients of the same sort were being treated with short incision, rapid operation with insertion of a small drain and then the application of the Alonzo Clark opium treatment in cases in which that was desirable.

As an advocate of this fourth or physiologic era in New York I found it difficult to obtain a hearing. Statistics were questioned. It was believed by some that cases selected with a view to favorable report had been used for statistics. There is always somebody who knows. It is this "somebody who knows" who brought about a compromise between methods employed in Boston, Baltimore and New York.

At the J. Hood Wright Hospital in New York where surgeons who "saw too much" in appendicitis cases with complications had a death rate of 31 per cent, Dr. L. W. Hotchkiss was the first to make a complete abrupt change over to the fourth or physiologic era in surgery. He then had a run of 76 appendicitis cases without a death, these cases being of the same sort as those which previously furnished a death rate of 31 per cent by third era methods.

Pyosalpinx furnishes another object lesson for contrast between the methods of the third era and fourth era of surgery. According to methods of the third era, when surgeons "saw too much" of ragged adherent tubes with dammed pus and often with other abscess formations in the pelvic cavity they did devastating work by removing the damaged tubes and ovaries. They did not stop to remember that a testicle and epididymis, the site of acute orchitis, would have presented quite as bad looking a spectacle had it become the custom to cut down or remove such testicles as promptly as ovaries and tubes were being removed. Men objected to testicles being cut out. Women did not seem to mind losing their ovaries and tubes. Some third era surgeons in addition to removal of ovaries and tubes went still further, and said that the uterus being infected, and of no further service might as well be removed also, making a clean job of the whole thing. Fourth era surgeons did nothing of the sort. They
taught that infected tubes freed from adhesions should be split open lengthwise, sutured to the anterior abdominal wall and then allowed to drain externally while the patient was being treated with vaccines. Hygroscopic and astringent tampons were at the same time to be employed in the vagina.

At the end of some weeks or months when the patient had quite recovered from infection a small secondary operation would suffice for freeing the tubes which had been fastened to the anterior abdominal wall. At the time for this secondary operation it was sometimes found that the tubes had freed themselves, that tubes which had been split wide open in their entirety had not only become round again but that fimbriae had developed where no fimbriae were to be detected at the time of the original operation. Pyosalpinx then furnishes one of the best object lessons in relation to the need for the wearing of blinders by surgeons of the third era who have not moved up to the principles of the physiologic era of surgery.

Typhoid perforation of bowel or acute perforation of gastric ulcer allow still further striking contrast between the methods of the two eras.

In acute perforation cases third era surgeons felt that they must open the abdomen widely, wash or wipe out escaped visceral contents and then do an ideal operation by closing the perforation for patients who were in no condition to bear any such attack of surgery at such a time.

The fourth era surgeon, on the other hand, in cases of acute visceral perforation, makes a very quick operation, sometimes with local anesthesia only and through a small incision introduces a drainage device. He then places the patient upon treatment which will conserve natural resources, postpones the time for an "ideal operative procedure" to a time when the patient is in condition to stand up under such an attack and this time in fact may never come. In some cases a good recovery occurs under the guidance of the patient's own protective resources.

Even in the simple matter of wound dressings the difference between third era methods and fourth era methods would seem to indicate that blinders would often be desirable. One who observes the house staff or the nurses of a hospital washing and wiping pus away from a wound, sometimes even going to the extent of using the injurious peroxide of hydrogen, will be impressed by the fact that new repair cells are being sacrificed upon the altar of the idea of gross cleanliness.

Wounds undergoing repair are seldom to be washed or wiped. They are to be treated by dressings which will absorb and spread discharges safely. Every care is taken to avoid injuries to new repair cells with germicides or with irritating dressings.
Blinders are wanted for nurses and assistants in the daily round of new dressings quite as much as they are wanted where third era surgery allows the operator to see too much.

114 EAST FIFTY-FOURTH STREET.

DISCUSSION

DR. CHARLES P. NOBLE, PHILADELPHIA, PENNSYLVANIA.—It seems to me, that all that Dr. Morris has talked about as instituting a new era in surgery, is contained in Hilton on "Rest and Pain," in principle, if not in detail. That book was published fifty or more years ago. All the remarks about cleaning out milk and letting the patient cure himself has been known since the days of Hippocrates, as the vis medicatrix naturae. Ambroise Paré said: "The physician treats, but God heals." Time does not permit me to present properly my ideas regarding what has lead to the demonstrated inefficiency of the younger medical men, but it is my opinion that since about 1890 medical education has been miseducation. It has left out a great many things—clinical wisdom and the constitutional factor in disease—and has taught a good deal of the laboratory facts, with a false and exaggerated estimate of their value. I have always used the laboratory in the proper way; but it is not the practice of medicine. It is merely a technical way of getting a quantitative index with reference to certain facts which one ought to know, not the facts themselves. If you are a good clinician you get both a qualitative and a quantitative index more accurately than the laboratory man, as a rule, can approximate it.

DR. MORRIS (closing).—In regard to Dr. Noble's point, every man should do his surgical work as quickly and as skillfully as possible. He should do the best he can through either a small or large incision. If you believe in making a mackerel incision, do it, but if you have the skill that will allow you to gracefully and naturally make a small incision without shocking the patient at all, then you are doing the best for that patient.
REFLECTIONS UPON HOSPITALS

BY JOHN W. KEefe, M.D., F.A.C.S., PROVIDENCE, R. I.

WE of today can scarcely realize how comparatively few were the hospitals in this country previous to the Civil War, and these were established chiefly to care for the poor who became ill. The hospitals constructed during the war, for the wounded soldiers, taught the people the desirability of erecting hospitals in the larger cities, for the accommodation of the sick poor. These hospitals proved of great value, not only in adequately caring for patients, but also in educating the medical profession, as these institutions were frequently used as teaching centers and thus the physicians became more expert in the diagnosis and treatment of disease.

It was soon apparent that the poor often received a higher grade of medical treatment than persons who were financially better situated. Then came a time when patients sought the hospital who were able to pay a moderate sum for board and nursing in the wards. Later we find those who applied for admission not only were willing to pay the hospital for board and nursing, but also were willing to pay the physician for medical treatment.

Today we have reached a period where the millionaire may find in the hospital a beautiful suite of rooms, where highly trained nurses and physicians minister to his wants.

While vast has been the development of hospitals in this short period the growth in number has been so phenomenally rapid that of necessity many problems remain unsolved; yet, I am convinced that by the deep thought and careful study which will be given to this subject of hospitals, many of the present defects will be eliminated in the not too distant future.

The first problem that confronts a community is the desirability or necessity of having a hospital. A painstaking consideration should be given to these fundamental questions by a committee competent to judge, following a careful survey of the local conditions.

Very often a few individuals actuated by good intentions, but ignorant of hospital needs and management, create a public clamor and raise money. The money raised is promptly spent on land and buildings without adequate consideration of present and future problems. These same well-intentioned persons who raised the money spend it and very likely continue their control of the enterprise, appointing their executives and medical staff.

Physicians should have a more prominent part to play in the management of hospitals than they have had in the past.
Their intimate contact with people when they are sick, ailing and complaining, engenders a sympathy and arouses a love for their fellow man.

It is quite natural that the physician should look at hospital problems in a different manner from the successful merchant, manufacturer, or socially prominent man; but why, in the name of common sense, cannot physicians and laymen cooperate and both give of their skill and knowledge for poor suffering humanity.

Why exclude the physician from the board of trustees and select men who too often lend only their names. The members of the board of trustees of our hospitals, with a sufficient number of exceptions to prove the rule, devote an insufficient amount of their time to acquiring a knowledge of the many phases of hospital management.

I once heard it said of a trustee of a hospital that at a meeting of the board he said in criticism, "'Why, gentlemen, this is not the way we run our mills,'" and a fellow-trustee said, but "'This is not a mill that we are running.'"

And so it is, a hospital is distinct from any other institution or business and requires an understanding primarily of the mission of hospitals, which can be summed up in a few words, as the adequate, efficient and interested care of sick people.

A trustee of a hospital should become familiar with the many problems he will have to cope with by study, by travel, and by visiting other hospitals. What a boon to humanity is the big, human, kind-hearted man who really gives unstintingly of himself in the service!

Sentiment should fill a prominent part in the care of the sick; too often we find it wanting, due in a large measure to cold-blooded business managers.

The correct solution of hospital problems can only be reached through a study of hospital problems. The men selected to conduct or manage the steel mills, the cotton mills, or woolen mills are selected with care and because of their expert knowledge of these various industries.

We will all admit that twenty hospitals would be too great a number for a city with a population of 300,000. Do we need ten or five? You will readily see that the number and the type of hospital to be erected requires careful consideration and an adequate survey. The initial cost of the building is trifling compared with the annual expense of conducting the same.

May we not by enthusiasm and thoughtlessness, impose a burden of taxation upon the people that is greater than they should properly be asked to bear.

We must remember that the money paid by the state and city is derived from all the taxpayers, and so of necessity the day is coming when the people will rightly demand representation in the governing bodies of hospitals.
The site, or location, for a hospital may appear to be a problem easy of solution, until one considers whether it should be placed on a hill, or in a valley, adjacent to factories, with the noise and smoke accompanying them; or in a residential section; or where it may best serve the patients. The outlook over the adjacent country should give pleasure.

Many times we have observed that the site selected was due to a grant of land or family residence which had outlived its usefulness; or that a certain piece of property could be acquired for a small sum of money; little regard having been paid to other factors, such as room for expansion, future requirements, outlook, scenery, freedom from noise and ease of access to the patients by their friends.

The automobile has rendered it possible to select a site beyond the center of a city or town.

The plans should not be left solely to the architect. He should consult with the physicians and the nurses with reference to many details of the various hospital problems; such as the location of operating rooms, bath rooms, laboratories, light, and many other phases of hospital construction.

The experience of physicians and nurses equip them with a practical knowledge of the care of patients, which should be utilized by the architect, who should be a man of broad vision and one who has sufficient humility to accept advice, even from physicians and nurses.

I do not wish to infer that all physicians, or all nurses take an interest in hospital details, but there are some in every hospital who do.

The board of trustees, the superintendent, the physicians, the nurses and the architect should all work in harmony, and ever keep before their minds, the cause for the existence of the hospital, namely, the welfare of the patients.

Should we have wards in a hospital? If so, how many should they accommodate? Some hospitals have wards containing twenty, thirty, fifty and even seventy beds; although the present tendency is toward small wards of four, or six beds.

The ideal hospital would be one where each patient has a separate room.

Hospital ventilation is a subject with which the physician should be familiar, and greater stress should be given to this important requirement of the patient.

How many expensive and theoretical ventilating schemes have been installed which failed to ventilate?

Operating rooms are often located so that they receive light from two points of the compass, say south and east, rather than light from the north. When adequate light is so essential to the performance of an operation, why handicap the operator to the detriment of his patient
by a defective lighting system when a suitable method of lighting could be so readily provided.

The late Dr. Charles McBurney, who had the direction of the building of the Sims operating theatre in New York, once told me that he had given more thought to the lighting of the amphitheatres than to all the details of the remainder of the building. The views of this master of surgery demonstrate the value he placed upon the necessity of suitable light in an operating room.

Often we find the laboratory and etherizing rooms too remote from the operating rooms. Why not etherize in the operating room, where there is always a sufficient number of assistants, should an emergency arise?

The physician should demand that he be taken into council when these important adjuncts in the care of the sick are under discussion.

The public, including the governing bodies of our hospitals, should be educated to the importance of a careful study of the details of hospital construction and management.

The question arises, should a nurse, a physician or a competent business man be selected to manage a hospital?

Should a hospital be conducted as an open hospital where any licensed practitioner may care for his patient? Is this method the best for the patient in the long run?

It would appear at times that the welfare of the patient, which should be the first consideration, is only incidentally considered, yet the hospital was really built to care for him.

The organization of the medical staff of a hospital is a problem worthy of deep thought. Is our present system of organization in most of the hospitals in this country, with a few notable exceptions, the best one obtainable?

The Johns Hopkins Hospital made an enviable position for itself in the country, not only because of an Osler, a Halstead, a Kelly and a Welch, but also because of the system of organization.

A responsible head to each department, who had the power to select his associates and control the medical treatment of the patients was the basis of the success of their organization.

All successful organizations, whether for business, education, or religion, should have a head or chief, with subchiefs to the various departments.

Should interns be paid for their services, or should they be compensated by allowing them to perform major operations before they are sufficiently trained?

The nursing problem is in a state of evolution at present. Many think the course of three years at a training school is too long, some think it is not long enough. There is a shortage of nurses in the country. How is it to be supplied? Should we have intensive training
for two years with less time spent in sweeping, dusting and bed making and more time in acquiring an accurate knowledge of the essentials of practical nursing?

Some hospitals have adopted the eight hour shift. Are we to have eight hour shifts in private practice in the home? Many people in moderate circumstances today cannot afford to employ a trained nurse. Should we therefore educate some nurses for a shorter period, who would receive a smaller fee for their services?

These and many other problems confront us today, and how shall they be met?

The Rockefeller Foundation selected a committee to report upon the many phases of the nursing problem; following a study of nearly three years, a report was submitted in 1922.

Among numerous sound suggestions was one advising a course of twenty-eight months in a training school for nurses.

Also that a subsidiary type of nurse may be developed and trained for a shorter period, say nine months. They may be employed to nurse cases of minor illness and convalescents.

The name of this class of worker is important, and among the suggestions we find nursing aide, nursing attendant and practical nurse.

In conclusion, may I say that I have intentionally raised many questions in order that those interested in hospital problems may cudgel their brains for their solution.

Physicians should awaken and take a more prominent part in the hospital programme.

A plea for greater harmony and closer cooperation between the various bodies that govern and carry on the work of hospitals.

262 Blackstone Boulevard.

DISCUSSION

DR. EDWARD SPEIDEL, LOUISVILLE, KENTUCKY.—Hospitals should be as complete as possible in their construction and equipment for the accommodation of patients; but the most important thing to determine is the selling space which such a hospital has, and how much earning power each square foot must have, and what the price of each square foot should be. It can be taken for granted that the rooms are full only three-quarters of the year.

As has been said, a very important point is to have a committee of physicians in consultation with the architect. I know of an instance where for a maternity service the architect arranged for sixteen rooms, each provided with a bathroom. When it was pointed out how infrequently maternity patients took tub-baths during their stay in a hospital, two-thirds of the bathrooms were eliminated, and the capacity of floor space was increased from sixteen to twenty-four beds.

In regard to the nursing problem, there is one feature that can and should be eliminated. The highly specialized nurse whose services can be utilized to great advantage in the operating room should be relieved from the "bed pan" feature of nursing. There should be attendants in every hospital for this work, which takes a great deal of the time of the specially trained nurse.
DR. GEORGE CLARK MOSHER, KANSAS CITY, MISSOURI.—The most important essential for hospitals today is a proper endowment fund, as the great mass of people of a community cannot afford to pay for hospital service. The rich can have whatever they want, and the poor are forced into what they need. The middle class of people cannot afford to pay the expenses of a high priced hospital.

DR. JAMES E. SADLIER, POUGHKEEPSIE, N. Y.—Last February I had the honor of being one of three hundred physicians of New York whom the Governor invited in conference to discuss the question of what should be done regarding the lack of physicians in country districts throughout the state. It was interesting to note the views that were brought out. The facts were these: Out of sixty counties in New York state there were actually but four or five that had not been adequately cared for. It was found that cities of the third and fourth class had developed their hospital facilities to such an extent that the country districts were being well provided for. It simply showed that these cities and the people had taken the matter into their own hands.

The question of what was to become of the great overhead cost, that was to be thrust upon cities of the third class that had to look after hospital accommodations for the population of large rural sections, was also brought up at that meeting. For instance, in the district I know best, twelve years ago there were 90 hospital beds in two counties (Dutchess and Putnam) to care for general sickness. Today, with hospitals in the course of construction, there are 545 beds. What is going to happen with the tremendous overhead cost in maintaining such extensive hospitals? Perhaps it might be well if we could hear from the Pennsylvania men about the law that has been in operation there referring to subsidizing the hospitals caring for indigent cases.

DR. DOUGLAS C. MORIARTA, SARATOGA SPRINGS, N. Y.—In many localities we are confronted with the problem of furnishing a building and equipment for a hospital, while the overhead or maintenance expense is entirely forgotten. Dr. Sadlier spoke of what is being done in small cities and towns, but a great calamity is presented in that the price is made to meet the running expenses of the institution and the sick are being commercialized. We had fifty or sixty beds in our hospital at Saratoga Springs and could not meet our overhead expense, yet we made a drive for $100,000 which was successful, so we now have one hundred beds. But if they could not take care of the expense of fifty beds, what are they going to do with one hundred? This addition was thought necessary as by increasing the number of beds, many more people could be taken care of in the obstetric wards. So as I stated, patients are being commercialized and forced to pay beyond their means. The nurses have formed unions, so to speak. They work eight hours, without exception. I believe we may be forced to secure unskilled nurses who will work for a moderate fee, so that the ordinary uncomplicated case can be cared for, with a chief to look after them. This will be a step in advance.

In the ordinary hospital, if there is a difficult case, and the nurses change after so many hours, you have a hard problem to meet. You must have a special nurse for the case; if you have one special nurse, you must have two or three. If we take a man who is only earning $2,000 or $3,000 a year and a member of his family has to go to the hospital to receive the care and attention necessary, the expense will be $150 a week; and if the patient has to stay in the hospital for two or three weeks while the household must be maintained as usual, it surely works a hardship for the individual. I believe the fundamental thing is to look at the hospital problem from that standpoint. It is all right to talk about the doctors being on the Board. I have been on the Board, and the members of our Board of Managers are fond of their own doctor. A doctor in a hospital never resigns.
and seldom dies, so the matter is generally in the hands of one or two men. I was one of the pioneers in our hospital in 1904, and many of us are still there. In a small hospital one should look after the overhead expense.

DR. EDWARD A. WEISS, PITTSBURGH, PENNSYLVANIA.—I should like to emphasize the last paragraph of Dr. Keefe’s paper. We, as physicians, should arouse ourselves and take an active part in solving hospital problems. We may discuss this question for days and not get anywhere. Hospitals do not know our views and it is very essential for us to go before hospital organizations and voice our opinions to the authorities. Possibly many of you may not know that there are two or three large organizations, the largest one being the American Hospital Association, which meets annually to discuss various hospital questions. For years they have been urging physicians to attend their meetings and join in their discussions. I have attended these meetings for the last ten years, and the number of physicians present has been very small. Dr. Keefe has presented a subject that is timely and while not immediately associated with obstetrics and gynecology, at the same time it is plain that physicians should have more to do with the administration of hospitals than in the past.

DR. JEROME M. LYNCH, NEW YORK CITY.—It seems to me that Doctor Mosher is correct when he states that the crux of the whole situation is the proper endowment of hospitals. St. Bartholomew’s, New York, is unique in that it never hesitates in cases of emergency, regardless of the fact whether the patient can pay or not, to supply a critically ill patient with a night and day nurse. I have had experiences in many hospitals within the last twenty-five years and I have yet to see any hospital, except St. Bartholomew’s, where the patient is the first consideration. Nearly all the patients on leaving the Hospital speak in the highest terms of the treatment they have received at the hands of the nurses and superintendent.

DR. MAGNUS A. TATE, CINCINNATI, OHIO.—Recently we had a meeting in Cincinnati for the purpose of making a drive for some $600,000.00 with which to put up a new building. At this meeting we invited the men who send cases to the hospital, and they asked us to give expression of our views as to what we thought a modern hospital should be like, and what we thought were the essentials to make it a hospital working for humanity. This was about the consensus of opinion of some 60 doctors who were present: the building should be compact; it should do away with beautiful lawns, marble halls and other things that are attended with unnecessary expenditures of money; there should be one part in which to care for patients in moderate circumstances. We have wards in which patients now pay $10.00 to $25.00 a week, a fee for the operating room, and from $10.00 to $25.00 for the anesthetic. How can a member of the family of a man who is earning say a salary of $2,000.00 a year, a respectable, decent, honest citizen, go to one of our private hospitals?

REV. THOMAS A. HYDE, SUPERINTENDENT OF CHRIST’S HOSPITAL, JERSEY CITY, NEW JERSEY (by invitation).—I share the views of the last speaker who spoke of the average man and the ordinary middle class type of people. I think today in your particular department you are the most important men of the entire staff. I do not know of any place where we are having so much good work done for humanity as we are in the maternity department, and I am referring now to average people. In every other department of hospital work, we know that the surgeon is fairly well placed; he is usually able to collect his fee, but in a modern hospital—at least in our hospital—I find women going to clinics who are able to pay for services rendered to them. I believe we have reached a time when in this particular department we should make an arrangement between the obstetrician
and the hospital for the collection of his fee. There are hundreds of people going out of hospitals who are able to pay a fee to the obstetrician, yet they are coming in as poor patients and not paying any part of the attendant's bill. If we have attending obstetricians they must be paid for their services. I feel the importance of this because in our particular city we have come to some new arrangement regarding the admission of average people who go to clinics, in order to provide remuneration for the attending obstetrician.

Dr. Keefe raised a number of important questions but did not answer a great many. After all, we have to settle each particular problem in our own particular city, and I wonder if it is possible to build a modern hospital away from the center of population, away from the cross roads and cities and get out in the country. I doubt it. I believe, despite the smoke, noise, soot, etc., in our big cities, we have to build our hospitals where the people are. It seems to me that has been a progressive step in the great cities, and we must keep near the poor people.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—I wish to speak of one phase of this subject which has not yet been discussed. In each hospital there are two types of bookkeeping, one of which might be designated as the commercial, and the other as the scientific. If any of you have attempted to do clinical research work in hospitals, you will understand the necessity of having the scientific bookkeeping done well. It is found in reviewing a large series of cases that the records are very inadequate in many ways.

Just one other point, in regard to the laboratory. The average laboratory pays the hospital handsomely, where the equipment is adequate to turn out the work. The equipment should be great enough to do a certain amount of research work all the time. If we do not have it this way, whenever the clinician wants any extra work done the technicians cannot do it, because they are so busy turning out routine work which must be done at a certain time. We ought to have one or more workers provided in the laboratory to take care of any research problems of a small or large character. This is essential for doing the most essential of all laboratory work, namely, the clinical research type.

DR. JAMES F. BALDWIN, COLUMBUS, OHIO.—I built a hospital twenty-three years ago which is now the largest hospital in Columbus. We have blue prints for its further enlargement. I have been the presiding genius, or whatever you wish to call it, during all this time. We have a board of trustees, but nothing of importance is done without consultation. We have always aimed to make our charges such that the average man could meet them without serious trouble. We have a large number of rooms at $4.00 and $4.50 a day. That includes board, room and ordinary nursing. A large number of nurses are in training. We have the eight hour system and a nurses' home for them, and we treat them as young women of education and refinement. In serious cases special nurses have to be secured, but in ordinary cases nothing of the sort is necessary because we have sufficient pupil nurses.

The location of a hospital is of very great importance, as has been suggested. I do not believe, as the last speaker has said, that you can conduct a hospital out in the country, even though doctors have automobiles and can get to hospitals very easily. The hospital should be centrally located, with reasonably ample grounds, but nothing elaborate. Patients want to get home just as soon as possible after operation, and as one of the speakers remarked (Dr. Speidel) we should do away with all superfluous bathrooms. Most patients want to get home long before they can use a bathtub.

I recently visited the Henry Ford Hospital in Detroit, and found that every room had its bathroom. There are no wards or double rooms, but all are single rooms and exactly alike. It is very satisfactory in many respects, but I approve of small
wards, i.e., of 2 to 4 beds. I do not like the idea of having only single rooms for everybody. Many patients must necessarily remain in the hospital for a number of days after operation; the nurse gives them a morning bath, brings their meals to them, attends to the bed pan, and so on, but aside from that it is almost like solitary confinement. We have a number of double rooms, and a few with three and four beds. We put patients in a private room until they are convalescent, then if they wish—as many of them do—they are put in a double room or with two or three other convalescents, and it is delightful to notice the pleasant friendships that are thus frequently formed. They feel better and leave the hospital happy and satisfied. Small wards for convalescent patients are all right, but not for sick patients.

In the Henry Ford Hospital all employees are on a salary, from the chief surgeon to the lowest scullion. The salaries are good. The salary of the chief surgeon is such that I do not think his position would go begging for five minutes if vacated. There is no worry about fee bills.

It seems to me the time will come, as suggested by a recent writer, when obstetrics will be done by teamwork on the eight hour plan; an obstetrician will be on duty eight hours, after which somebody else goes on. Then they are not in a hurry. Hurry is the bane of obstetric practice. A report was recently issued by the State Board of Health of New Jersey which said that the death rate with doctors attending maternity cases was much larger than that with midwives. It was a source of amazement to me to find that doctors of that state had more maternal deaths, more stillbirths and more infant deaths under one month, than the midwives. It is a shame if it is true, and the only explanation is that the doctor is in too much of a hurry, is too quick with the use of forceps and pituitrin.

A few years ago a former assistant of mine was doing a great many cesarean sections. He went abroad, and when he came back I thought he had been converted from the error of his ways. He said that in Germany among the women whom he examined he found many who, he was sure, would require high forceps or cesarean section; but in the course of time practically all of them had their babies in the old-fashioned way.

One point should be made, as it comes under the head of location of hospitals, and that is the position of the building on the lot. If you will come to Columbus, where we have had for years a recruiting station for the United States, and go to Fort Hayes and visit the government hospital you will be amazed. The hospital is built, as so many are, with a court, but the court opens to the north instead of south. No sun ever gets in there. It is damp and dirty and filled with snow during the winter. The grounds are spacious, and no one knows why the architect did not open the court to the south so as to get the benefit of the sun.

A firm of architects consulted me two or three years ago in regard to a large hospital they were building out in Kansas. I gave them my advice and suggestions and when I got through there was practically nothing left of their plans. They decided to turn the hospital completely around, and to reorganize it from top to bottom.

If you indulge in marble halls, if you have an enormous overhead expense you cannot furnish moderate priced rooms. Much of the expense incidental to the building of hospitals is unnecessary. A hospital should be built substantially, with all necessary comforts for patients. You can then furnish accommodations at $4.00 or $5.00 a day as we do.

The essayist spoke of the anesthetist’s fee being from $5.00 to $20.00. There has to be a change there. Why should we pay the chief of the laboratory department $5,000.00 or $6,000.00 a year and allow the anesthetist to collect ‘all the traffic will bear?’ The pathologist has to be a much more capable man than
the anesthetist. His position is a most responsible one, and yet we have no trouble in filling this place with competent men. Routine work everywhere should be compensated for by routine salary, and I think it would be wise for all hospitals to place their anesthetists on a salaried basis. Indeed, I am not at all sure but what ultimately the Henry Ford idea will be carried out, and all hospital employees will be placed on salaries, all fees from patients going into the common treasury of the hospital. In that hospital there is a scale of charges for every sort of service rendered, with a specific price for each operation. I think hospital trustees and the profession in general will watch the working out of this idea with much interest.

DR. KEEFE (closing).—One of the reasons I brought this subject before the Association is the fact that you men have standing and position in the various cities from which you come, and you may be the nucleus of a body which will take greater interest in these various problems. Too frequently the physician is pushed aside by the energetic business man, and unless he looks out sharply, he will be excluded from conferences upon the management of hospitals.
THE RENAISSANCE OF ABDOMINAL SURGERY; THE PASSING OF THE GYNECOLOGIST

By John B. Deaver, M.D., Philadelphia, Penn.

It is commonly recognized that abdominal surgery and gynecology, as we know it today, owes its renaissance to the introduction of ether and more particularly to the development of aseptic methods of operation, and that with the conquering of pain, hemorrhage and infection, the three great evils which for so many centuries retarded surgical progress, the pathway was opened for the development of modern surgery. But even the most enthusiastic abdominal surgeon gladly recognizes the fact that the surgery of the upper abdomen owes its rise to the fearless and ingenious work of the early gynecologists.

There is perhaps no more dramatic era in surgical annals than that which marks the beginning of gynecologic surgery. The story of that bleak day in December, 1809, when a woman "with her pendulous abdomen resting on the pommel of her saddle" rode sixty miles into Danville, Kentucky, to seek relief for an ovarian tumor that was sapping her strength, reads almost like a work of fiction. She did not come in vain, for she found in Ephraim McDowell a man with the courage of his convictions and willing to suffer bitter and hostile criticism for his temerity in attempting to extirpate the ovarian growth by surgical removal of the ovary itself. This same fearlessness characterized those who came after McDowell. The efforts of his followers, Smith, Peaslee, the Atlees, Dunlap and others to create a legitimate place in surgery for the operation of ovariotomy reads like the strangest story of perverted persecution of men, branded as butchers and murderers, those whose sole object was the relief of suffering womankind.

To these pioneers we owe our everlasting gratitude. Surgical principles and operative procedures which they laid down are accepted today unaltered. Many methods of investigation are the outcome of those which they evolved, and strategy which they employed is still and probably always will be effective.

In the decade that followed these pioneer days it was only in the field of gynecology that abdominal surgery was at all active. With these times are intimately associated the names of Sims and his ingenious treatment of vesicovaginal fistulas; of the elder Emmett and
his plastic repair of the lacerated cervix; of Warren and his plastic perineal surgery; of Dudley and others in the development of the reduplication of the round ligaments for the correction of the retroverted uterus, etc. While all these endeavors mark the rise of gynecology as a specialty, as distinguished from general surgery, they also hail the advent of the surgery of the upper abdomen as distinguished from pelvic surgery. Stimulated by the fearlessness that characterized the early gynecologic surgeons and encouraged by their triumphant overthrow of prejudice, and what is most important, armed with the panoply of anesthesia and antisepsis, abdominal surgery began its slow and gradual march to its present-day perfection.

There is one very good reason why gynecology should have been the earliest specialty in abdominal surgery. It is no doubt due to the fact that the operative field is superficial and the parts present a greater amount of natural resistance and were more easily drained, so that the risk of operation was not so great as in surgery of the upper abdomen. It is only natural, therefore, that the surgeon of largest experience was to be found among the gynecologists per se.

There are one or two commanding figures of the times that can be mentioned without in any way detracting from the glory of that array of lesser lights to whom surgery owes an inestimable debt. In speaking of the renaissance of abdominal surgery one’s thoughts naturally revert to the gigantic figure of Lawson Tait. It seems superfluous to mention that it was with Tait’s epoch-making recognition of the true pathology of pelvic suppuration and his work on the fallopian tubes that gynecology entered into a new era of activity. A close second to this commanding figure is our own Joseph Price, well described as a “bold, rugged, brilliant surgeon,” a “militant advocate of the new surgery.” Like Tait, Price had to contend against the conservatism of the surgeons and teachers then in authority, and like Tait, he remained callous to criticism and opposition and with singleness of purpose tenaciously forged ahead, bending all his endeavors toward establishing the new surgery. His work was marked by simplicity and thoroughness, and it is no exaggeration to say that, even today, surgery in this country still demonstrates the influence of this master surgeon. We also recall the names of J. Marion Sims, the first to attack the gall-bladder by his drainage operation. But attractive as it may be to recount the early days and dwell on the remarkable progress of abdominal surgery, it is not this aspect of the subject that I have been asked to present at this time, but rather to discuss the effects of the renaissance of general abdominal surgery on gynecology as a specialty.

We, as general and abdominal surgeons, recognize and congratulate
you upon the contributions which your predecessors have made. In the search for truth these men have made invaluable contributions. Few of them knew or thought that the mantle of recognition would fall upon them and that their work would be a beacon light in the future. But little did they care as long as they had the personal satisfaction of having taken a step forward. There is nothing so interesting in the entire history of surgery as this tireless and relentless persistence which led to the conquering of the mysteries of the abdomen. It has meant the alleviation of the suffering of countless thousands and the restoration to perfect health of many more.

Gradually there developed an imaginary line more or less arbitrarily placed, which supposedly differentiated the abdominal from the gynecologic surgeon. The isthmus which joined the two specialties was the ileopectineal line, but years of watchful waiting have shown us that it is a false boundary. It is like taking Alsace and Lorraine from France, eventually, in the evolution of mankind, natural boundaries only are able to withstand the onslaught.

A survey of the work that is being done by those who are known in each specialty indicates quite clearly that none hesitates to invade the field of the other, and that the term abdominal surgeon may well be applied to both. While this may indicate the passing of the gynecologist per se it would in no way be contrary to prevalent facts, inasmuch as neither the abdominal surgeon, as we have him with us today, nor the man who claims gynecology as a specialty is practising as a specialist in the accepted sense of the term.

There is a time in every new movement when the pendulum swings to one extreme or the other. This is as true in medicine and surgery as it is in politics and religion. It is characterized by closely drawn lines, by prejudices and by selfishness. A survey of the history of the surgery of the abdomen and pelvis will show that we have just passed through such a period.

There has been, and unfortunately still is, a feeling among some gynecologists that the general surgeon should confine his activities to that region which anatomically lies above the ileopectineal line. There is thus an attempt to create specialists in a domain where specialism frankly does not exist. It is entirely analogous to a situation where an automobile mechanic would tell you he could bore your engine cylinders, but he could not replace the piston rings.

There is no actual separation between that area above and below the ileopectineal line. It is an imaginary, scarcely even a potential separation. It is true that the functions of the viscera in the two portions are not the same, but the problems encountered are closely identical and very frequently coexisting lesions are present.
THE RENAISSANCE OF ABDOMINAL SURGERY

How then are these to be dealt with? Should the surgeon and gynecologist always be present whenever the abdomen is opened? Even were this in harmony with modern organization and efficiency it would perhaps be against our better judgment, for just where would the one stop and the other begin? For instance, who would remove the pelvic appendix which has its attachment in the right iliac fossa?

Because of these conflicting problems there has developed, at least among most general abdominal surgeons and gynecologists, a disregard for the supposed domain of the other, each invading whatever area demonstrated pathology regardless of his "supposed" jurisdiction. At first this occurred when operation demonstrated the presence of coexisting lesions, and it has gradually spread so that each specialty came to invade the field of the other for primary lesions. Thus both may more aptly be termed abdominal surgeons, for if the gynecologist is to forsake his birthright he must needs forsake his title also.

A condition such as I have pictured of course presages the passing of the gynecologist. It is not contrary to the facts as they exist today, since finding himself cramped in the narrow confines of the bony pelvis he has emerged into a larger and more liberal field.

In the accepted sense of the term, therefore, neither the abdominal surgeon nor the gynecologist is a specialist, and it would be fitting clearly to meet the issue and openly acknowledge that which both of us are doing by a back door method, for neither of us is devoting attention exclusively to that part of the body which we claim as our specialty.

Anatomically, as I have said, this is impossible. It is not comparable to the specialties of otology and ophthalmology, but is analogous to that of rhinology and laryngology—who would attempt to draw lines between these two?

The solution of the problem lies in openly discarding that which we have not practiced for years. Should not the so-called gynecologist be trained to deal with the lesions of the upper abdomen, just as the general abdominal surgeon should be prepared to apply his skill to pelvic lesions? Neither should have any temerity when the peritoneum is opened in attacking that which the aseptic scalpel has brought to the light of day. And when the mystery is dispelled and truth revealed, the revealer must go ahead with the same confidence of bringing the case to a successful conclusion, as if the diagnosis had been correct.

Surgery by force of circumstance must fall in line with modern accepted economics. We cannot go along groping in the past and
ignoring the present. The principles and reasoning I have elaborated I believe to be sound. During this present generation we will see the refinement of the field of the specialist. The modern surgeon who enters the abdomen should know equally well the anatomy, the physiology and the pathology of all that lies within. The problem of hemostasis, of asepsis and skill in the gentle handling of the viscera are as applicable to the upper as to the lower abdomen.

This striking change is coming regardless of our individual feelings. The patient of the future will entrust himself for operation to the abdominal surgeon who can accurately deal with any lesion he may encounter. He will not accept the greater risk imposed upon him when he accepts the so-called absolutely pelvic specialist. Unquestionably, therefore, the work of the two will converge and be replaced by the one. It does not mean a replacement of either, but a development of both, and as each becomes a craftsman in the field of the other, as they are doing today, their fields will converge and overlap and they will be merged into a homogeneous whole.

Greater progress, no doubt, is assured by the merging of specialities. As Harvey Cushing has aptly said, "When progress ceases to be made through the incentive studies which the smaller field of work permits, there is every reason why the vagrant specialty should be called back under the wing of its parent, general surgery, from which, under no circumstances, should it ever be permitted to wander too far." The time has not, and may never, come when the specialty will go back to the general surgeon, but the time has come when the abdominal surgeon because of broader experience must assume control of the situation.

It may be bold, but I see in the not distant future a realignment of surgery, and in the picture which rises before me I fail to see any one of the nomenclature of a gynecologist. Expediency in surgery, just as in all processes of evolution, demands that those only survive who are capable of dealing with that larger field which lies between the diaphragm and the levator ani.

Unfortunately, also, in our medical schools where the chairs of gynecology and obstetrics coexist there is rarely harmony and nearly always a duplication of teaching. The obstetrician has reached out for the operative side of the diseases of women. He should content himself with the process of gestation and with the normal and abnormal phenomena which occur during it. There is a serious question as to whom the plastic surgery rightly should fall, but we may say that repairs of the pelvic floor should remain with the obstetrician as long as he gives promise of productivity. However, intraabdominal lesions should be turned over to the general abdominal surgeon and
the obstetrician should not be permitted to develop a complete Frauenklinik.

There would thus be developed two specialties whose lines are delineable, whose results would be more apt to be proficient, and of whom we could say they have seen the bidding of the times and have answered it.

1634 Walnut Street.
ADMISSION THESES

1923
UTERINE PROLAPSE, CYSTOCELE, RECTOCELE. AN 
ANALYSIS OF SIXTY-THREE CONSECUTIVE CASES 
OPERATED UPON BY THE VAGINAL ROUTE 

By Louis E. Phaneuf, M.D., F.A.C.S., Boston, Mass. 

(Associate Professor of Clinical Gynecology, Tufts College Medical School, 
Gynecologist and Obstetrician, Carney Hospital)

THE woman with a slight degree of prolapse of the uterus associated with a slight cystocele and rectocele usually requires no operative interference during her childbearing period. The two main reasons for intervention before the menopause are extensive lacerations of the cervix with the resultant leucorrhrea and the increased frequency of abortion and miscarriage, and procidentia with the uterus, bladder and rectum extruded, making the patient an invalid. The two reasons which stand out against surgical intervention during the childbearing age are, first, the danger of complicating future labors, since many cases are on record of women who had had one or more children by the pelvic route, and later had to be subjected to abdominal deliveries because of previous operations for the repair of lacerations of their genital tracts; and, secondly, because of the danger of recurrence of the conditions if the patients thus treated are subsequently delivered by the natural passages. Most operators, however, agree that when a woman has reached the menopause, if the lesions above mentioned are at all severe, they should be repaired so as to allow her to spend the rest of her years in comfort.

Uterine prolapse, although a source of many discomforts, does not threaten life; for this reason, if we are to recommend operation for this condition it is important to find a method attended with little operative risk, and at the same time one which will offer as good a chance of a cure as possible. After trying many of the accepted methods, both vaginoabdominal and vaginal, for surgically treating prolapse, I now prefer the vaginal route for patients at or after the menopause.

Of the sixty-three consecutive operations in this series, sixty were performed at the Carney Hospital and three in other hospitals; the ages of these patients are grouped in Table I.

As previously stated, all cases were operated upon vaginally; the transposition operation was chosen as the method of election and was performed on fifty-eight of the patients, while five had vaginal pan-
UTERINE PROLAPSE, CYSTOCELE, RECTOCELE

Table I.

<table>
<thead>
<tr>
<th>Ages</th>
<th>Between 40 and 45</th>
<th>17</th>
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<tbody>
<tr>
<td>&quot;</td>
<td>45 &quot; 50</td>
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</tr>
<tr>
<td>&quot;</td>
<td>50 &quot; 55</td>
<td>14</td>
</tr>
<tr>
<td>&quot;</td>
<td>55 &quot; 60</td>
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<td>&quot;</td>
<td>60 &quot; 65</td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td>63</td>
</tr>
</tbody>
</table>

The oldest patient was 82 years old.

Table II shows the diagnoses in detail.

Table II.

Diagnoses

<table>
<thead>
<tr>
<th>Procedure</th>
<th>51, or 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>First and second degree prolapse with cystocele and rectocele</td>
<td>12, or 20%</td>
</tr>
<tr>
<td>Ulcer of vagina</td>
<td>2</td>
</tr>
<tr>
<td>Carcinoma of cervix (epidermoid)</td>
<td>1</td>
</tr>
<tr>
<td>Cervical polypus</td>
<td>5</td>
</tr>
<tr>
<td>Ovarian cyst</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1</td>
</tr>
<tr>
<td>Myoma of uterus</td>
<td>1</td>
</tr>
<tr>
<td>Cyst of perineum</td>
<td>1</td>
</tr>
<tr>
<td>Third degree laceration of perineum</td>
<td>1</td>
</tr>
</tbody>
</table>

hysterectomies with transposition of the united broad ligaments between the bladder and the vagina (modified Mayo technic). In connection with the fifty-eight transposition operations, amputation of the cervix was performed forty-six times; this was done on all cases where hypertrophy, elongation or laceration of the cervix was present. In all cases a colpoperineorrhaphy and, where an enterocoele was present, obliteration or, better, shortening of the culdesac of Douglas, completed the operation.

The cases called suitable for the transposition operation were those where the uterus was normal in size or hypertrophied. Our experience has borne out Watkins’ statement: “A uterus transposed that is too large never gives trouble afterwards because of remaining large. It always atrophies.” On the other hand, we have found by experience that the senile atrophic uterus does not adapt itself well to this procedure because the heavy bladder will push it down again. If that type of uterus is transposed, the cervix may subsequently appear at the vulva although the cystocele does not recur. The overlooking of this fact accounts for the three recurrences, Cases 6, 22, and 33, in this series, or a recurrence of 4.76 per cent. So far no recurrence has been observed where a uterus of suitable size was transposed. In the three women who were not relieved by this operation, the uteri were exceedingly small, one was the size of a large English walnut. The recurrences were treated by fixing the transposed uterus to the ab-
Fig. 1.—Male sound in the bladder with point towards operator to indicate bladder reflection and where first incision is to be made.

Fig. 2.—Upper edge of first incision drawn down and held taut by two Ochsner clamps, while the bladder is being separated from the fascia of the anterior vaginal wall by curved sharp-pointed scissors.

Fig. 3.—Incision of anterior vaginal wall, fascia and mucosa, in the median line.

Fig. 4.—Bladder freed entirely of fascia from fundus to vesical neck. The vaginal flaps consist of fascia and overlying mucosa.
Fig. 5.—The bladder is pulled upwards with smooth tissue forceps, exposing the utero-vesical ligament which is being cut.

Fig. 6.—The bladder is held under a retractor and the utero-vesical peritoneum is picked up and opened.

Fig. 7.—The peritoneum has been opened and the uterus is being delivered into the vagina.

Fig. 8.—The uterus has been delivered into the vagina and the utero-vesical peritoneum has been sutured to its posterior surface at the level of the internal os. Four sutures of large chromic catgut are placed deeply into the uterus, in the median line. The lowermost stitch is placed at the junction of the corpus uteri and the cervix.
dominal wall; the final result was satisfactory but it necessitated a laparotomy which these patients were reluctant to undergo. Cases of that type are now treated by removing the uterus vaginally, suturing the broad ligaments together, and transposing them between the bladder and vagina. Five cases were operated upon by this method and so far no recurrences have been found. I have met but once a uterus that, although prolapsed, was too large to be transposed; this was in a younger woman, a good surgical risk, and she was relieved of her symptoms by a cervical amputation, anterior colporrhaphy, colpoperineorrhaphy, abdominal supravaginal hysterectomy and fixation of the cervix to the anterior abdominal wall.

Several methods have been advocated to reduce a large uterus in size before transposing it. Of these, two are in common use. The first consists of the excision of a wedge-shaped piece in the anterior uterine wall, suturing the incision thus made, and transposing the smaller uterus; if this method is resorted to, it is of advantage to remove the uterine and cervical mucosa. The second method is that of Vineberg and consists of a vaginal supracervical hysterectomy with transposition of the cervical stump. We have not resorted to the first modification since it predisposes to suppuration. Vineberg has reported excellent results for his operation, but thus far we have not had the opportunity of trying it.

The two cases of ulceration of the vagina were kept in bed until their ulcers were healed before they were subjected to operation. Carcinoma of the cervix, although a rare complication of prolapse, occurred in one of the cases of this series; this was an epidermoid new growth grafted on an ulcer of the cervix of long standing; at the time of operation (vaginal hysterectomy) the neoplasm was circumscribed and, so far, the disease has not recurred. There were five cervical polypi which were removed from the cervix previous to amputation. One case was complicated by an ovarian cyst too large to be safely removed through the vagina; for this reason an abdominal cystectomy was performed two weeks after the plastic operation. The diabetic was made sugar-free before operation; she made an uneventful recovery and the vaginal incisions healed by first intention. In one case several myomata had to be enucleated before the uterus could be transposed. One patient had had a previous perineal repair elsewhere; it was found that some of the vaginal mucosa had been turned in at operation, so that a cyst the size of a small egg had developed in the perineum. This was removed while denuding at the second repair. All lacerations of the perineum encountered were of the second degree except one which was of the third degree; the repair in this case gave a satisfactory result.
Nitrous oxide-ether anesthesia was administered sixty-one times, while spinal anesthesia was resorted to twice, and this because the patients had myocarditis and were thought to be poor risks for a general anesthetic. While these operations may be done perfectly well under spinal anesthesia, we have reserved it for special conditions, feeling, as we do, that ether anesthesia, where no contraindications exist, is as safe a method as there is.

**Table IV.**

<table>
<thead>
<tr>
<th>Anesthesia</th>
<th></th>
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<tbody>
<tr>
<td>Nitrous Oxide</td>
<td>61</td>
</tr>
<tr>
<td>Ether</td>
<td>61</td>
</tr>
<tr>
<td>Spinal Anesthesia</td>
<td>2</td>
</tr>
</tbody>
</table>

**Technic of Operation**

**I. Transposition Operation.** —The interposition operation for uterine prolapse and cystocele was first described by Watkins in 1899; later, in 1921, he suggested the name transposition operation as a better term. His original operation is the foundation upon which the following technic was built.

Traction is made on the cervix by means of double hooks, a male sound is introduced in the bladder with the point toward the operator; by raising the tip of the sound, the bladder attachment to the cervix is clearly shown, a transverse incision is made through the vaginal mucosa and fascia below the point of the sound, which is then removed. It is very important to go through the fascia. The fascia and mucosa are grasped with Ochsner clamps, one at each limit of the incision, sharp-pointed scissors are introduced under the fascia and separate this with the overlying mucosa from the bladder up to about two and a half centimeters from the urinary meatus. The scissors are separated before they are withdrawn and the flap is incised in the median line with straight uterine scissors. The bladder is now separated as far as possible laterally, the uteros vesical ligament, which holds the bladder to the cervix, is cut and the former is easily separated from the uterine. The bladder is now held under the symphysis by means of a retractor, the uterosvesical peritoneum is opened, the fundus of the uterus is delivered into the vagina, and the peritoneum is sutured to, the posterior uterine wall at about the level of the internal os. Four chronic cat gut sutures are placed in the uterus; the first takes a deep bite in the fundus, the second is placed in the anterior wall two centimeters below the first, the third is similarly placed, while the fourth goes in deeply at the junction of the corpus and cervix where an angle exists. This last stitch, described by Johnson, when threaded through the vaginal wall and tied, straightens out the uterus and throws the cervix well back in the pelvis. We prefer this to the shortening of the sacro-uterine ligaments, a procedure recommended by Jelleti to accomplish the same
Fig. 9.—The upper stitch has been rethreaded and passed through the anterior vaginal wall, fascia and mucosa. After the excess of anterior vaginal wall has been cut away, the remaining three sutures are rethreaded, passed through the fascia and mucosa, and the four large sutures are tied. The lowermost stitch when tied straightens out the uterus and throws the cervix well back.

Fig. 10.—The four large sutures have been tied and intermediate sutures of finer catgut have been placed between them. The intermediate sutures also pick up the uterus, so that no dead spaces are left.

Fig. 11.—Amputation of the cervix and the sutures in place. The mattress suture at each angle is important because it obliterates a dead space.

Fig. 12.—The interposition operation and the amputation of the cervix have been completed. Note the roomy external os. The uterus is now pushed back in the vagina.
UTERINE PROLAPSE, CYSTOCELE, RECTOCELE

Fig. 13.—A self-retaining perineal retractor is introduced, the points entering below the ducts of the vulvo-vaginal glands. The crest of the rectocele is picked up by a forceps and the pelvic floor is opened by a curved incision at the mucocutaneous border. The rectum is separated from the fascia of the posterior vaginal wall by curved sharp-pointed scissors, and the flap, fascia and mucosa, is incised in the median line.

Fig. 14.—The rectum has been exposed and the excess of posterior vaginal wall, fascia and mucosa, is being cut away.

Fig. 15.—A mattress suture of chromic catgut attaches the rectum to the unstretched upper portion of the vagina. This stitch is tied above the upper angle of the denudation.

Fig. 16.—The posterior vaginal wall has been closed with interrupted sutures of chromic catgut. The levators covered with their fascia are exposed.
purpose. Furthermore, we feel that this stitch is a most important one and that it helps greatly to the success of the operation. The excess of the flaps, fascia and mucosa, is now cut away, the four sutures are rethreaded, passed through the vaginal wall and tied, and the spaces between these four sutures are closed in with interrupted sutures of chromic catgut, each stitch taking a deep bite of the uterus, so that no dead spaces are left between the uterus and the vagina, an important step in preventing the formation of a hematoma and suppuration. We do not separate the fascia from the mucosa, as we believe that equally good support may be obtained if the two layers of tissue are sutured together.

The cervix is amputated by the Emmet method, chromic catgut being used entirely as suture material.

The perineum is repaired in the following manner. A Gelpi self-retaining retractor is introduced, the points entering the tissues just below the ducts of the vulvovaginal glands, the high point of the rectocele is grasped, in the median line, by an Allis forceps, while posteriorly a similar instrument picks up the mucocutaneous line, also in the median line. The pelvic floor is opened by an incision extending from the point below the right duct of Bartholin to the posterior Allis forceps and then extending upward to the point below the duct of the vulvovaginal gland on the left. The anterior edge of the incision is picked up with tooth forceps, and sharp-pointed scissors are introduced between the rectal fascia and the rectum, the separation is carried upward to the cervix, when the scissors are separated and withdrawn. The fascia and the overlying mucosa are now incised in the median line with straight uterine scissors and the flaps are separated from the culdesac and rectum above, and from the pelvic slings below. The excess of posterior vaginal wall is cut away, thus leaving a diamond-shaped area of denudation. If an enterocele is present, the culdesac is opened, dissected free on all sides and removed as a hernial sac, the opening is closed by suturing the sacrouterine ligaments together, from side to side, as suggested by Ward, Frank, and others. In the absence of an enterocele we do the rectopexy recommended by Ward. The upper part of the vaginal incision is now closed by interrupted chromic catgut sutures, each one picking up mucosa and fascia, until the upper edges of the levators are reached. These muscles, covered by their fascia, are approximated in the median line, in front of the rectum, by means of three interrupted chromic catgut sutures, the triangular ligament is approximated by a continuous stitch of fine chromic catgut, and the external perineum is closed by a subcuticular stitch of the same material.

II. Vaginal Panhysterectomy with Transposition of Broad Ligaments. (Modified Mayo Technic.)

The technic is identical with that of the transposition operation until the uterus is delivered into the vagina. The culdesac of Douglas is then opened, an Ochsner clamp is applied on each side of the cervix, taking in all the parametria from below, while a similar instrument is applied from above on each broad ligament in such a way that it meets the lower clamp of the same side, and the uterus is removed. The tubes and ovaries may be removed or not, according to indications. After the removal of the uterus, the clamps are brought together and the broad ligaments are united by a continuous mattress suture of large chromic catgut; this suture is placed two to two and a half centimeters from the cut edges and serves as a hemostatic as well as an approximating stitch. The raw edges are carefully turned in with fine chromic catgut. The excess of the vaginal flaps, fascia and mucosa are cut away, the upper edge of the united broad ligaments is sutured to the upper angle of the vaginal wound and the rest of the incision is closed with interrupted sutures of chromic catgut, each one pick-
UTERINE PROLAPSE, CYSTOCELE, RECTOCELE

Fig. 17.—The posterior vaginal wall has been closed with interrupted sutures. The levator ani muscles, and the fascia covering them, are being approximated by three chromic catgut interrupted sutures. The uppermost stitch is being tied.

Fig. 18.—The posterior vaginal wall has been closed and the levators and their fascia have been approximated. The triangular ligament is being approximated by a continuous stitch of fine chromic catgut.

Fig. 19.—Closing the vaginal wound with a subcuticular stitch of fine chromic catgut.
ing up the broad ligaments. These ligaments are thus placed between the bladder and the vagina and act as a support for the former. The perineum is then repaired by the method described above.

Table V.

| Mortality | 0 |
| Result satisfactory | 60 |
| Recurrences | 3, or 4.7% |

The absence of mortality in a series of sixty-three women, a number of them advanced in years and physically worn out by hard work, leads one to infer that this method is safe. All patients were examined at the time of their discharge from the hospital and were asked to report a month later for further examination. At this time they were asked to return if the least signs of "falling down of the parts" became evident. To date but three recurrences have been found, and these, as we have explained above, were due to the fact that we had transposed uteri which were too small. Were we doing these cases now, we would use the second method described.

The first case was operated upon January 4, 1916; the last case on December 9, 1922.

Conclusions

1. It is generally considered that at, or after, the menopause, the vaginal route offers a safe method of treating women with uterine prolapse, cystocele and rectocele.

2. Vaginal operations are attended with a comfortable convalescence, and may be done on old women where an extensive laparotomy would be contraindicated.

3. We advocate the transposition operation in cases where the uterus is normal in size or hypertrophied.

4. When dealing with an atrophic uterus we have obtained better results with the vaginal panhysterectomy with transposition of the united broad ligaments. (Modified Mayo Technic.)

5. If, in doing the transposition operation, the incision in the anterior vaginal wall is made as described, the fascia and overlying mucosa will be an entity, and will help greatly in keeping the uterus in exaggerated anteversion.

6. Failure is apt to be the case if the uterus is attached to the vaginal mucosa only.

7. A stitch introduced at the juncture of the cervix and corpus is important because when passed through the vaginal flaps and tied, it holds the cervix well back in the pelvis.

8. The bladder should be well separated from the vagina and uterus so that it will lie smoothly, and not in folds, on the transposed uterus.
9. An adequate repair of the pelvic floor is essential in all cases.

10. Spinal anesthesia may be used to advantage in cases where the use of a general anesthetic is contraindicated.

BIBLIOGRAPHY


395 COMMONWEALTH AVENUE.
A METHOD OF TREATMENT OF SEVERE TYPES OF DYSMENORRHEA WITH A REPORT OF RESULTS IN 230 CASES

BY FREDERICK A. CLELAND, B.A., M.B., F.A.C.S., TORONTO, CANADA

(Assistant Professor of Obstetrics and Gynecology, University of Toronto)

ABOUT seven years ago, at the Academy of Medicine, Toronto, I outlined a method of treatment for severe types of dysmenorrhea, and reported the results in about ninety cases. Since then I have continued to use the method, and have employed it in two hundred and thirty cases. My ideas have sufficiently crystallized to warrant a second report, and although I have no little temerity in proposing to this Association a method for the relief of severe dysmenorrhea, in addition to the already too lengthy list, I feel it is sufficiently easy and safe of application and satisfactory in ultimate results to recommend its use.

The pain of dysmenorrhea may begin before the commencement of the menstrual flow or at the beginning of the period; it may disappear as soon as menstruation is definitely established, may persist during the whole of the period with more or less variation in intensity; and in some cases it continues for a short time after the cessation of the flow. It is difficult to define exactly what degree of pain constitutes dysmenorrhea, pain being a subjective symptom. Moreover, menstruation is nearly always normally attended by a certain amount of physical, mental or local disturbance. This seems to be part of the price that our women pay for higher civilization, which has accentuated the excitability of the nervous system, for we are told that women belonging to uncivilized tribes, do not experience much discomfort at such times. The cases I report all belong to the severe and obstinate types of dysmenorrhea. They have all been severe enough to cause a greater or lesser degree of disablement, and in some cases to seriously affect the general health, and all had been previously subjected to various forms of treatment without relief.

The most prominent symptom of dysmenorrhea is pain, which in the severe cases is more acute than any pain in the pelvic region in the absence of physical signs of disease. The intensity of the pain necessarily varies, but the symptoms are sufficiently characteristic to classify the disease as an entity. Herman¹ expresses the opinion that dysmenorrhea should be described as a disease and not a
symptom. The symptoms are identical with those described by writers fifty or a hundred years ago, and do not call for a long description here. The pain always begins in the pelvic region, usually in the hypogastrium, radiates to one or both iliac regions, to the sacrum, to the loins, and down the thighs. The pain at first is of a dull, aching character but it commonly becomes paroxysmal, resembling colic, and is often severe enough to cause the patient to writhe, perspire, vomit and sometimes faint. Most of my patients usually have had to remain in bed for one day, some two or three, and in exceptional cases even four or five days each month; and the pain was not relieved by lying down. With some women the spasmodic pain lasts only a few hours, but with others from twenty-four to thirty-six hours. After the acute exacerbations have passed off, the patient is left with a general soreness which persists for a varying length of time.

Many earnest investigators have, over a long period, presented countless hypotheses and theories on the etiology of dysmenorrhea and many methods of treatment have been advised, even to the point of the ridiculous, and in some instances undoubtedly most distasteful to the patient, who is usually a young unmarried woman. A review of the literature leaves an impression of confusion and one fails to find any definite or authoritative result either in the discovery of causation or an unanimous opinion as to a reasonable, safe and inoffensive treatment. One is bound to confess that all our theories and suppositions end for the most part in mere words. The bibliography is packed with extensive and often wearisome scientific speculations, but we still have no uniformly accepted explanation even of the causation of menstruation; and it necessarily follows that we know still less of the causation of dysmenorrhea. Therefore, the treatments which have been adopted up to the present, must be regarded as almost entirely empirical. In fact we must admit that in the last hundred years the medical profession has advanced very little on this subject. It is illuminating to read old and new textbooks and old and new journals, and see what a bugbear it has long been and still is to the profession.

To enumerate all these hypotheses and theories would be much too long for this paper, but to illustrate the confusion which exists, some must be mentioned. Carstens included the following as local causes:—

1. Mechanical obstruction, usually congenital, and due to smallness of the external os or internal os or abnormal position of the uterus, such as anteflexion or retroflexion. He also included under this heading, the so-called membranous dysmenorrhea.

2. Inflammatory conditions, such as inflammation of the mucous membrane of the uterus.
3. Dysmenorrhea dependent upon the musculature of the uterus, defective development or infantilism of the uterus.

4. Dysmenorrhea associated with premature atrophy of the uterus.

He includes under the inflammatory causes of dysmenorrhea, inflammation of the mucous membrane of the uterus or endometritis.

I have not seen any cases of endometritis which I could think were the cause of dysmenorrhea. Moreover, true endometritis is rare and especially so in virgins. Undoubtedly chronic inflammation following a previous infection, will cause some women to suffer considerable discomfort, a feeling of fullness and heaviness in the pelvis and often certain degrees of pain, but they do not present the classical symptoms of essential dysmenorrhea. The leucorrhrea from which many patients suffer in the intermenstrual period, is usually due to hypersecretion of the glands of the cervix. This may or may not be accompanied by erosion, but in practically all cases, it can be cured by one application of the Paccoulin cautery to the glands at and around the external os. In many of my cases this procedure was carried out in combination with the other treatment for dysmenorrhea.

Carstens has met with many cases of dysmenorrhea which were apparently connected with premature atrophy of the uterus. The women are usually from thirty to thirty-five years of age, and school teachers and stenographers appear to be especially predisposed to the development of this form of dysmenorrhea. In from fifteen to twenty years after the onset of menstruation, it gradually becomes painful, and in the course of a year or two, the pain may become so severe that the women are seriously handicapped in following their ordinary vocations. Several of my cases might be put in this class, but I fail to see why they should be considered as premature atrophy of the uterus.

Sippel considers the etiology of dysmenorrhea under the headings of—

**Mechanical Causes.**—These are factors capable of producing painful contractions which obstruct the exit of blood from the uterine cavity and include (a) congenital or acquired stenosis of the internal os, and in rare cases of the external os, (b) certain forms of anteflexion and retroflexion, and (c) myomatous or mucous polypi in the internal os or cervical canal.

**Nervous Dysmenorrhea.**—This includes all cases of dysmenorrhea for which a mechanical cause cannot be discovered.

Sippel considers that the assumption of menstrual hyperemia in itself producing dysmenorrhoea, or if resulting from tension of the external longitudinal musculature of the uterus (tension of capsule as suggested by Schutz) has no foundation in fact, as such women experience no pain when they become pregnant although the hyperemia and tension of the capsule are then much more marked than during the periods.

Herman advances the hypothesis that dysmenorrhea is due to imperfect development of the center in the spinal cord or sympathetic system which regulates the movements of the genital canal, and that as a result, the natural dilatation of the cervix, which takes place in normal, painless menstruation, fails to occur. The contractions of the uterus consequently become abnormally violent and painful.

Certain investigators would seem to indicate that it is reasonable to assume that dysmenorrhea may be due either to an increase or diminution of ovarian secretion. When the ovarian secretion is normal in amount, the menstrual blood does not coagulate, but when there is an excessive oophorin secretion, there is increased swelling and edema of the mucous membrane and consequently see-
TREATMENT OF SEVERE TYPES OF DYSEMENORRHEA

Tertiary colic. But other observers engaged in this speculation, speak of an insufficient secretion of oophorin and consequently insufficient swelling of the mucous membrane, as being a cause of dysmenorrhea. This theory works both ways.

Possibly the most logical and clearly presented contribution to the etiology of dysmenorrhea is that of Chipman. He bases his conclusions upon the admirable work of H. Reginald Clarke. Clarke showed that the proportion of muscular and of fibrous tissue in the uterus, varied according to age. At the third month of fetal life, the muscular tissue is less than 35 per cent; at term it is about 46 per cent; at the seventh year 52 per cent; at the fourteenth year 62 per cent, and at the twenty-first year 65 per cent. About the beginning of menstruation, therefore, the proportion of muscular tissue is about 62 per cent and the fibrous tissue 38 per cent. Chipman thinks that if this musculofibrous proportion is disturbed, in other words if there is a greater proportion of fibrous tissue than there should be, that it will lead to an impairment of function and result in dysmenorrhea.

Watkins is of the opinion that dysmenorrhea is most often due to defective development of the uterus, the pain being caused chiefly by the contractions of the uterus which soften and dilate the cervix and resemble those of the first stages of labor. This is along the same line as Chipman's explanation, and considering the success which has followed my operations, it leads me to believe that this theory is probably correct.

Chipman gives what may be considered a reasonable explanation of Watkins' theory. He thinks the disturbing factor, causing musculofibrous disproportion, is to be found in some fault of the endocrine system. He endeavors to correlate the work which has been done by investigators of the ductless glands and to explain thus the faulty development of the uterus, that the hypophysis and adrenals govern and control the growth of the uterus and dictate the terms of the secondary sex characters. He finds two types, a hypopituitary type and a hypoovarian type with all the gradations between them. It is to be hoped that the enormous research being carried out by numerous investigators, will prove Chipman's theory to be correct; if so, treatment could then be directed to the cause, so that the musculofibrous disproportion and sex stigma would not appear.

Doederlin gives a review of the theories up to 1914, and mentions the following:—

1. Marion Sims supported the obstructive theory and believed that 'nulla dysemenorrhæa nisi obstructiva.'
2. Schauta distinguishes organic, congestive and neurologic forms.
3. Gusserow describes an ovarian and uterine dysmenorrhea.
4. Gebhart, Theilhauber and Victor Schulze maintain that the pain is due to pressure within the uterus.
5. Vedeler holds that dysmenorrhea is a stigma of hysteria.
6. Kronig and Veit admit the possibility of a neuropathic sensitiveness, but maintain that there are many cases in which local conditions are productive of the violent pain.

Doederlin thinks that neuropathic and idiosyncratic tendencies play an important rôle in the production of essential dysmenorrhea, but that local anatomic and physiologic conditions deserve equal consideration.

Morton evidently thinks that pelvic congestion and stasis of blood vessels, either arteries or veins of the rectum and bowel, is the main cause, and advises a table with hips and legs elevated for postural treatment and deep breathing exercises.
Block\(^9\) uses the following classification—(a) Obstructive type; (b) Ovarian or secretory type; (c) Vagotonic type.

Novak\(^{10}\) evidently believes that muscular spasm of the uterus is the essential cause, and advises the use of atropine to control it.

Bandler\(^{11}\) thinks that the cervix plays an important part in the production of the pain, and uses a galvanic, electric current to dilate the cervix to demonstrate if the dysmenorrhea is due to the cervix, and if so then advises surgical measures.

Blair Bell\(^{12}\) submits the following classification based on causal factors:

**Dysmenorrhea Due to Structural Anomalies.**—(1) Undeveloped uterus of normal shape, to be treated by endocrine extracts; (2) Undeveloped uterus with anteflexion, to be treated by anterior hysterotomy; (3) Fully developed uterus with anteflexion, to be treated by anterior hysterotomy only in cases where pregnancy is unlikely; (4) Gross malformations.

**Physiologic Anomalies.**—(1) Intrauterine clotting; (2) Exfoliation of endometrium; (3) Painful ovulation.

**Acquired Lesions.**—(1) Constitutional diseases, hysteria, neurasthenia, etc.; (2) Toxemias, rheumatism, syphilis and intestinal intoxication.

**Infections.**

**Acquired Displacements.**

**New growths.**

In an interesting paper, thirty-eight years ago, J. A. Temple\(^{13}\) says dysmenorrhea often followed the unhygienic and unhealthy life of the young women of that period. He speaks of the style of dress, too frequent dancing parties, going to bed too late during the fashionable winter months, and of the accompanying ailments. He also speaks of the factory girl, working ten hours a day in an overheated, overcrowded, ill-ventilated room, trying to keep pace with her friends by putting most of her earnings in the shape of finery on her back and head, and consequently neglecting underwear, her feet improperly protected and no flannel petticoat or woolen stockings. Along the same line Herman states that in young women who are ill or weak, the premenstrual increase in vascular tension and rise of temperature reduces the resistance of the nervous system and renders them more susceptible to pain, and that, therefore, they complain of dysmenorrhea. In such cases the nervous system is so weak that its power of resistance to pain breaks down under the strain of menstruation. When a woman who is otherwise quite well and not suffering from any psychoneurosis, is suddenly attacked by a most violent and unbearable pain, it scarcely seems reasonable to describe the condition as hysteria, although on the other hand, it is a well-known fact that in some instances, true hysteria may lead to dysmenorrhea. Undoubtedly, Temple, Herman and others who lay emphasis upon general conditions, are correct insofar as these patients are more liable to suffer severe pain at menstruation. A young woman who is exposed to undue cold immediately before or during her menstruation, may suffer from a cessation of the flow and pelvic congestion, which gives rise to much pain. Moreover, a woman who has been relieved of her dysmenorrhea by operation, or a married woman, who having borne a child does not ordinarily suffer pain, if subjected to cold and possibly even more so, if subjected to mental or physical exhaustion, will suffer from a sense of fullness and heaviness in the pelvis, often accompanied by pain, although at other times she is quite free of these. These are important facts to remember when trying to summarize results of any treatment for the relief of dysmenorrhea. Even
women who consider themselves quite free of pain and answer the question as to whether they have pain at menstruation in the negative, will volunteer the information, that they always feel a bit out of sorts and have some dragging weight in the pelvis, but that that is nothing.

Many other authors of textbooks and writers of articles in the journals might be quoted all with different classifications and explanations, but sufficient has been presented here to show how confused the whole subject appears not only to the general practitioner but to the specialist.

As regards treatment, undoubtedly careful attention to the general health at the time of puberty, would greatly diminish the number of cases. In some instances in which mental development has been encouraged at the expense of physical development, it is advisable to allow the girls to give up attending school for a year or so, and to spend the time in the country, as far as possible out-of-doors. If the endocrinologists are correct, this is the time that gland therapy should be employed. In addition to this it is necessary to treat suitably, any general symptoms or disease presenting, such as indigestion, constipation, chlorosis, anemia, tuberculosis, malaria, syphilis and chronic poisoning from various causes, as it is necessary to treat these conditions whether dysmenorrhea is present or not. As regards local treatment, so many measures have been tried with varying success, that it is impossible to enumerate them. Palliative treatment consists chiefly in the application of heat to the abdomen, Bier’s hot air treatment, hot sitz baths, etc. Many have thought that they have found specifics for the pain in different drugs, and guaiacum resin, uzarin, nitroglycerin, atropine, sodium citrate, castor oil. chlorodyne, and all the coal tar analgesics have been vaunted at different times; and now many physicians turn to the widely advertised preparatory preparations, such as Hayden’s viburnum compound and Smith’s ergoapiol. Alcohol or opium and its derivatives will always relieve pain, and I am sorry to say are more frequently prescribed than one would imagine. Removal of the ovaries is an infallible remedy for dysmenorrhea, which I mention only to condemn it. The case in which it would be indicated has never come under my observation, and I do not believe it would be justifiable under any circumstances.

In 1897 Fliess\(^4\) first drew attention to what he describes as genital “stelle” or sensitive spots in the nose, and pointed out their apparent connection with certain disorders of the female genital organs. Since that time contributions have been made to the literature by several writers, including Sigmund,\(^5\) Schiff, Koblauch, Seifert and Brettauer,\(^6\) who emphasize the value of nasal treatment in some forms of dysmenorrhea. Sippel and Kuttner,\(^7\) do not believe in the specificity of the so-called sensitive spots, and other writers have shown that
the application of cocaine to other mucous membranes acts equally well. It is significant that the authors advocating the treatment have not broken silence since their first publication. In the few cases in which I have tried this method, it has proved a failure. Nor have I been able to obtain the beneficial results reported by some writers from organotherapy. I have tried most of these preparations, including ovarian extract, thyroid extract, pituitary extract, extract of corpus luteum, mammary extract and combinations of them, and the results have been quite as indifferent as those obtained from administration of iron, aloes, strychnine and manganese. Electricity has been advocated by some writers, notably Sprague,\textsuperscript{18} Lapthorn Smith\textsuperscript{19} and Goelet.\textsuperscript{20} I have not tried this remedy nor have I used tampons in essential dysmenorrhea, as local applications of this kind are objectionable in young women. Recently it has been advocated to treat the tonsils or remove them, and Hernamann and Johnson\textsuperscript{21} recommended x-ray treatment for dysmenorrhea. I anticipate that soon someone will advocate the use of vitamines.

Although there is some merit in all this multitudinous conglomeration of ideas as to etiology, and also, we may admit, much virtue in many of the numerous remedies proposed, why not come down to a simple basis of fact? It would simplify our classification into two groups, (a) those cases in which a gross pathologic lesion is demonstrable, (b) those cases in which a gross pathologic lesion is not demonstrable, namely, essential dysmenorrhea. Our treatment would then be very much simplified. Group (a) would be treated by the removal or cure of the pathologic lesion with which the dysmenorrhea is associated. In this group would be placed such cases as reported by Rona,\textsuperscript{22} McIlroy,\textsuperscript{23} Suckling,\textsuperscript{24} Pardhy and Billington,\textsuperscript{25} and Sippel. This group does not come within the scope of my paper, for these are not cases of essential dysmenorrhea. Group (b) would be treated by suitable hygienic measures, regulation of diet, habits of dress, the correction of other matters of this kind, and the administration of simple remedies to relieve the pain. But if the case did not respond and relief was not obtained and it was necessary to administer alcohol or opium and its derivatives or larger doses of coal tar products; or if the condition was of a disabling character, then more radical measures would be undertaken.

One is apt to forget what many writers have pointed out, which is undoubtedly a fact, that essential dysmenorrhea is always cured by childbirth. Women who have borne children do not suffer from dysmenorrhea unless they have had a mild infection or some gross pathologic lesion is present. And it is remarkable what various pathologic lesions may be present in women who have borne children without causing dysmenorrhea. Therefore, in bad cases of essential dys-
menorrhea, cases which are not amenable to palliative treatment and are disabling, it should be our aim to change as far as possible the nulliparous uterus into one resembling a parous uterus, and this should be by the simplest and safest method possible.

Dilatation of the cervix has been recommended for a long time. Deweis in 1826 reports dilating with metal bougies with satisfactory results. The technic is so simple that there are few general practitioners who have not had some experience of it. The proportion of cures which result from it have been variously estimated, but there is a consensus of opinion among the majority of general practitioners and specialists, that the relief obtained is only temporary. The patients are relieved for a few months and then pain returns as bad as ever. Instead of metal bougies, laminaria tents were popular for some years, but have been discarded on account of the uncertainty of the result and the danger of infection. To overcome the tendency to recurrence, the stem pessary has been used by many operators, and in cases in which it has been kept in position for some months, relief from pain seems to have been more permanent. My experience of the stem pessary has been limited for the reason that I feel that I have a simpler, cleaner and safer method. One case has come under my notice where, after the use of a stem pessary, such a severe infection resulted, that later a complete removal of the pelvic organs was necessary. Certain operations have been devised by Dudley, Pozzi and others, all of which are on the principle of splitting the cervix, but none of these split the internal os, and although they are often successful for sterility, they have not given great satisfaction in the treatment of dysmenorrhea. Heywood Smith writing in the "Lancet" in 1890, recommended dilating to No. 12 Hegar and then cutting the internal os bilaterally and inserting a stem pessary in the cervix for five days, so that the fibers would not unite; but he does not say whether he has used the method and does not report any results. Blair Bell states that in a few cases he has dissected back the mucous membrane from the anterior surface of the cervix, as is done in the first step of vaginal hysterectomy, and has severed the internal os from without inwards, and reports good results in his cases, although he does not mention any means employed to obtain a permanent dilatation.

I have come to the conclusion that no matter what may be the cause of essential dysmenorrhea, the site of the trouble is at the internal os, and that by severing this powerful, circular, fibromuscular ring and producing a dilatation, which is maintained long enough that the muscle does not contract again, nearly all cases of dysmenorrhea can be cured, or if not entirely cured, a sufficient measure of relief can be obtained to warrant the procedure. In the first
cases in which I severed the internal os, and did not adopt any means of maintaining the dilatation, my results were not much better than from ordinary dilatation. I then adopted the principle of firmly packing the uterus and cervix with iodoform gauze and leaving it undisturbed until the eighth day. In some cases it is not necessary to cut the internal os, as dilatation may be easily proceeded with until a sufficient degree is obtained; but in the majority when one has dilated to No. 10 or No. 11 Hegar dilators, one comes upon an unyielding band as resisting as a teething ring, as someone has suggested; the muscle of the internal os is so firm and dense and almost fibrous, that further dilatation is almost impossible without risk of tearing out the volsella with which the cervix is held. It is then simpler and safer to cut the internal os than to try and divulse it. The amount of incising which has to be done varies slightly in different cases. I usually make, with a blunt pointed bistoury, two lateral incisions about one-sixteenth to one-twelfth of an inch in depth, care being taken to cut only the internal os. After this procedure, dilatation is easily continued to No. 14 or 15, according to the size of the uterus being operated upon. In the earlier cases, I dilated to No. 17 or No. 20, but this is unnecessary and may be too much. I found that although the pain was removed, a few patients had excessive flow after this extreme dilatation, and my experience has shown me that pain is quite as satisfactorily relieved by dilatation to No. 14 or No. 15, which can usually be accomplished without splitting the external os. If No. 16 or a larger dilator is used, the external os almost invariably begins to split, and I always stop the dilatation now before this occurs. As the uteri vary in size, this gives a fairly good indication when dilatation has been sufficiently carried out. Dilators of the Goodell-Ellinger type are useless for this operation, and one should always use graduated, solid dilators, so that the exact amount of dilatation may be known. Practically none of these uteri requires curettment, and I think it is a mistake to curette. If the cervix is eroded, it is lightly cauterized with a Paequelin or electric cautery; the interior of the uterus is wiped out with iodoform gauze wrapped around a curette and immediately packed firmly with iodoform gauze, right out to the external os. The gauze is left long, lying in the vagina, to facilitate its removal on the eighth day. The operation is often carried out under gas and oxygen anesthesia, but sometimes gas and ether are required. Asepsis is imperative, particular care being taken in packing the uterus, not to allow the gauze to drag over the vulva. In none of the operations I have performed, have I had ill effects either primarily or secondarily.

In order to satisfy myself that the risk of infection is not a bar to the operation, I have, in many cases, had the gauze examined bae-
teriologically, after its removal. In most cases the gauze from the interior of the uterus is sterile, but in some, staphylococci, colon bacilli, streptococci and other organisms have been found. In no case in which bacteriologic examination has demonstrated these organisms, has there been any clinical evidence of their presence. There is usually a rise of temperature to about 99.6° or 100.2° on the second day, but this generally falls after a purgative has been given. In one case only have I had a rise of temperature which caused any anxiety. In this case the temperature rose to 102.4° on the second day, but as the patient was suffering from bronchitis, the gauze was not removed until the eighth day and no ill effects resulted. On three occasions in the early days, the incision of the internal os was made too deep, and very severe hemorrhage for a minute or two resulted, but in each case it was quickly controlled by passing a catgut suture well up in the fornix along the side of the uterus. Most of the patients have considerable pain for one or two days, the pain being of the same type as that from which they suffered at menstruation. It is usually relieved by the administration of aspirin and codeine but occasionally a hypodermic of 1/6 gr. of morphine is necessary. I do not think that this operation can be done with impunity, but in the hands of those accustomed to operating, it ought to be as safe as an ordinary dilatation and curettage. The patient should be as carefully prepared as for a major operation, and the operation should always be done under the most rigid surgical technic.

Many of the patients have since borne children, and in no case has there been any trouble due to the previous operation; in fact most of the labors have been reported as being easy, the cervix rapidly dilating and no tear resulting. A few women have reported that at their first or later pregnancies, they have aborted, but as far as I am able to learn, no greater proportion of abortions has occurred after operation than occurs in women who have not been operated upon. My records show that I have employed the method 230 times, and I have sent out questionnaires in order that I might have accurate results to report. As the operations extend over a period of thirteen years, a considerable number have been lost track of. I have been able to keep in touch with 175 cases, and of these 138 have been either completely cured or markedly relieved, menstruation often coming on without the patient being conscious of it.

Twenty-nine cases have been partially relieved. These patients, although still suffering some pain or discomfort are able to "carry on" with or without the use of the simple measures of medical relief, and do not need to go to bed. In eight cases there has been no relief; the patients express themselves as being no better. In two cases I have performed the operation a second time. One was an
early case, in which the cutting of the internal os and the packing of the uterus was not satisfactorily carried out. This patient has been permanently relieved by the second operation. In the second case, the patient was relieved for about eighteen months, when her pains recurred. The second operation has resulted in relief although she is not completely cured. The ages of the patients vary from 15 to 42 years. Of those operated upon, 117 were unmarried. In several cases the operation has been done at the same time as some other operative procedure, such as the removal of an ovarian cyst or an operation for retrodisplacement, a myomectomy or the removal of a chronic appendix. It is interesting to note that in two cases, a retroverted uterus had been corrected without incision of the os, with no relief of dysmenorrhea. Both of these patients were completely cured by subsequent dilatation and incision of the internal os. In a few other cases the dysmenorrhea has been associated with retroversion of the uterus, and although the retroversion was let alone, the patients were completely cured of dysmenorrhea.

Among those upon whom I have done this operation, there is a greater proportion of grateful patients than from any other operation which I perform. I recommend it for disabling cases and cases which are severe enough to require alcohol or opiates to obtain relief. It will cure or relieve practically all young women who are otherwise in good health and who look forward with dread to the recurrence of their pain each month. It is applicable to all types of essential dysmenorrhea, whether they are classified as congenital, congestive, ovarian, uterine, obstructive, neuralgic, vagotonie, spasmodyic or what not. Naturally, it should be used with caution where the painful menstruation is only one symptom of an unbalanced, nervous mechanism or where some psychoneurosis is present and should be performed with as great care as if it were a major procedure. Leaving the realm of speculation, the practical gynecologist must, until further light is thrown on the subject, proceed to make use of what knowledge he has, and apply it as scientifically as possible to relieve suffering.

BIBLIOGRAPHY

RECURRENT TOXEMIA OF PREGNANCY

BY FOSTER S. KELLOGG, M.D., BOSTON, MASS.

THE purpose of this paper is to call attention to some preliminary studies of certain cases of toxemia of pregnancy. I believe from this study that it is possible to regroup certain toxemias of pregnancy cases in a manner which is of great clinical importance, particularly in relation to prognosis. Recently facilities have become available through the opening of the new Boston Lying-in Hospital for the proper study of such cases, and since this proper study involves a period of considerable length, it is not yet possible to give any results from the work done there. I simply attempt now to furnish the evidence so far as it goes that led up to a feeling for the need of studying toxemias along a definite scheme and from the angle here presented.

The chief material from which the idea sprang in the order in which it became of interest, was from three sources: First, the study, several years ago and for another purpose, of 400 consecutive toxemias from the records of the Boston Lying-in Hospital. Second, the study of forty odd cases of toxemia from my own private records, and third, the study, within the last nine months, of the records and autopsies of two cases of toxemia dying at the Boston Lying-in Hospital during my service. In addition to these three main sources there have been sundry observations on other cases of toxemia seen in hospital which have tended to stimulate an interest in this phase of the problem. I will now take up the three main sources and attempt to give you briefly the ideas derived from each source.

1. From the study of the records of 400 consecutive toxemias, made primarily for the purpose of determining the relation of toxemia to uterine sepsis, certain other questions, aside from the main point, arose,—many of these having to do with the question of treatment of toxemias and not of importance to the matter in hand. Certain other questions arose, however, which were profoundly interesting and somewhat irritating which sowed the original seed of the ideas here offered. The first was that at once it became evident from the records that over and over again it was impossible to demonstrate satisfactorily whether one was dealing with chronic nephritis complicating pregnancy, or whether one was dealing with a so-called toxemia of pregnancy. About one-fourth of the 400 cases were toxemias with convulsions, whereas the rest were without convulsions. It had been
a preconceived notion of my own, based on previous observation and on the accepted teaching in the school and hospital where I had learned my obstetrics, that chronically diseased kidneys complicating pregnancy seldom or never develop convulsions,—that it was far safer to carry them in this aspect than to carry the so-called acute toxemia. Without going into details, it became evident to me that this assumption, while possibly correct, speaking very broadly, was not nearly so true as I had believed. It is to be remembered that in these records we had, for the purposes of differentiation between chronic kidneys complicating pregnancy, the ordinary nephritis of pregnancy, and the acute toxemia, nothing to act on except sometimes a previous history and the clinical picture including the blood pressure and urinalysis, and all too infrequently, examination of eye grounds by men of varying competency, and I was left at the end of the study with the feeling that all we knew about the classification of the late toxemias of pregnancy amounted to next to nothing, and the very strong desire and hope that in time, with the erection of the new hospital, and the ability to study each toxemic thoroughly and follow it up with an adequate system, that we would be able to properly classify them, not purely for scientific interest, but because I came to feel that we were not handling these cases as well as we might for lack of adequate conception of where each case actually stood. Further, in the course of this study it became evident to me that there was a great group of cases which, though showing no clinical manifestations of chronic nephritis when not pregnant according to the ordinary methods of clinical observation, nevertheless, in all or in the majority of pregnancies, showed kidney insufficiency or toxic manifestations, and to this group I gave the name tentatively "recurrent toxemia of pregnancy," and set it aside in my mind for future study. It is with this group of cases that we are particularly concerned at present, and not with the other questions which I have suggested. To redefine what I have called "recurrerm toxemia of pregnancy"; this term is applied to individuals who, while showing no demonstrable kidney lesion between pregnancies, nevertheless, in each pregnancy, or in the majority of pregnancies, show symptoms of kidney insufficiency or toxemia of pregnancy. On consulting certain monographs on toxemia of pregnancy, I found this condition has been recognized and observed in some degree under the general title of "Nephritie Toxemia or Kidney of Pregnancy" and in Kosmak's monograph (published in 1922) under the head "Nephritie Toxemia," (page 21) about a page is devoted to this condition, and in order to show the indefiniteness of present knowledge of this condition, I shall take the liberty of quoting this page.
NEPHRITIC TOXEMIA

The overburdening of the maternal kidney function during pregnancy undoubtedly serves as a starting-point for the frequent disorder to which the term "kidney of pregnancy" has been applied. In many instances an existing nephritis that can be traced to one of the exanthemata may undergo an exacerbation after years of quiescence. Every infectious disease may be complicated by nephritis during pregnancy and the prevalence of epidemic influenza during recent years, I believe, accounts for the increased number of the cases that have occurred lately. The presence of a chronic nephritis may be unknown to the patient and may make itself evident only during pregnancy, because of the increased burden placed upon the kidneys. The mere presence of albumin in the urine is not necessarily an indication of this lesion, as this may appear in minute quantities in the urine of perfectly healthy people and especially after severe exercise, but albuminuria characterized by more marked traces is associated with many pregnancies and constitutes a predisposing factor for a more serious involvement of the kidneys. In all cases where the albumin reaction averages 1 to 1,000, or more, we may assume that the normal limits have been exceeded, especially if this is accompanied by casts of the hyaline or granular variety.

Symptoms.—We find that the onset of nephritic toxemia is gradual in most instances, which serves to distinguish it from the renal symptoms in actual eclampsia. Appearing usually in the second half of pregnancy, it attacks primiparae more often than multiparae; it is also likely to be associated with multiple pregnancies. In addition to the urinary findings, edema of the ankles and legs is present in varying degrees and sometimes involves the lower portion of the abdomen. Puffiness and swelling of the hands is usually noted, although they may not be so evident as an edema. In a certain number of cases, headache, nausea, indigestion and slight visual disturbances are present.

It may be safely assumed that some direct and specific toxic factor is the exciting cause of this disturbance in the kidneys and not, as was formerly believed, a mechanical condition, such as that arising from increased intraabdominal tension, heightened blood pressure or added muscular activity during labor. Functional kidney tests seem to show that in these cases the excretory possibilities for water and salt are considerably reduced. This would point to a retention of these materials in the organism with consequent ill effect. In many cases the progress of the kidney involvement is apparently halted at this stage and no further extension of the process results. In others the incidence of more advanced toxic symptoms indicates an extension of the process clinically into a pre-eclamptic toxemia or into an actual eclampsia.

There is another group of phenomena to which attention must be called. Williams, among others, has pointed out that women who give birth to premature infants repeatedly are likely to be the subjects of this condition. It will be noted in these cases that the patient is apparently well up to the middle of her pregnancy, when albuminuria, with an accompanying edema, appears. The patient goes into labor and gives birth to a poorly nourished infant or one that is stillborn. The children are poorly nourished because of the insufficient placental nutrition, the organ in these cases being diseased and the seat of infarcts.

Following these observations, under the head "Pre-eclamptic Toxemia," I shall quote the first three sentences.

Pre-eclamptic Toxemia.—It may be difficult to draw a distinction between nephritic toxemia and that to which the term "pre-eclamptic toxemia" has been given and most cases are probably better labeled by the latter term. The clinical signs and symptoms show a marked resemblance to that class in which the
kidney alone seems to play a leading part. A distinction may be made, however, in that the evidences of specific kidney lesions are less well defined and we may have presented simply the picture of a toxic disturbance.

It may be said then that I am making an effort in these observations to give more definiteness to the matter spoken of in the above quotations, and to point out what I am forced to consider of great importance, namely, placing this matter on a more satisfactory basis.

Having shown you the source of the idea of "recurrent toxemia of pregnancy" from source 1, I shall now take up source 2, namely, observation of forty-one toxemias seen in private practice, and show what these cases seem to demonstrate to me. Following the war I came into close association with an internist, and with this opportunity began to study all possible toxemias, which I saw in private practice, with his help. We began to have cases coming to us in the course of private practice who belonged in our minds in this class of recurrent toxemia of pregnancy. I am not going to burden you with individual case histories, but these selected cases all presented more or less the same history of repeated toxemia in two or more pregnancies. These patients were immediately turned over to the internist who went to work to establish to the best of his ability whether or not they had chronic nephritis. Some did, but most of them did not. Whether or not they did, they were all treated by the internist on the same basis, namely, that they did have kidney insufficiency, or that they would have it in the course of the pregnancy. This treatment consisted of the ordinary nephritis diet, rest each day and ten hours' sleep every night, absolute freedom from worry and care insofar as possible, absolute freedom from any hard work or getting tired. This included every form of exercise except moderate walking and every form of work, together with a thing which we had come to feel was most important of all, namely, absolute freedom from exposure to wet and cold. All these matters, simple enough and well known, we felt very important because I had again and again been impressed with the kidney insufficiency, shown by traces of albumin and elevated blood pressure, appearing in women following an afternoon's shopping in the wet or similar exposure. We soon began to find that under this care patients who had never before done so were going through their pregnancies without manifesting any signs of kidney insufficiency. These cases ranged all the way from recurrent miscarriages, which ordinarily often would fall under the head of habitual abortion, to the type case in which the patient had had induction of labor three times in succession and all three done by high class obstetricians for toxemia of pregnancy, each time somewhat earlier than the time before, and who under the care outlined above went through two pregnancies without manifestations of toxemia.
or kidney insufficiency. In addition to these observations, we had certain patients who showed no chronic kidney lesion, so far as the internist's study could demonstrate, and who could not be made to understand the importance of these precautions, and who developed kidney insufficiency or toxemia on breaking the above named rules in such a definite way that we were impressed negatively as well as positively by the importance of these rules. For example, a doctor's wife had been delivered six years previously at seven and one-half months for fulminating toxemia and in the ensuing five years she had had four miscarriages between the third and fourth months, each time with slightly elevated blood pressure and very small trace of albumin. The fifth pregnancy, having demonstrated that she had no chronic nephritis between pregnancies, we pressed her to follow the careful routine life above outlined. She went along to five months without showing any kidney insufficiency,—she had felt fetal movements and was much encouraged at the trend of events. She wished to give a party and got up and broke her routine, running about all day and sitting up late at night. The next day she called on the telephone and announced that the fetal movements had ceased. Her husband took her blood pressure and found that it had risen twenty points and she had a slight trace of albumin. Two days later she miscarried a slightly macerated fetus of somewhat over five months.

In addition to these we had certain cases in which, in spite of the best possible care, toxemic symptoms occurred in the pregnancy, necessitating induction or resulting in premature labor.

Two other facts stood out in the study of these cases which had previously impressed me in the study of the larger series from the Lying-in Hospital records (Source 1). First, that occasionally a true chronic kidney, which had been neglected in one pregnancy and had resulted in premature labor and the loss of the baby, or necessitated induction, could be taken through to a live baby under the best possible care as outlined above; and second, that the prognosis for the child in most chronic kidneys complicating pregnancy was bad, and that a repetition of pregnancy in these cases simply further damaged the kidney each time and left the woman worse off in health afterwards.

At this time I shall make no analysis and detail no cases in this group of forty-one cases studied. The series is too small to be of value statistically. I will say, however, that of these forty-one cases, not a few of which were seen late in consultation, and so inadequately studied and more or less lost track of subsequently, eight appeared on close study to belong certainly to the group of recurrent toxemias. We may say then that insofar as this insufficient number would indicate, approximately 15 per cent of all toxemias and chronic kid-
neys complicating pregnancy seen belong in this recurrent toxemia group. The figure in itself is of no particular value or importance, but serves roughly to indicate that this group is not negligible. In several of these eight cases we have been able to place the patients subsequently in the hospital and do complete urinalyses, phenolsulphonephthalein test and two-hour test, blood pressure, blood chemistry, ophthalmoscopic examinations, liver function test, etc., as I shall hereafter indicate in relation to the way in which we are now handling all toxemias in the hospital. The number is so few and the work so new to us that I shall say nothing now concerning these tests on these patients save that such investigation tended to demonstrate that these cases were not chronic kidney cases and did belong definitely in the group of recurrent toxemias.

The above observations tend to demonstrate theoretically that what I have designated as recurrent toxemias is a clinical entity, but the proof that such condition actually existed was lacking until this year when I was on service at the hospital (Source 3). During this service two patients were admitted and died in the hospital, and had partial autopsies, which demonstrated to me conclusively the existence of recurrent toxemia of pregnancy. These cases are so interesting in themselves and of such importance to the proof of my contention that I give them in detail together with the autopsy findings, including past histories. The pathologic material was examined in the laboratory of the Harvard Medical School. The material was taken fresh a few hours after death. Below are these cases in detail.

Case 1.—Mrs. McN., No. 29980, para iv, age forty, admitted May 11, 1923.

In May, 1918, the patient was admitted in the eighth month of her pregnancy because of bleeding. A diagnosis of partial separation of the placenta was made and a Voorhees bag was inserted. Five hours later the patient was delivered normally of a stillborn baby weighing less than four pounds. After the birth of the baby a large amount of blood elot came away, and the placenta showed evidences of marginal separation. The patient apparently had no toxic symptoms but there is no further history recorded. Neither the blood pressure nor the urinary findings were noted. Patient had an uneventful convalescence and was discharged on the eleventh day well.

In November, 1918 she had a miscarriage at about ten weeks. In June, 1919, she reported to the clinic two months' pregnant. She had a blood pressure of 120 and her urine was negative. She had no symptoms until near the end of the fifth month when she began to have occasional headaches and slight edema. Early in the sixth month her blood pressure rose suddenly to 180 and she was sent into the hospital. She was treated for four weeks by rest in bed and free catharsis with salts. Blood pressure varied between 150 and 190 and urine showed a slight trace of albumin. The phthalein test was thirty per cent. She then went into labor and was delivered normally of a macerated fetus. The placenta showed marked degeneration. She at no time had any toxic symptoms other than an occasional slight headache and slight edema of the feet. Convalescence was uneventful. She was discharged on the fourteenth day blood pressure.
140, urine still showing a slight trace of albumin. Clinical diagnosis, chronic nephritis.

She was not seen again until the present admission when she was sent into the hospital by a physician who saw her for the first time that day and found her flowing profusely. No further history was obtained. On admission she presented the characteristic picture of an acute separation of the placenta. Uterus was hard and tender and she was flowing moderately. She was between seven and eight months' pregnant. Blood pressure and urinary findings were not recorded. She was in fairly good condition and was delivered at once by cesarean section. The uterus showed the usual hemorrhagic infiltration of the wall but it contracted well and was not removed. At the conclusion of the operation her pulse was 130 and of good quality. Two hours later her blood pressure was 140 and she appeared to be doing very well though she was flowing somewhat more than a normal case. The pulse rate did not go up. About six hours after operation she collapsed very suddenly and died before a transfusion could be given.

Permission for complete autopsy was refused but the abdomen was inspected by reopening the incision. The uterus was empty and firmly contracted. There had been no bleeding into the abdominal cavity. The surface of the liver was pale and mottled with small hemorrhages. Portions of the liver, kidneys and uterus were removed for microscopic examination. Diagnosis:—Hemorrhages into the uterine musculature; acute, hemorrhagic and necrotizing hepatitis confined mostly to the periportal areas; acute diffuse nephritis.

It will be noted (1) that on history this patient in her third pregnancy was diagnosed clinically as chronic nephritis and so treated, expectantly by several members of the staff, with a blood pressure of 190, which is practically never done if the case is considered an acute toxemia, (2) that at autopsy there was no chronic nephritis but the acute nephritic kidney of toxemia of pregnancy.

Case 2.—Mrs. H., No. 30095, para iv, age thirty, admitted July 14, 1923.

First pregnancy was normal and ended in 1916 at full term with a normal delivery. In 1918 the patient had a miscarriage at four months. In December, 1921, the patient entered the hospital in the eighth month of her third pregnancy. She had not felt the baby move for several days. The day before admission she had been suddenly seized with a moderately severe pain in the right lower quadrant and had begun to flow. On entrance she was in labor and was flowing slightly. The uterus was tender over the lower half and was not relaxing well between pains. There were no other symptoms. The systolic pressure was 112. Fetal heart was not heard. She was delivered normally in five hours of a stillborn baby. The placenta followed promptly and was found completely covered with an adherent clot. A considerable amount of blood was passed after the birth of the baby. Patient had an uneventful convalescence and was discharged well on the fourteenth day.

On June 10, 1923, the patient entered the hospital because of severe epigastric pain. She had vomited once or twice. She had no headache, blurring of vision or edema. Marked tenderness in the epigastrium, no spasm or jaundice. B. P. 168/68. Urine showed a large trace of albumin and many hyaline and granular casts. A Rosenthal liver function test showed 6 per cent of the dye in the blood at the end of 15 minutes, 6 per cent at the end of one hour and none at the end of two hours. She was given a quarter of a grain of morphia and the following morning was much improved. Her epigastric pain had stopped and did not recur during this stay in the hospital. Her blood pressure came down and her urine cleared up rapidly. Phthalein test was 60 per cent. Blood taken the night of admission showed in the plasma an N. P. N. of 26.6, (mg.

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RECURRENT TOXEMIA OF PREGNANCY

per 100 c.e.) B. U. N. 17.5, uric acid 7.3. On the eleventh day she was discharged with a blood pressure of 110, a negative urine and no symptoms.

Eleven days after discharge she was seen in the pregnancy clinic when she had a B. P. of 118, a trace of albumin and no symptoms. A week later on July 9 she was seen again in the clinic with the same B. P., a trace of albumin and no symptoms. On the morning of July 14 she entered the hospital again because of steady severe epigastric pain which she had had for about six hours. She had severe nausea and had vomited several times, had moderately severe headache, and slight blurring of vision. B. P. was 188 systolic and urine showed a very large amount of albumin. The liver function test was repeated and at the end of 15 minutes there was 9 per cent in the blood, after one hour, 8 per cent, and after two hours, a trace. There was marked tenderness in the epigastrium. There was no jaundice, no edema and no bleeding.

A Voorhees bag was inserted about noon and the patient delivered normally of living, active eight months' baby at 3 P. M. About half of the maternal surface of the placenta was dark brown and necrotic looking. She bled rather more than a normal amount at delivery but appeared to be in good condition, pulse was 120, of good quality, B. P. 128. She continued to have very severe epigastric pain and about an hour after delivery went into severe shock from which she did not react. She had no convulsions or coma but died about three hours after delivery. Permission for complete autopsy was refused but a portion of the liver which was secured showed a pale cut surface mottled with small hemorrhagic areas. Microscopic examination showed an acute, hemorrhagic necrotizing hepatitis chiefly in the periportal areas. Section from a portion of the right kidney showed an apparently beginning acute diffuse nephritis.

This case is less convincing and necessitates the assumption that the separation of the placenta terminating the third pregnancy was toxemic in character, as well as the second four months' miscarriage, an assumption study of the private series shows not unfair, but is considered worth while reporting in this connection.

I have come to feel from the above that all toxemias both in private and hospital practice should be studied by some system which will enable us sooner or later to throw each case into one or another of these groups, namely, (1) definite chronic kidney, (2) recurrent toxemia of pregnancy and (3) acute toxemia of pregnancy. I am impressed by the fact that because we have not been able to do this, we have wasted kidney reserve in many chronic kidney cases in attempting to carry the patient toward term to no purpose; that we have mishandled the recurrent toxemia group by not recognizing it and not handling it with the strictest prenatal care, and I believe that once a patient has had a toxemia of pregnancy, she should be treated as though she were going to repeat it and belonged in the recurrent toxemia group until we find that she does not belong to this group by the test of complete pregnancy.

With this idea in view, we have outlined the following scheme for prenatal, natal and postnatal care for every case coming into the hospital in the future. This work was only possible by the establishment this year of a postnatal clinic, and of a pretty nearly absolute follow-up system. The outline itself embodies the ideas of some of
the staff and the resident who is engaged in the actual follow-up work as well as in the laboratory work done on all toxemias. This outline is tentative and can undoubtedly be improved upon, but I feel it represents the way in which toxemias should be studied everywhere from our present knowledge.

ROUTINE STUDY OF TOXEMIC CASES

As soon as possible after admission a catheter specimen is examined and the Rosenthal liver function test is done. At the time that the liver function test is done blood is taken for blood chemistry. As soon as practicable a phenolphthalein renal function test is done. On cases which are being treated conservatively a daily urine specimen is examined and the other tests are repeated if it seems advisable to do so. Eye grounds are examined.

On the twelfth or thirteenth day after delivery a catheter specimen is examined, the phthalein test and the blood chemistry are repeated and the liver function test is repeated if the first one showed any deviation from normal.

All patients at the time of discharge are given a date on which to return to the postpartum clinic. This is ordinarily six weeks from the date of delivery. When they return to the postpartum clinic the toxemic cases in addition to the ordinary examination have their blood pressure taken and their urine examined. They are given a date some time within the next month on which to re-enter the hospital for observation. On this date the patient is admitted in the afternoon or evening and has a phenolphthalein renal function test done. The following morning her blood is taken for blood chemistry and she is started on a two-hour renal test. An albumin test is done on each specimen and several sediments are examined. The liver function test is repeated only if it has been abnormal the last time it was done. On the second morning the patient is discharged.

Cases which fail to return to the postpartum clinic are followed by the Social Service workers and induced if possible to come back for examination.

These cases are then grouped in a "Toxemic Index" under one or another title so that on reappearance in another pregnancy the group to which they are considered to belong, together with the data on which this decision was based, are available to the men on service.

I believe that we are justified in drawing the following conclusion tentatively from these observations. 1. That recurrent toxemia of pregnancy is a clinical entity distinct from chronic kidney disease complicating pregnancy and different from the acute single toxemia of pregnancy. 2. That whereas further investigation along laboratory lines may show that this group consists of patients who have a faulty kidney balance, that is, a balance that allows them to live without kidney manifestations when not pregnant, but when the load of pregnancy is added develop kidney insufficiency, we are not at present in a position to say that this is true. 3. That this group of recurrent toxemia of pregnancy may be subdivided judging by results into two classes—(1) in which the prognosis under the strictest possible prenatal care is good for both mother and child, and (2) in which
the prognosis for the child is bad no matter what prenatal care is instituted. This division is not to my mind sufficiently recognized even by those who have felt that the grouping I have used here is clinically correct, and it is on this point that I would lay especial emphasis because it is of tremendous importance to certain individuals that, in spite of previous failures to obtain a living child, they can be taken through pregnancy and a living child obtained.
PYLORIC OBSTRUCTION IN INFANCY

BY THEW WRIGHT, M.D., F.A.C.S., BUFFALO, N. Y.

(Assistant Professor of Surgery, University of Buffalo.)

ALTHOUGH the literature of the past ten years is replete with articles on the subject of pyloric stenosis in infants and the symptomatology and diagnosis have been clearly set forth and the medical and surgical treatment ably discussed, its importance and frequency are still unappreciated by a large percentage of the profession. There are still too many infants buried with the diagnosis of marasmus or inanition and the subject should be repeatedly discussed, until the clinical picture and appropriate treatment are as familiar to the general practitioner as are those of appendicitis, for lack of recognition is quite as disastrous while prompt and proper treatment is fully as efficient.

Careful observations have placed the incidence as 1 in 200 (Hill⁶), and yet many practitioners have told me that they had never seen a case in twenty or thirty years of practice.

Apart from the relatively rare cases due to peritoneal bands causing obstruction of the pylorus or duodenum, pyloric obstruction in infancy is due to a combination of two conditions which are always associated but whose relative importance in the production of symptoms varies with the individual case; namely, pylorospasm and hypertrophy of the pyloric muscle.

Much confusion has resulted from the attempt to sharply differentiate these two and make two distinct types of cases, the purely spasmotic and the congenital hypertrophic.

My observations have led me to agree fully with Holt⁶ who believes that such a division is not permissible and that the congenital hypertrophy is the essential underlying factor in all these cases, the spasm being an added secondary condition. In some cases the spasmodic factor greatly outweighs the hypertrophic and in others the reverse is true.

Although an accurate differentiation between these two conditions might at first thought appear essential practically it is not so, for the stenosis may be as complete in one condition as in the other and the early treatment is the same and if it is not promptly successful, the later treatment is likewise identical for the two conditions.

In persistent stenosis, due principally to pylorospasm, there is al-
ways a slight hypertrophy of the pyloric muscle but not enough to produce a distinctly palpable tumor.

In the second type there is actual hyperplasia of the circular muscle of the pylorus often reaching four to five times the normal thickness.

There has been much discussion as to whether the hypertrophy is a pre- or postnatal affair. The weight of evidence is in favor of its being congenital, for cases have been found in premature, stillborn infants. That the hyperplasia continues after birth is also most likely for there is a striking uniformity in the reports that the actual size of the pyloric tumor corresponds to the age of the child. Some writers have held that the hypertrophy was due to spasm and hence acquired, an hypothesis which fails of appeal to one who remembers his youthful efforts to cause hypertrophy of his biceps.

The importance of spasm in the hypertrophic cases is in the production of symptoms through completing the stenosis. The presence of hypertrophy of the pyloric muscle even to a degree sufficient to produce a readily palpable tumor does not of itself mean stenosis and symptoms, as is proven by the persistence of such a tumor for weeks after the cessation of symptoms in cases successfully treated medically (Holt⁶).

It is not my purpose to discuss etiology. Many theories have been advanced and are covered in the writings of Holt,⁶ Scudder,¹⁴ Downes,³ Richter,¹² Stiles,¹⁵ La Fétra,⁷ Pfaundler⁹ and others.

The clinical picture of pyloric stenosis is so typical that it is only the exceptional case that will be confusing. An apparently healthy normal infant begins, usually during the second to fourth weeks of life, to vomit its feedings. The fact that most infants of this age are still nursing explains the often repeated observation that the majority suffering from this condition are breast fed. The vomiting increases in frequency and soon assumes the projectile type. In advanced cases the vomitus may be propelled four to five feet. Vomiting may occur shortly after each feeding, or may be postponed until after several feedings, they are all ejected at the same time. There is always gastric retention; i.e., but little if any food passes the pylorus. With the persistence of vomiting the stools become less frequent, until milk stools are absent and nothing but mucus or small meconium-like stools are passed. The urine becomes scanty and concentrated, for the infant vomits water as well as milk and rapidly becomes dehydrated.

Soon after vomiting has become well marked, visible gastric peristalsis appears, which, together with projectile vomiting, is absolutely diagnostic. The peristaltic wave starts under the left costal margin and travels downward to the right and across the median line to disappear in the right hypochondrium. In a well marked case it is by no means uncommon to see two waves at once and for them to be
½ to ¾ of an inch in height. They usually follow promptly the ingestion of food or water and persist intermittently until the child vomits, with an explosion that projects the vomitus several feet.

If these symptoms have existed for some days or weeks all the signs of inanition are present; wrinkled face and skin, dry tongue, sunken eyes, etc. Such a picture may be produced by marked spasm with slight hypertrophy or by true hypertrophic stenosis. In the latter case palpation after the stomach has been emptied either by vomiting or tube will in the vast majority of cases reveal an olive-shaped tumor at the site of the pylorus. The tumor can best be palpated by using the left hand and from the patient's left side. Downes states that the tumor is palpable in practically every case. This is doubtless true if sufficient care and time are given to its finding. Not considering the demonstration of the tumor essential in all cases, I have operated upon several in which I had failed to palpate the tumor although it was well marked. Occasionally a large right lobe of the liver will render palpation difficult.

Before the advent of the Rammstedt operation surgical interference in cases of pyloric stenosis was accompanied by so high a mortality that it was justly reserved for cases of true marked hyperplasia and more importance was attached to the actual palpation of the tumor than is, in my opinion, called for today. An emaciated, dehydrated baby with projectile vomiting and marked visible gastric peristalsis and a history such as I have mentioned is suffering from pyloric stenosis and requires prompt relief. If that relief cannot be quickly brought about by medical treatment it should be given the benefit of surgery without delay, for it will be just as dead from persistent spasmodic obstruction without true hypertrophy enough to give a readily palpable tumor, as though the tumor were as big as one's thumb. With an operation so simple as the Rammstedt and with so little risk I have no hesitancy in advising its performance even in cases that I feel are 90 per cent spasm. We can be confident of prompt and permanent relief and in a few hours have a baby that is taking its full quota of food. I know nothing more striking or even spectacular than the contrast between the contented baby quietly assimilating its food on the day following operation and the wretched, starved child of the previous twenty-four hours, with its big eyes and wistful expression, lest it be the change wrought in the ex-sanguininated child by a well timed blood transfusion.

Approximately one-third of the cases I have operated upon have been cases of spasm with some hypertrophy, though not enough to give an easily palpable tumor. Not one of the cases has died and each has made a rapid convalescence and completely justified the operation. Several of these were in as extreme a condition of starvation as any
of those with a marked hyperplastic pylorus. Hill in his series of cases noted practically the same proportion of pylorospasm and true hypertrophy.

The diagnosis of hypertrophic stenosis should but rarely present any difficulty. First of all the age of onset should direct attention to its possibility, this in nearly all cases falling within the second and sixth weeks of life.

The diagnostic points in order of their importance are:
1. History of increasingly progressive vomiting of projectile type.
3. Abnormal gastric retention.
4. Wasting, constipation, scanty urine.
5. Palpable tumor.

Although some observers, notably Strauss, place importance upon x-ray study, I feel it to be unnecessary and often an unjustifiable procedure. It certainly is unnecessary for the diagnosis of obstruction and may in extreme cases be a fatal procedure either through its severity or through delaying operation.

Strauss claims that by an x-ray study he can differentiate between those cases requiring surgery and those which will recover under medical treatment. I contend that in many cases that might recover under prolonged medical treatment surgery is much more prompt and surely efficient and in the type of case that promises well under medical treatment causes practically no mortality. That instead of weeks of careful feeding and nursing, during which the patient’s condition may at any time suddenly become desperate or death may occur, surgery offers a prompt and efficient means of cure. Within a week the baby is nursing and retaining all its food as a normal child and it is permanently cured with no danger of the relapses that are so common following successful medical treatment. I do not mean that every baby presenting symptoms of pyloric stenosis should be operated upon immediately. If the condition is recognized shortly after the onset of symptoms medical treatment should be tried. All degrees of stenosis are met with and many mild cases if properly handled will be successfully treated without recourse to surgery.

Many cases in which the spasmotic factor is the predominating one respond promptly to atropin, gastric lavage and careful feeding, others to the thick farina feedings. The more severe cases can only be successfully handled medically when the most expert nursing is available. Remarkable results have been accomplished in some cases by the thick feeding method (Porter, Sauer) but its proper application is complicated and time consuming and relapses occur.

Cases that are seen early may properly be treated medically for a week to ten days, provided they show a slight steady gain. If
however they remain stationary in weight or lose slightly during this time I believe they should be operated upon.

Cases that are first seen in the later stages should I believe be operated upon without delay. Hypertrophic pyloric stenosis is as definitely a mechanical obstruction as any other type of gastrointestinal obstruction and it should be recognized that its mortality is as elsewhere a mortality of delay.

The following observations of Goldbloom and Spence⁴ made upon a large series of cases at the New York Babies Hospital show this point most clearly.

"1. The duration of symptoms prior to operation is probably the most important single factor affecting the prognosis. When symptoms have lasted less than four weeks, the mortality is one-third as great as when they have lasted four weeks or longer.

"2. The mortality in artificially fed babies is more than three times that for breast fed babies.

"3. In infants weighing 7 pounds or less, the mortality was three and one-half times as great as in those who weighed more than 7 pounds.

"4. The mortality for breast fed infants who vomited less than four weeks and who had lost less than 20 per cent of their best weight is almost nil. The fatalities which occur are due to accidents usually avoidable when the operation is done by a skillful surgeon.''

Holt⁶ places the mortality of the condition under medical treatment at 58 per cent.

SURGICAL TREATMENT

Of all the procedures that have been tried for the surgical relief of this condition, the Fredet-Rammstedt is in my opinion the operation of choice.

Gastroenterostomy is difficult, unnecessary and although efficient, leaves an abnormal situation, is attended by a high mortality rate and has been properly abandoned. The more complicated methods of pyloroplasty are unnecessary as they are no more efficient in relieving the obstruction than a well performed Rammstedt operation.

My experience in operating for this condition is limited to 50 cases, of which the first five were pyloroplasties according to the method of Nicoll, all of which recovered. My sixth case, early in 1914, was so nearly moribund at the time of operation that after cutting the muscle as the preliminary step of the Nicoll operation both my anesthetist and I felt that further operation would be promptly fatal. I therefore merely separated the cut muscle and closed the abdomen expecting the baby to die. To my surprise he made a rapid convalescence and is today a healthy, vigorous child. Shortly after this the Rammstedt¹¹ operation came to my attention and since that time I have performed it exclusively.
I have lost three babies. Two of the cases were apparently moribund at the time of operation and died within the first twelve hours, though there were others in the series who appeared in as desperate a condition, who made good recoveries. The third was a case in apparently fair condition, which died suddenly three hours after operation. This case was operated upon under ether and we felt the death was possibly thymic but as autopsy was denied the exact cause of death is unknown. Several of the cases were in an extreme marasmic state and were brought to operation as last resort.

The series does not represent selected cases and no thought was given to statistics. Two of the cases that died might have been denied operation without criticism but for the recovery of at least two previous infants whose condition had been adjudged hopeless by my colleagues and myself prior to operation.

Since the death of the third child I have used local anesthesia in all cases, feeling that the elimination of inhalation anesthesia lessened the risk, although I have made the observation that occasionally ether seems to have a somewhat stimulating effect.

I grant that infants stand ether anesthesia well but I also feel that ether or chloroform introduces an added risk and agree with Bevan that this operation should always be performed under local anesthesia if possible.

I have found that it can usually be readily performed under ½ per cent novocaine, although in certain cases I have used a small amount of ether for a few moments if there was any tendency for the intestines to protrude into the wound. Fortunately the sicker and younger the child the more easy the performance under local anesthesia. The two important points in successful use of local anesthesia, namely, the allowance of sufficient time for the anesthesia to occur and gentleness in handling the tissues, apply here as in adults and one who is accustomed to the use of local anesthesia in adult surgery will have little difficulty in working with it here.

The operation is simple, but there are a few technical points that should be borne in mind.

First. Immediately before operation the stomach should be thoroughly lavaged with one per cent soda bicarbonate solution. This might at first thought appear superfluous in a child that is constantly vomiting. It must be remembered, however, that the stomach is not completely emptied and one is often surprised to find the amount of stagnant gastric contents that will be withdrawn. Furthermore there is often a hypersecretion of thick tenacious mucus in the stomach which, if not removed, may cause partial plugging of the pylorus during the first few hours after operation.

Second. The infant should be kept thoroughly warm during opera-
tion as the only factor that can produce shock in the properly handled local anesthesia case is chilling from undue exposure.

Third. An ordinary rubber nipple stuffed with cotton moistened with sugar solution should be in readiness. If this is given to the child as soon as the peritoneum is incised I have found that in nine cases out of ten the short intraperitoneal handling can be done with no evidence of discomfort and with perfect ease. I have done 26 of these operations under local anesthesia and since adopting this simple procedure have in the last fifteen cases used no ether at any stage of the operation nor have I had any evidence of imperfect anesthesia.

Fourth. I find that the location of the abdominal incision is of importance. I make a high rectus incision in the outer third of the muscle. This is done so that the major portion of it is over the right lobe of the liver. The liver is readily held out of the way during the delivery of the pylorus and after the pylorotomy is done and the stomach replaced, there is no difficulty in closing the peritoneum, as the liver makes an ideal natural spatula and there is no tendency for intestine or omentum to force its way into the line of suture, as when a lower or more mesial incision is made. I have not seen attention called to this point but have found it well worth observing.

Fifth. The pylorus is most easily delivered by means of a blunt hook as advised by Strauss. The pyloric end of the stomach often bulges into the incision but it is thick and difficult to grasp so that time is saved by gently hooking it up.

Sixth. The pylorus and adjacent portion of stomach and duodenum should be delivered through the incision and held in the thumb and forefinger of the left hand.

Seventh. At the junction of upper and middle third of the anterior surface of the pylorus, which is its least vascular part, a longitudinal incision is made beginning at the duodenum and extending well into the prepyloric portion of the stomach. This incision should be most superficial, scarcely more than a millimeter in depth. Through this and with the blunt end of the scalpel the entire thickness of the pyloric muscle should be split until the mucosa is clearly seen throughout the entire length of the pylorus. The mucosa should then be gently separated from the overlying muscle on both sides of the incision until it herniates well above the peritoneal level. This is accomplished by stretching the muscle wound with a blunt hemostat and shelling the mucosa away from the inner surface of the muscle with the handle of the scalpel. The efficiency of the operation in the markedly hypertrophic cases depends upon the thoroughness with which this step is carried out. Many observers have called attention to the danger of opening the duodenal mucosa unless great care is
exercised in handling that end of the incision. The duodenum is very thin at its beginning and the change from hypertrophied pylorus to thin duodenum is very abrupt. I can testify that the danger is a real one for while calling the attention of my students to the possibility of its occurrence and proceeding with great care I opened it myself. The accident need however cause little concern if noticed, for the pouting mucosa can be caught with a clip and a ligature will readily close the opening. A careful inspection should always be made for such a possible opening, for if not repaired peritonitis might easily follow.

In the cases in which spasm is the main factor the pylorus is more vascular than in the marked hypertrophic cases. In the latter type the pylorus is ischemic and there is practically no bleeding at all; in the former there may be considerable oozing. I have always found that this could be controlled by pressure of gauze wrung from hot water and have not as yet found occasion for the running suture over the cut muscle edge as suggested by Downes and Hill.

This finishes the operation and the pylorus is returned to its place. There is no need to suture omentum over the pyloric incision, nor is there in my opinion any necessity for a more complicated pyloroplasty.

Eighth. The peritoneum and posterior sheath of the rectus is then repaired by a continuous catgut suture and just before tying the last stitch the peritoneal cavity is filled with warm saline.

Ninth. Before closing the anterior rectus sheath three through and through silkworm sutures are passed extraperitoneally to be tied over a thin roll of gauze after the skin is sutured. This precaution I feel is necessary because of the fact that several cases have been reported in which the abdominal wound has opened, as it did in one of my earlier ones. In this case the wound separated on the third day and although chromic catgut had been used there was not a vestige of it to be seen. The gut was a commercially prepared gut of excellent quality and other samples of the same lot were tested and proved perfect. There was no infection in this case and after resuturing, the wound healed nicely and the child made a good recovery. Whether the starved patient's tissues possess an abnormal digestive power I do not know, but similar observations have been made by others.

The postoperative treatment of these cases is of extreme importance. It must be remembered that the child is primarily suffering from starvation and that the indication is to supply food and drink as quickly as possible. One distinct advantage of local anesthesia is that it permits of much earlier feeding.

One-half ounce of water is given one-half hour after operation. If retained, as is usually the case, breast milk one-half ounce, if obtainable, is given one hour later. It is of great advantage to have
breast milk but if none is available Eiweiss milk or a formula of
skim milk, barley water and sugar may be used. The milk feeding
is given every three hours increasing by 2 c.c. at each feeding. Mid-
way between feedings water is given in equal quantity. The feedings
are thus gradually increased until in the average case at the end of
twenty-four hours the child is taking an ounce at a time. The ad-
vanced cases are always dehydrated and it is often wise to supplement
the water intake by hypodermoclysis. Proctoclysis is rarely of use.
If possible the child is put to the breast one week after operation and
nursing supervised so that not more than two ounces are taken at a
feeding during the second week. Thereafter the child may take its
fill and can in the vast majority of cases be treated as a normal
child.

We meet of course with difficult feeding cases after a Rammstedt
operation as well as in infants who have had no pyloric stenosis and
they are handled in exactly the same manner as though there had
been no surgical procedure.

It is the exception to have vomiting persist after operation. Many
cases will regurgitate once or twice during the first twenty-four to
forty-eight hours, retaining however practically all their nourishment.
If vomiting occurs and is at all marked it has been my experience
that prompt gastric lavage and the semierect posture will stop it.
A teaspoonful of castor oil twenty-four hours after operation will
remove gas and mucus and aid in the establishment of normal in-
testinal action. The tendency to diarrhea seen in the more advanced
cases will usually respond to modification of the feedings.

The incision is left undisturbed for nine or ten days unless there
is some indication for earlier inspection. At this time the retaining
sutures are removed.

One case in this series was complicated by continuous and profuse
oozing from the skin incision, although the child when a week old
and eight weeks prior to operation had been circumcised without
showing any tendency to abnormal bleeding. The hemorrhage was
sufficiently profuse to suggest the possibility that a small vessel in the
abdominal wall might be its source. I therefore re-opened the skin
incision but no bleeding vessel was found. After resuturing the skin
the hemorrhage persisted in spite of two subcutaneous injections of
father's blood and one transfusion of the mother's. I therefore again
opened the skin incision and packed it with Coagulin and sterile
gauze, after which bleeding ceased. Two days later I removed the
gauze pack and strapped the skin and prompt healing took place.

CONCLUSION

1. Congenital pyloric stenosis is sufficiently common to deserve more
general recognition.
2. Mild cases may be treated medically.
3. Severe cases and those not rapidly responding to medical treatment should receive prompt surgical treatment.
4. The simplest and best surgical treatment is the Rammstedt operation.
5. The advantages of local anesthesia are sufficient to make it the method of choice.
6. The mortality of congenital pyloric stenosis is the mortality of delay, the operation itself having practically none.

BIBLIOGRAPHY


375 Delaware Avenue.
THE INCIDENCE AND SIGNIFICANCE OF UROGENITAL SYMPTOMS IN GYNECOLOGIC PATIENTS

By Walter T. Dannreuther, M.D., F.A.C.S., New York City

(Associate Professor of Gynecology, New York Post-Graduate Medical School and Hospital; Attending Gynecologist, St. Elizabeth's Hospital; Consulting Female Cystoscopist, Lutheran Hospital.)

AFTER four years in general practice, and another four of gynecology, I acquired a working knowledge of cystoscopy in 1914. During these eight years women complaining of symptoms referable to the urinary tract were treated for "cystitis" without any real study of the urinary pathology, unless the severity of symptoms demanded consultation with a urologist. Since 1914, however, such patients have received the benefit of a cystoscopic examination, supplemented by such further urologic investigation as was deemed necessary. Retrospection now convinces me that: (1) many gynecologic patients manifest symptoms referable to the urinary tract; (2) in women, there is such a close relationship between the pelvic and urinary organs, that symptoms originating in one group are frequently referred to the other; (3) no gynecologist is equipped for the practice of his specialty until he becomes proficient in cystoscopy; (4) it is not necessary that the gynecologist become a urologist, but he must be qualified to recognize lesions of the urinary tract promptly and treat them intelligently; and (5) these facts are not appreciated by all gynecologists.

My own early sins of omission and the observations made during the last ten years have so inculcated the truth of these aphorisms that here-with I venture to submit a review of 600 consecutive private case records. No dispensary or hospital ward records have been included, because histories taken by different individuals lack uniformity, and patients coming to the ward service are usually selected cases and candidates for some definite gynecologic operative procedure. No obstetric cases are included in this presentation.

While I have no inclination to compile a series of statistical tables, which, as has well been said, "may be made to prove anything, even the truth," yet the occurrence of urinary diseases in gynecological practice and the relative significance of the several symptoms discovered in the analyses of these histories must necessarily be gauged to a considerable extent by their mathematical frequency.
A study of the case records reveals:

Patients having no urinary symptoms 481
Patients having some pathologic condition of the urinary tract, or symptoms referable to it 119
Total 600

It is therefore evident that 20 per cent of patients consulting the gynecologist require cystoscopic examination to establish a diagnosis. Of the 119 patients constituting the basis of this investigation, 53 had urinary symptoms only, while 66 had both urinary and pelvic symptoms. But the fallacy of relying upon symptomatology for diagnosis is well illustrated by the causative factors discovered:

| Patients having lesions of the urinary tract | 51 |
| Patients having lesions of both the urinary and pelvic organs | 44 |
| Patients having lesions of the pelvic organs only | 14 |
| Patients having urinary symptoms due to remote causes | 10 |
| Total | 119 |

In the 95 patients having actual disease of the urinary tract, either alone or associated with some pelvic lesion, the following pathologic conditions were present:

- **Pyelitis**
  - Acute Suppurative 7
  - Chronic Hemorrhagic 1
- **Trigonitis**
- **Cystocele**
  - With irritation of bladder 11
  - With trigonitis 10
- **Urethral caruncle**
  - Uncomplicated 4
  - With chronic pyelitis 2
  - With cystocele and trigonitis 1
  - With trigonitis and urethritis 1
  - With supernumerary ureter 1
- **Urethritis**
  - Acute cystitis 6
  - Prolapsed kidney 6
    - Uncomplicated 3
    - With chronic pyelitis 2
    - With hydronephrosis 1
  - Renal calculus 3
  - Ulcerative cystitis 3
  - Ureteral stricture with chronic pyelitis 2
  - Periurethral abscess 2
  - Renal tuberculosis 2
  - Bilateral polycystic kidney 1
  - Pyonephrosis 1
  - Relaxed vesical sphincter 1
  - Papilloma of bladder 1
  - Carcinoma of bladder (secondary) 1
  - Total 95

A general survey of these cases discloses many facts of clinical importance, but before discussing the several diseases separately, I desire to call attention to the practical value of two easily utilized diagnostic
aids; catheterization of gynecologic patients, and the routine use of the indigo-carmine renal function test.

**Catheterization of Gynecologic Patients.**—An empty bladder is a prerequisite for satisfactory bimannual examination. To preclude contamination, a specimen of urine must be fresh, obtained by catheter, and drawn into a sterile receptacle. I have, therefore, adopted the practice of catheterizing all gynecologic patients on their first visit, collecting the specimen in a long sterile test tube, after the fashion of the urologist. This method not only insures complete emptying of the bladder before making the pelvic examination, but also affords an excellent opportunity to examine the urine "body," with reference to its physical properties. Turbidity, discoloration, and the flakes, filaments, and shreds suspended in the urine are detected by twirling the tube. The same urine is available for smears or cultures, should they be deemed necessary. There is often a decided difference between the appearance of a freshly catheterized specimen and one contaminated by passing the vulva, and brought in a bottle by the patient after the lapse of considerable time. The advantages of catheterization are obvious. Inspection of hundreds of catheterized specimens of urine from women warrants the following conclusions:

Discoloration of the urine is due to the presence of blood, bile, or some chemical agent.

Turbidity of a milky character, cleared by adding a few drops of acetic acid, is due to phosphaturia.

Turbidity of a milky character, not cleared by acetic acid, is due to bacteriuria.

Flocculent material that does not tend to settle to the bottom of the tube is mucus.

Flocculent material that becomes "ropy" on twirling of the tube, and tends to settle afterwards, is pus.

Visible small granular flakes, equally distributed throughout the urine "body" are often a manifestation of pyelitis.

Large flakes and shreds usually come from the bladder or urethra, and often denote a cystitis or urethritis.

**Indigo-Carmine Renal Function Test.**—Of all the renal function tests, this one is probably the most easily applied and consumes the least time. Although it does not represent the metabolic capabilities of the patient as accurately as the phenolsulphonephthalein, it quickly indicates any impairment of renal function or ureteral obstruction on one or both sides. I would strongly urge that the gynecologist carry it out in every patient with chronic appendicities, cystic ovaries, and other diseases to which pain in the lower abdomen is so often ascribed, before subjecting the patient to operation, as its behavior may suggest the presence of some lesion in the kidney or ureter, which in reality is
producing the symptoms erroneously attributed to coexisting pelvic pathology. When the indigo-carmine is given intravenously, the technique is simple, elimination rapid, and the test reliable.

**Pyelitis.**—The most striking feature of this disease is the frequency with which it occurs in women. Adding the two cases of urethral caruncle, the two of prolapsed kidney, and the two of ureteral stricture, in which there was a coexisting pyelitis, to the 18 uncomplicated cases, makes a total of 24; 25 per cent of the whole number of the diseases of the urinary tract. Practically all of these, of course, showed a concomitant involvement of the bladder in the inflammatory process, so that although intravesical treatment would have failed to cure, a diagnosis of "cystitis" would not have been entirely wrong.

While many of these patients unquestionably acquired pyelitis as a lymphogenous or hematogenous infection, secondary to their constipated tendencies or focal infections, I have been impressed by the number of instances in which the onset in the under-nourished, anemic type of individual has followed sea bathing in the late summer months. In such cases, when the patient was at a resort, the local physician usually made a correct diagnosis during the acute stage, but limited his treatment to medical measures. Several of the patients with chronic pyelitis had been treated for variable periods of time by other physicians with indifferent success. All required irrigations of the renal pelvis through a ureteral catheter for cure. The acute cases were all suppurative but one, which was hemorrhagic in character.

Fourteen patients had previously been treated unsuccessfully by other physicians for periods of from three weeks to 23 years; 1 for three weeks; 2 for 4 months; 3 for 6 months; 5 for 1 year; 1 for 2 years; 1 for 10 years; and 1 for 23 years. The patient who was treated for 23 years had many nervous symptoms and had been in the hands of another gynecologist for a long time. Apparently in desperation he had cut down on the right kidney because of severe lumbar pain seven years before I saw her, without a preliminary cystoscopic examination. This woman was completely cured in six months by instillations of silver nitrate into the renal pelvis.

The urine from patients with pyelitis without exception showed alterations in its macroscopic appearance. Those with acute inflammation had a pronounced pyuria or bacteriuria, while those with chronic involvements showed small granular flakes or small shreds in the catheterized specimen. Four of the acute cases also had hematuria, in three of which the pyogenic features predominated and the bleeding occurred intermittently. In the other case, the hematuria represented a real hemorrhagic pyelitis.

Colon bacilli were found in the urine in 16 cases, staphylococci in 7, and streptococci in one case.
The elimination of indigo-carmine was delayed beyond 6 minutes from the affected side or sides in 18 cases, but never more than 12 minutes.

In each case of pyelitis there was an inflammatory involvement of the bladder, so that a certain degree of cystitis may be accepted as a concomitant of the disease, the acuity of the bladder inflammation often corresponding to the intensity of the pyelitis. The bladder capacity was markedly diminished in two cases of suppurative pyelitis, to 5 ounces and 3 ounces respectively, and in both instances there was a pronounced cystitis.

Of the 24 patients, 16 had urinary symptoms alone, and eight urinary and pelvic symptoms combined. Only two had an associated pathologic condition of the pelvic organs to which some of the symptoms might fairly be attributed (reversion of the uterus in both instances). The menopause was incidental in two other cases. The most common symptom was frequency of urination; diurnal and nocturnal in 19 patients, and diurnal only in two others; three were entirely free from this annoyance. The next most constant symptom was lumbar pain or discomfort. This occurred in 18 patients, while hypochondriac distress on the affected side was mentioned only five times. When a woman talks about "backache," it is a good idea to make her indicate its exact location by putting her hand on it. This is certain to prevent the not infrequently made mistake of assuming that she refers to the sacral region, when she really means the lumbar, and a mobile retroverted uterus will not be unjustly accused of causing it. Inguinal pain was noted in three cases: in the two of ureteral stricture with chronic pyelitis and in one case of prolapsed kidney with pyelitis. Urgency of urination appeared, seven, suprapubic discomfort, seven, burning sensation on voiding, five, tenesmus, three, and urethral discomfort three times. Pyrexia was observed in all cases of acute pyelitis, but in none of the chronic cases.

**Trigonitis.**—This is defined by Dorland as "an inflammation or localized hyperemia of the trigone of the bladder," which actually implies a chronic cystitis. When preceded by acute cystitis, the primary inflammation usually involves the entire bladder wall. This subsides rapidly, and except in those cases in which resolution and recovery are complete, there remains a chronic inflammation, which is either restricted to or more pronounced in the region of the trigone. On the other hand, a large number of cases are insidious in onset and chronic from the beginning. A certain degree of trigonitis invariably accompanies chronic pyelitis, so that the number of patients having this latter condition must be added to those with trigonitis alone. If all these are grouped with all the cases having acute inflammations, it is quite evident that the diagnosis of "cystitis" will be at least partially correct in about 50 per cent of gynecologic patients having urinary symptoms. The term "trigonitis," as generally used, refers to a chronic cystitis, limited chiefly to the region of the trigone, and usually seen as a trigonitis
pseudomembranosa or cystitis cystica. In chronic ulcerative and hemorrhagic cystitis the pathologic processes extend so far beyond the confines of the trigone that they cannot properly be included in this category.

The catheterized urine from every one of the cases of uncomplicated trigonitis showed either turbidity or comparatively large flakes and shreds. Cultures developed colon bacilli in nine cases, staphylococci in three, and micrococci catarrhalis in one case. In two instances no microorganisms could be recovered: one in which the trigonitis was apparently due to extraneous causes (postoperative adherent anteversion of the uterus) causing extravesical pressure, and another in a patient coming for the relief of bladder symptoms after a nephrectomy for pyonephrosis by another surgeon. One patient had been treated for six months by a general practitioner, and was referred to me for "tuberculosis of the bladder." The doctor stated that on one occasion he had found tuberele bacilli in the urine. He had undoubtedly examined a voided specimen, contaminated by contact with the vulva, and mistaken the smegma bacillus for the tuberele bacillus. Such an error is unlikely if the bladder is catheterized. In no case was there any reduction of the normal bladder capacity.

Indigo-carmine was eliminated from both ureters in less than six minutes in all cases.

Both urinary and pelvic symptoms were present in seven of the 15 patients, and six of these had coincident pelvic disease, the other had an intestinal stasis causing pelvic symptoms. Diurnal frequency occurred in 12 patients, and nine of these had nocturnal annoyance too. One patient had nocturia without any during the day. Two had urgency and tenesmus without any frequency whatever. The patient who had had a nephrectomy complained of dull discomfort in the lumbar and hypochondriac regions on the opposite side, probably due to compensatory hyperactivity of the remaining kidney. Only one other patient had hypochondriac pain, and this was due to cholecystitis. Six patients had urgency, 3 tenesmus, 3 suprapubic discomfort, and 1 impaired bladder control. No patient complained of urethral discomfort, burning on voiding, or inguinal pain, and none had any elevation of temperature.

Cystocele.—Many patients with cystocele are free from urinary symptoms. In these cases the prolapse of the bladder is not very extensive or the patient comes under observation early. But others do have annoyances which can justly be referred to the bladder. In these cases cystoscopy is of material aid, for should a trigonitis be present, it is only fair to warn the patient that the operative correction of the cystocele is but the first step in her treatment and subsequent intravesical instillations will be necessary. Otherwise the persistence of symptoms after operation will be disappointing. When the cystocele is pronounced
there is always some distortion of the bladder which gives rise to at least a capillary congestion. This, together with the tendency to urinary stasis, renders the bladder particularly susceptible to microbic invasion. The fifteen cases considered as representing purely a pathologic condition of the urinary tract include only the ones attended by urinary symptoms.

The physical properties of the urine are not affected by the extent of the cystocele, but are entirely dependent upon the intravesical inflammation and infection. The urine was clear in all the patients except the four in whom cystoscopy showed a definite trigonitis. In these there was turbidity, with large flakes or shreds, and colon bacilli were found in each one. The cystocele was accompanied by complete uterine prolapse in three cases, there being about one ounce of residual urine in each instance. One of these patients apparently had a diminished bladder capacity, as she could not tolerate more than three ounces of fluid, but this was probably due to extreme irritability of the mucosa rather than to actual contraction of the bladder wall.

All but one of the 15 patients had both urinary and pelvic symptoms and all had some coexisting pelvic lesion, while one was also syphilitic and another had a definite hyperthyroidism. The patient with urinary symptoms only had a huge cystocele, but only a moderate perineal laceration with it. The most characteristic symptom in cases of cystocele seems to be that on lying down the patient experiences relief from all her other urinary symptoms, whatever they may be. Diurnal frequency occurred in 11 of the 15 cases, but only two complained of nocturnal annoyance. Another had nocturnal frequency only. Control was impaired in five patients, varying from occasional dribbling to involuntary voiding on coughing, sneezing, and exertion, and actual incontinence. In two of these the vesical sphincter was decidedly relaxed, and all but one (the syphilitic patient) were cured by a Kelly operation on the vesical neck and correction of the cystocele. Only four patients complained of urgency, and they were the four with trigonitis. All these women with cystocele were conscious of "something coming down."

_Urethral Caruncle._—In view of the fact that in six of the ten cases of caruncle there was an additional pathologic condition of the urinary tract, it is obvious that removal of the caruncle would not always have sufficed to relieve the patient entirely.

One of the two cases associated with a urogenital anomaly was unique. This patient complained of sharp urethral pain and burning on urination, with some diurnal frequency probably due to circulatory hypertension. Examination disclosed a small, exquisitely sensitive excrescence on the vestibule, just below the normal external meatus. A probe, pushed through a tiny slit in its center, met with little resistance and traversed a path upward, backward, and to the right. Having
introduced a cystoscope into the bladder, the probe was seen to emerge through an aperture in the bladder wall, a little above and to the right of the right ureteric orifice. This patient had a second anomalous urethra, at the orifice of which was a caruncle. Removal of the latter effected a prompt cure of the patient’s symptoms. The canal was later inspected through a small Kelly endoscope, and found to have a mucous membrane lining.

A caruncle does not produce any change in the character of the urine, so that alterations in its appearance are of course due to some other cause. Likewise, all symptoms other than urethral discomfort and burning are due either to some complicating factor or reflex irritation. Diurnal frequency, which occurred in nine of the ten cases, and urgency of urination may fairly be attributed to the latter. The patients having a concomitant pyelitis, trigonitis, or urethritis manifested the diversity of symptoms which these conditions are capable of producing.

Urethritis.—Of the eight cases of urethritis, seven were due to gonococcal infection and one to the micrococcus catarrhalis. Half the cases were acute when first seen, and the others chronic. In the acute stage the diagnosis was proved by urethral smears; in the chronic stage by smears and urethroscopey. The urine was turbid, containing large flakes and shreds, while the infection was active, and gradually cleared as the inflammation subsided. One patient with acute gonorrheal urethritis had a simultaneous perineal chancre, another an acute Bartholin abscess, and another an acute salpingitis. All eight had diurnal frequency, but only six had nocturnal annoyance. Burning on voiding occurred in six, urgency in six, urethral pain in two, and tenesmus in two cases.

Acute Cystitis.—A tentative diagnosis of acute cystitis can be made from the intensity of the symptoms, and cystoscope or any other form of instrumentation is temporarily contraindicated. Acute cystitis, per se, can be differentiated from acute pyelitis, which may be accompanied by a cystitis, by the absence of fever. Fever was not observed in any case of infection limited to the bladder.

In every case there was a frank pyuria due to the colon bacillus. In many cases of acute colon bacillus infection of the bladder it is difficult to account for the migration of the microorganisms from the colon through the blood or lymph channels, and in several instances of this kind I have attributed the infection to the careless personal habits of some women. It does not require much imagination to conceive of a smear of colon bacilli being transmitted from the anus to the vulva.

Diminution of the bladder capacity to five ounces was noted in three patients. This was only a transitory intolerance, the capacity increasing with alleviation of the inflammation.

The symptoms produced by the intravesical acute inflammation are so severe that the patient’s attention is distracted from any other annoyances that she may have at the same time. For this reason, none of the
six patients mentioned anything but the urinary symptoms. While their nature does not differ from the symptoms arising from urinary disease, acute cystitis is characterized by the intensity of the symptoms. Not infrequently they are agonizing. All six patients had diurnal frequency, and all but one nocturnal frequency; five had burning on urination, four suprapubic pain, three urgency, three tenesmus, and one urethral pain. The absence of hematuria and pyrexia in all six cases is significant.

_Prolapsed Kidney._—Not so many years ago, well within my recollection, all sorts of vague abdominal, pelvic, and nervous symptoms were ascribed to "prolapse of the kidney," if the kidney came down sufficiently on deep inspiration to permit of palpation. The number of women unnecessarily operated upon in the past for this condition had best be forgotten. As a rule, renal prolapse is simply an easily identified participant in a general visceroptosis. When a kidney prolapses as far as the true pelvis, however, there are two definite indications for radical and permanent corrective measures: Dietl's crises, produced by torsion of the pedicle, and damage to the renal histologic structures, caused by obstructed urinary drainage. The six cases classified as prolapsed kidney in this series complied with the above principles, the kidney having migrated to the pelvic region. The three that were uncomplicated required nephropexy for the relief of typical Dietl's crises, while the one with hydronephrosis had such extensive destruction of renal tissue that nephrectomy was necessary. Once the vicious circle of obstructed drainage, back pressure, urinary stasis, and infection becomes established, correction of the prolapse is imperative.

The character of the urine is of course influenced by the complicating factors, such as nephritis, pyelitis, and infection. Colon bacilli were found in the specimens from the 2 cases with pyelitis, and staphylococci from the one with hydronephrosis.

The elimination of indigo-carmine was delayed beyond the maximum normal time limit in all cases. No trace of color was seen coming from the hydronephrotic kidney, after twenty minutes observation.

Pelvic symptoms were present in addition to the urinary symptoms in four cases, being due to a large ovarian cyst, a large intraligamentary cyst, the menopause, and chronic intestinal stasis respectively. Typical Dietl's crises occurred in three patients. Increased frequency of urination was not a constant symptom, being noted in only three cases. Hypochondriac discomfort or pain was present in four, lumbar in three, and inguinal in one case. The inguinal pain was probably due to a large ovarian cyst on the same side, rather than to the renal prolapse.

_Renal Calculus._—An elderly woman had been treated by another
physician for two years for "lumbago." Roentgenography disclosed two small calcui in the lower pole of the right kidney. Another middle-aged woman had had her gall bladder removed for the relief of pain in the right hypochondriac and lumbar regions, but the same symptoms persisted after operation. Again the x-ray revealed calcui in the right kidney. The third patient had been advised to have her left "cystic ovary" removed for the relief of pain in the right inguinal region which radiated to the groin, and requested me to verify the diagnosis and agree that operation was necessary. Since I could not determine any enlargement of the ovary, an indigo-carmine function test was done. No dye escaped from the ureter until 15 minutes had elapsed, and only traces appeared after that. A wax-tip ureteral catheter was arrested 11 cm. from the ureteric orifice, and the wax bulb showed deep scratches on its surface. Subsequent x-ray examination disclosed a large calculus in the left ureter. These cases well exemplify the desirability of utilizing a renal function test on the slightest suspicion of trouble in the urinary tract.

The urine from the first patient showed evidences of chronic interstitial nephritis. That from the other two was normal.

The elimination of indigo-carmine was delayed on both sides in the first patient, probably because of the nephritis rather than the calculi. In the second and third patients there was a decided interference with the ejection of the dye from the affected side.

All three patients had pain in the hypochondriac region, corresponding to the location of the calcui, and the two with stones in the kidney substance had lumbar pain as well. The patient with a stone in the ureter had pain along the crest of the ilium, which disappeared on lying down. All three had diurnal frequency without any at night.

*Ulcerative Cystitis.*—Syphilis and tuberculosis were excluded in the three cases placed in this category. Ulcerative cystitis seems to be characterized by a more or less general involvement of the bladder, irregularly distributed areas of small ulcerated spots, and an inflammatory reaction of the subacne type, with a corresponding severity of the accompanying symptoms.

The urine "body" contains large flakes and shreds, and epithelia from the middle and deep layers of the bladder wall can be found microscopically. Any of the more common pyogenic microorganisms may produce an ulcerative cystitis. In one of the three cases the bladder capacity was reduced to four ounces, and in another to five ounces.

Diurnal and nocturnal frequency were pronounced in all three cases. Urgency was intense in two, burning on voiding in one, tenesmus in one, and hematuria in one patient. In an elderly woman the bladder
control was distinctly impaired, but this could not be attributed entirely to the cystitis.

_Ureteral Stricture._—For several years Hunner of Baltimore has insisted that stricture of the ureter occurs frequently in women. The most significant feature of the two cases encountered in this series is the fact that the strictures escaped detection and the patients suffered unnecessarily for a comparatively long time. In the first case the patient was subjected by another operator to a left oophorectomy and resection of the left tube two years before I saw her. As her symptoms persisted thereafter, she was referred to me by her family physician, and I made the mistake of operating upon her again, without doing an indigo-carmine function test first. At this time I removed a hydrosalpinx in the stump of the left tube, and the right ovary, which had become cystic. Only when I found that the symptoms still continued after this operation did I appreciate the necessity for a urologic investigation. The elimination of indigo-carmine was delayed on the left side, and the ejected stream was small and sluggish. Subsequent ureteral catheterization and pyelography demonstrated a narrow stricture of the left ureter, dilatation of which, together with a few irrigations of the renal pelvis, entirely cured the patient. It was this case which caused me to adopt the practice of doing a function test before all elective gynecologic operations. In the second case, the patient’s physician had treated her for extreme nervousness and other symptoms for more than a year.

The urinary changes are those which are usually found in cases of chronic pyelitis, which nearly always follows a stricture of the ureter, if the latter has existed for any length of time.

The behavior of the indigo-carmine function test is often suggestive. Not only is the elimination delayed on the affected side, but the caliber of the stream is reduced, and the dye dribbles from the ureter instead of appearing in forcible spurts.

Both patients had diurnal and nocturnal frequency, and a discomfort along the crest of the ilium. Both also suffered from various nervous symptoms, which disappeared after a cure was effected. No other symptoms were present.

_Perirethral Abscess._—This condition is undoubtedly a sequel of urethral infection, but both patients presented themselves with a well defined abscess already formed. One had previously ruptured into the urethra, and the other did so before the patient reached the hospital for operation. The urethral sinus closed promptly, however, in each instance, as soon as the abscess wall was excised, and the cavity healed by granulation. Subsequent topical applications soon cleared up the urethritis.

The urine in both cases contained pus, and the quantity excreted
from the urethra was so excessive that the patients complained of leucorrhea, although neither had a real vaginal discharge. Cultures from the abscess cavity showed colon bacilli in one case and staphylococci in the other. No gonococci were found in smears from the urethra, vagina, or cervix in either case.

The chief complaint of both patients was urethral pain. One had urgency, and the other burning on urination. These were the only symptoms except the supposed leucorrhea. Neither had any increased frequency of urination.

*Renal Tuberculosis.*—While only two cases of urogenital tuberculosis were encountered in this series of private patients, the incidence of this condition in hospitals and dispensary practice is considerably higher. The subject is one of such importance and of so many ramifications that the limitations of this paper permit but a brief allusion to the most salient points. (1) the patient's symptoms are usually referred to the bladder, seldom to the kidney, and differ little from those produced by other lesions of the urinary tract; (2) tuberculosis cystitis is invariably secondary to renal tuberculosis; (3) these patients particularly are apt to go from one physician to another without a correct diagnosis being made; (4) the tuberele bacilli are often extremely difficult to find in the urinary sediment; and (5) local treatment of the cystitis is useless until the offending kidney is removed.

Urogenital tuberculosis should be suspected in women when the bladder is intolerant of even bland fluids; when the capacity is reduced to four ounces or less; when cystitis fails to respond to the ordinary remedial measures after a reasonable length of time; when intravesical irrigations with silver nitrate aggravate the patient's symptoms; when there is more involvement of one lateral half of the trigone than the other; when there is a linear ulcer on the anterior wall or obstructile ulcers elsewhere; and when there is marked distortion of a ureteral orifice.

One of the two patients had been in the hands of other physicians for one year; the other for five years. The urine was fairly clear and highly acid in one, but was turbid in the other, probably because of mixed infection. In one case the tuberele bacilli were found easily; in the other they were discovered only after repeated search. The bladder was extremely intolerant in both cases.

No indigo-carmine was excreted from the diseased kidney within 20 minutes after intravenous injection in either instance. The ureter on the affected side in both cases was so involved that a No. 5 ureteral catheter could not be introduced.

Both patients had pronounced diurnal and nocturnal frequency, suprapubic discomfort, and afternoon pyrexia. One had urgency and tenesmus. The other had lumbar and hypochondriac pain, largely
due to perinephritic suppuration. Neither had hematuria. Both patients were cured by nephrectomy, followed by intravesical irrigations.

Miscellaneous.—The patient with bilateral polycystic kidneys is now thirty-eight years old, and has been under observation for seven years. During this period she has been successfully operated upon for complete prolapse. Both kidneys are tremendously enlarged and she suffers considerably from lumbar and hypochondriac discomfort. Nevertheless, her general health remains fairly good.

The patient with pyonephrosis was referred for an opinion by a general surgeon, who proposed to do a hysterectomy for fibroid, but hesitated because there were "many pus cells in the urine." The patient had diurnal and nocturnal frequency, lumbar pain, urgency of urination, and fever. I persuaded the doctor to do a nephrectomy and defer the contemplated hysterectomy.

The patient who had a papilloma of the bladder mentioned "bladder irritability" while suffering from acute appendicitis. After the appendectomy, frequency, urgency, and tenesmus still persisted. Cystoscopy disclosed the bladder tumor, which was removed by fulguration.

A relaxed vesical sphincter was found in several of the patients previously mentioned, but in one case was not associated with any other lesion of the urinary tract. This patient's impaired control was corrected by a Kelly operation on the vesical neck.

The patient who had carcinoma of the bladder suffered from an advanced carcinoma of the uterus, and lived but a short time after coming under observation. She had frequency, urgency, and hematuria.

In only a little more than 11 per cent of the 119 patients with urinary symptoms were the symptoms due entirely to lesions of the pelvic organs. The lesions in these cases were:

<table>
<thead>
<tr>
<th>Lesion</th>
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<td>Fibromyoma of the uterus</td>
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<tr>
<td>Ovarian cyst</td>
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</tr>
<tr>
<td>Pyosalpinx</td>
<td>1</td>
</tr>
<tr>
<td>Ectopic gestation</td>
<td>1</td>
</tr>
<tr>
<td>Varicosities—broad ligaments</td>
<td>1</td>
</tr>
<tr>
<td>Bartholinitis</td>
<td>1</td>
</tr>
<tr>
<td>Chancreoids</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

In every instance the urine was clear and free from pathogenic microorganisms. All these patients had coincident pelvic symptoms, except the two with postoperative anteversion of the uterus.

All six patients with fibromyoma of the uterus complained of fre-
quency of urination, but in only two did it cause nocturnal annoyance. In two others urgency was marked, and in another two there was suprapubic discomfort. The tumors were all intramural or subperitoneal, and quite large. Cystoscopy showed extravesical pressure and consequent distortion of the bladder wall in every case. One patient with a fat abdominal wall had been treated for six months by her physician for frequency and urgency of urination; her doctor did not suspect the presence of a tumor, as she had no other symptoms. Cystoscopy alone was sufficient to establish the diagnosis; there was a very marked bulging and distortion of the posterior wall of the bladder, without any evidence of cystitis.

The two patients with an extremely anteverted, almost immobilized uterus complained of frequency of urination only. They had both been operated upon for correction of retroversion, and were victims of operative "technic," at the expense of restoration of function. I could not determine what special technic had been followed, however An extremely anteverted fundus, which cannot move backward to any extent as the bladder fills, causes extravesical pressure, capillary stasis, and serves as a constant irritant to the bladder in the course of time. This point should be borne in mind by gynecologic operators. Immobilization of an anteverted uterus is just as bad as a mobilized retroverted organ.

The large ovarian cyst, pyosalpinx, and ectopic pregnancy also excited frequency of urination through extravesical pressure.

In the patient with varicose veins of the broad ligament cystoscopy showed the same sort of varicosities in the bladder wall. Frequency of urination promptly disappeared after the incidental retroversion and broad ligament varicosities were cured by operation.

One woman with Bartholinitis complained of urethral pain, but had no specific urethral infection. This symptom was due to the pressure of a huge abscess, exerted on the urethra.

The patient with chanceroids complained of burning on voiding, due to contact of the urine with the vulvar and perineal lesions.

It is interesting to note that ten patients had urinary symptoms for which no local cause could be found in either the pelvic organs or urinary tract. They were ascribed to the following extraneous causes:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocrine derangements</td>
<td>4</td>
</tr>
<tr>
<td>Neurasthenia</td>
<td>2</td>
</tr>
<tr>
<td>Neurosis</td>
<td>2</td>
</tr>
<tr>
<td>Circulatory hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Menopause</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
</tr>
</tbody>
</table>

As is usually the case in disturbances of the internal secretory glands, there was definite indication of dysfunction of more than one
gland in three of the four cases. But it is significant that all exhibited several manifestations of hyperthyroidism. They all had increased frequency of urination, and three had impaired control.

One patient with neurasthenia had diurnal frequency; the other had urgency, without increased frequency. An obscure neurosis was blamed for two cases of nocturnal enuresis; one in a fourteen year old girl and one in an adult. These four patients were referred to a neurologist.

The woman with circulatory hypertension (systolic blood pressure 214) had diurnal and nocturnal frequency, both of which disappeared with the reduction of the abnormal pressure.

Similar symptoms occurring in another woman during her climacterium cleared up simultaneously with the hot flushes, sweats, and other menopausal manifestations, after the administration of ovarian and corpus luteum extracts.

CONCLUSIONS

While it is obvious that an exhaustive exposition of the several topics considered has not been attempted, and that the number of case records included in this study is not very large, I believe that sufficient evidence has been presented to justify the following conclusions:

1. A study of 600 consecutive private case records indicates that approximately 20 per cent of gynecologic patients will require a cystoscopic examination to establish a diagnosis.

2. About 15 per cent of gynecologic patients have some definite lesion of the urinary tract.

3. Many patients are deprived of prompt relief from symptoms because so many practitioners are willing to treat a woman for "cystitis," without actually demonstrating an inflammation of the bladder.

4. It is imperative for the gynecologist to have a working knowledge of cystoscopy.

5. All gynecologic patients should be catheterized on their first visit.

6. Valuable information can be obtained by the inspection of freshly catheterized urine.

7. A renal function test should be done before most elective gynecologic operations.

8. Pyelitis occurs frequently in women, and is often overlooked.

9. Fever is conspicuous by its absence in all cases of inflammation limited to the bladder.

10. In a small proportion of cases only urinary symptoms are caused by pelvic lesions, without coincident disease of the urinary tract.

11. Cases are encountered occasionally in which the urinary
symptoms are due to causes remote from the urinary and pelvic organs.

12. No urinary symptom, or symptom-complex, is pathognomonic of anything. The diagnosis rests almost entirely upon the objective evidence.

580 Park Avenue.
DR. JOHN WILLIAM BALLANTYNE
In Memoriam

JOHN WILLIAM BALLANTYNE, M.D., F.R.C.P.E., F.R.S.E.  
(Physician Royal Maternity Hospital, Edinburgh, and Antenatal Department; Lecturer on Midwifery and Gynecology.)

BY JAMES E. DAVIS, A.M., M.D., DETROIT, MICH.

The death of this distinguished Scottish pathologist, obstetrician, gynecologist and medical writer on January 23, 1923, twenty-four hours after an operation for appendicitis, is one of the greatest losses of modern medicine.

The life lived, the work accomplished and the reforms established in the course of sixty-two years are wonderful tributes to place, persons and things making the environment, in which effort could reap such merit in fruition.

Excepting a relatively brief period of study in the schools of Berlin, Munich and Göttingen, Ballantyne's preparation was obtained at Edinburgh University where his M.B., C.M., were received in 1883 after a distinguished undergraduate career which won for him the Buchan Scholarship in Midwifery and Gynecology. Four years later he passed his examination for the M.R.C.P. Edinburgh, and in the following year was elected to the Fellowship and after two years secured his M.D., presenting as a thesis Some Anatomical and Pathological Conditions of the Newborn Infant in their Relation to Obstetrics, for which he was awarded a Gold Medal and the Gunning-Simpson Prize in Midwifery (1889). In 1901, just one year after receiving an appointment of assistant physician to the Royal Maternity Hospital, Ballantyne wrote an urgent and telling plea in the British Medical Journal for the care of the expectant mother, to which an anonymous donor responded and endowed the Hamilton Bed. From this beginning the work developed into a special system with a welfare center for expectant mothers and infants, administered and supported by the municipality with Ballantyne as “extra-physician in charge of the antenatal department.” Two years later there was added to this a department for the treatment of venereal disease in pregnancy and labor.

From the inspiration of his graduation thesis and the impetus arising directly in his daily work he published his two volumes on Diseases of the Fetus between 1892 and 1895, then in 1897 his Tera-
togenesis, and in 1902-4 Antenatal Pathology and Hygiene. In 1902 the Royal College of Physicians of Edinburgh recognized his work by awarding to him the Cullen Prize “for the greatest benefit to practical medicine in the previous four years.”

Ballantyne’s writings had by this time made his name world known in midwifery and gynecology and brought to him varied honors in Great Britain and the Americas. The American Association of Obstetricians and Gynecologists made him an honorary member, as did also the American Child Hygiene Association and the Societa Scientifica Protectora da Infancia (Brazil).

He was the convener of the committee which established the now famous Edinburgh Postgraduate Courses. His industry was phenomenal, the output from his pen would have done credit to an exclusively professional journalist. He was the author of some ten scientific volumes, besides editing two issues of Green’s Encyclopedia Medica, a Dictionary of Medicine, Quinquennium of Medicine and Surgery, Teratology, and subediting International Clinics. Besides the foregoing he had published between four and five hundred articles in medical and other journals. The editor of the British Medical Journal has tersely characterized his writings as possessing “a high level of literary excellence, with sentences poured out with not merely fluency and ease of style, but at times with the cumulative force of a torrent, sparkling with a freshness and variety of apt and illuminating imagery that is most unusual in medical papers.” By nature and temperament he was a scholar rather than a practitioner. Worldly advancement, moreover, was not his ambition; his aim was service to his fellows, and in that he spent himself lavishly.

Ballantyne’s greatest claim to fame and remembrance will rest upon his pioneer work in establishing antenatal pathology upon a scientific basis and teaching its practical application.

His life was one of intense religious conviction and conscientious fulfillment of the Christ spirit. Sir Halliday Croom, his coworker at Edinburgh University, has written, “Ballantyne’s religion was to him a natural secretion, an integral part of his being; like the circulation of the blood, it performed its function.”
Dr. David Tod Gilliam
In Memoriam

DAVID TOD GILLIAM, 1844-1923

By Earl M. Gilliam, M.D., Columbus, Ohio

DAVID TOD GILLIAM, son of William and Mary Gilliam, was born April 3, 1844, in the village of Hebron, Ohio. His parents, who resided in Virginia, came to Ohio early in the last century.

After obtaining a common school education, he enlisted August, 1861, at the age of seventeen, in the Second West Virginia Loyal Cavalry, the Ohio regiments being filled. He was with Garfield during his march against Humphrey Marshall on Big Sandy River, Kentucky, and went sent to Wheeling, West Virginia, as recruiting officer, and later ascended Kanawha River and took part in many skirmishes. Under General Crook he participated in the battle of Lewisburg. In 1862 he was wounded and captured by the Confederates, at Gauley River, Virginia, later escaping and making his way to his home in Middleport.

He then came to Columbus, Ohio, to a parole camp and upon becoming seriously ill was discharged from the army and sent home to die. Upon his recovery he attended a business college to prepare for a mercantile career, but a few years later he began to read medicine, and entered the Ohio Medical College at Cincinnati, from which he graduated in 1871.

He first located in Nelsonville but came to Columbus, Ohio, in 1877, to accept the chair of pathology at the Columbus Medical College. In 1879 he was appointed professor of physiology at the Starling Medical College; in 1885 he was elected professor of gynecology and obstetrics in the same institution. Later he was made professor emeritus in gynecology in the medical department of the Ohio State University. He was among the first to conduct work along the line of gynecology, and his studies in this specialty won him wide recognition both at home and abroad.

He was gynecologist to St. Anthony's and St. Francis hospitals; trustee of Starling Medical College; member of the Columbus Academy of Medicine; the General Practitioners Society; the Ohio State Medical Society; the American Medical Association; the Pan-American Medical Congress and the Ninth International Medical Congress; formerly vice president of the American Association of Obstetricians and Gynecologists and president of the Franklin County Medical Society.
As an author his works comprise: *Pocket Book of Medicine* (1882); *Essentials of Pathology* (1883); *Practical Gynecology* (1903); *Medical History of Ohio* (Ryan and Randall, 1911).

In fiction he produced the *Rose Croix* (1906) and *Richard Devereux* (1915). At his death he left an unfinished work, *God and Religion as Revealed in Nature*.

In 1899 he devised an operation termed "round ligament ventrosuspension of the uterus," which bears his name, and which has been the prototype of operations that thread the round ligaments through the abdominal walls. He also originated for the repair of cystocele and incontinence of urine. He invented numerous surgical instruments.

On October 7, 1866, Dr. Gilliam was married to Lucinda Ellen, daughter of Judge Thomas L. Mintun, of Nelsonville, Ohio, who survives with their three children, two sons and a daughter. Dr. Gilliam died October 2, 1923, of cerebral hemorrhage.
In Memoriam

EDWIN WALKER, PH.D., M.D., F.A.C.S.

BY W. N. WISHARD, M.D., INDIANAPOLIS, IND.

Dr. Edwin Walker, a long-time and prominent member of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, was born at Evansville, Ind., May 6, 1853, and the city of his birth was the place of his residence until his death which occurred there April 23, 1922. He was of pioneer and patriotic lineage. His paternal grandfather was a captain in the war of 1812, and near the town of Salem, N. J., there is still standing what is known as the Walker tree, near which he and the company he commanded was encamped. He also commanded a company in the Mexican War and was killed at the Battle of Buena Vista while charging the Mexican Lancers. He had removed to Evansville in 1835. His son, James T. Walker, was the father of Dr. Edwin Walker.

Dr. Walker graduated from the Evansville High School in 1869 and then went to Hanover College, from which institution he later received the degree of Ph.D. He graduated from the Evansville Medical College in 1874 and began the practice of medicine in his native city. His proficiency in anatomy led to his appointment as professor of anatomy in his alma mater and he began teaching in this department at the opening of the term following his graduation. He subsequently took two full courses in the Medical Department of the University of New York, from which he graduated in 1879, and by which institution he was awarded the prize for the greatest efficiency in diseases of the nervous system. Returning to Evansville he was appointed professor of diseases of women and of the nervous system in the Evansville Medical College. In 1883 he took a special course in diseases of the nose and throat in the Medical Department of the University of the City of New York and two years later returned to New York to spend some months in attendance upon hospital clinics, following which he went to Europe for two years for clinical and laboratory work, returning in August, 1886. His time while abroad was chiefly devoted to the study of disease of women and surgery and he was under the instruction of the most eminent members of the profession in Berlin, Vienna, London and Edinburgh. After again taking up his work in Evansville, he spent frequent periods in the principal
clinical centers of America and also made several trips abroad, always devoting the principal part of his time to clinical study, on these occasions.

He was one of the first to advocate dry surgery and the abandonment of irrigation and flushing during operation, and also early opposed to the use of active purgation as a preliminary to operative procedures. He had written extensively and it is regrettable that a complete list of his productions is not available.

The following publications by Dr. Walker are listed in the John Crerar Library, Chicago.

1. Report of Two Cases of Tubal Pregnancy, 1890.
2. Some Remarks on One Phase of Puerperal Sepsis, 1891.
3. Tetanus Following an Operation for Lacerated Perineum, 1892.
4. Reflex Irritation as a Cause of Disease, 1895.
7. The Dry Method in Surgery, 1901.
8. Galvanism as a Remedy for Uterine Hemorrhage, 1901.
10. Some Experiences with the X-ray as a Therapeutic Agent, 1903.
11. General Practice a Continuous Postgraduate Clinic, 1904.
16. The Technique of the Dry Method, 1897.
17. The Dry Method in Intrauterine Surgery, 1896.
18. Infection of an Ovary Cyst by the Typhoid Bacillus, 1902.
22. Ectopic Gestation, 1908.
23. The Purposes and Limitations of the Hospital, 1908.
26. A Further Protest Against the Routine Use of Purgative, 1911.
27. Visceroptosis: Surgical Treatment, 1913.

For twenty years or more prior to his death his face was a familiar one at the annual meetings of the American Medical Association, the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, the Indiana Medical Association, and the various other national and local medical meetings. He was a member of the first House of Delegates of the American Medical Association after its reorganiza-
tion under the present plan, and continuously held this position for twelve or fourteen years with the exception of one year when he was First Vice-president of the American Medical Association. He had also served as Vice-president of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, and President of the Mississippi Valley Medical Association and of the Indiana State Medical Association, and the Vanderburg County Medical Society. At the time of his election as President of the Indiana State Medical Association he was the youngest man that had ever held that position. His judgment, vision and fairness made him an ideal committee man and he was for many years a member of one or another of the important committees of the American Medical Association, the American College of Surgeons and other medical organizations.

He was the principal founder of the Evansville City Hospital in 1882, and in 1894 established the Evansville Sanitarium, and Training School for Nurses (now known as the Walker Hospital). It was the first training school for nurses as well as the first private surgical hospital established in Evansville. He was for many years President of the Evansville Charity Organization. He was for several years President of the Evansville Board of Health and also served one term as a member of the Evansville City Council.

The Journal of the Indiana State Medical Association said of him, in part, "In the death of Dr. Edwin Walker not only does Evansville, but Indiana, and in fact the Middle West, lose one of its most capable surgeons and enterprising citizens, beloved by all who came in contact with him. Dr. Walker had the distinction of being an indefatigable worker, with a mind centered upon scientific achievement and the good that can be done to humanity, and lofty ideals in his intercourse with his fellowmen. He was at all times devoted to the best interests of the medical profession, and his loyalty to his friends was especially noteworthy. His achievements in the interest of scientific medical progress and in allaying the sufferings of humanity have left an imprint that will long survive."
In Memoriam

WILLIAM WHITFORD

BY JAMES E. DAVIS, A.M., M.D., DETROIT, MICH.

WILLIAM WHITFORD was intimately known and highly respected by all of us who had become accustomed to his presence at our meetings. He seemed essential for a successful record of our Transactions, and his substantial personality was distinct among us.

William Whitford
1858—1923

Always quiet, reliable, pleasant and accommodating, and possessed of a thorough-going knowledge of the details of our work, he had indeed become one of us. He knew our Fellows intimately, and could immediately record their names when they were taking part in the proceedings. It is our high privilege to pay tribute to the man, William Whitford, and to the service he has rendered.

William Whitford passed away suddenly December 10, 1923, at his home in Oak Park, Illinois, of acute heart disease. He was the official
stenographer of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons for over thirty years. He had reported the Southern Surgical and American Medical Associations consecutively for thirty-four years. At the time of his death he was the official stenographer for thirty medical and dental societies in various parts of the United States.

Mr. Whitford was born in Cornwall, England, January 31, 1858. In 1880 he came to America and settled in Chicago in 1881. He was a pioneer in America in medical reporting, and for a time was the only dependence of medical organizations which desired to have an exact record of their proceedings. He was a member of the Standardization Committee of the National Shorthand Reporters' Association and at one time served as its President.

He is survived by his widow and a daughter, May, who acted as his secretary.

To the foregoing memorial the Editor of the American Journal of Obstetrics and Gynecology desires to add a word of praise and acknowledgment for the labors of a man whose worth will be more appreciated as time goes on and whose presence will be sadly missed from our medical gatherings. His character and ability were widely recognized, his skill, his patience, his grasp of discussions and his wide acquaintance among doctors, all contributed to the value and accuracy of his transcripts. Modest and quiet in demeanor, always prompt and eager to reply to the many demands made upon his time and energy, his memory and accomplishments will long survive in American medical publications in which the Transactions of those many meetings appear, of which he was the faithful "recording angel."

Geo. W. Kosmak, M.D.
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