

GENERAL STAFF MEETING  
UNIVERSITY HOSPITALS

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## I. ANNOUNCEMENTS

### 1. Vacation.

No meeting Thursday, March 26, because of spring vacation (March 22-29). This is the last meeting of the winter quarter (tenth) missed vacation February 12. Next meeting spring quarter April 2.

### 2. Tumor Conference.

Friday, March 20, 11 A.M. Todd Amphitheater. Carcinoma of cecum.  
Wm. A. O'Brien.

### 3. L. W. Tasche.

Ph.D. Surgery (1930) writes:

"This is merely a note to let you know how much I appreciate the weekly reports from the University Hospitals.

I certainly think that you have put it across. It not only contains the news of the hospital for us old timers, but also has a great deal that is of value in it.

Hoping that this work keeps on going and if possible improves, I can assure you that I shall always receive 'the proceedings' with interest.

Very truly yours,  
L. W. Tasche, M.D.

P.S. My father and I have just resigned as members of the Sheboygan Clinic and will practice together.

Best regards to all".

Thank you and good luck in your new association!

### 4. Northwestern Pediatric Society

Meets in Eustis Amphitheater Friday, March 20 at 8 P.M. Clinico-pathological conference (pediatric cases) to be presented by staffs of Minneapolis General and University Hospitals:

(M.G.H.) Mumps-encephalitis, agranulocytosis, streptococcic laryngitis and bronchitis (cast).

(U.H.) Congenital cretin, intrathoracic actinomycosis, congenital absence of lung.

You are welcome. Visitors' cases will be presented first.

### 5. Institute for Funeral Directors (5th annual).

March 23 to 28th, inclusive, (U. of M. Anatomy Bldg.). Harry J. Gilligan, National Association of Funeral Directors (Note terminology). Einar O. Jule, Funeral Directors' Psychology; Metals (Dowdale); Wood (Schmitz); Art (Burton); Floral (Holm & Olson); History of Burial Customs (Kane); Credits (Ostlund); Grief (White); Anatomy (Erdman); Chemistry (Pervier); X-Ray (Rigler); Embalming (Calloway); Autopsies (O'Brien); etc. You are welcome.

Special invitation to Dramatized Clinic (The Old and New) at Music Building - time to be announced. Come and see "New" help get autopsies from relatives.

## II. CASE REPORTS

### 1. CARCINOMA OF RECTUM, PYELONEPHRITIS, FIBROMA OF KIDNEY.

Path. Randall & O'Brien.

The case is that of a white female, 66 years of age, admitted to the University Hospital 1-3-31 and died 2-16-31 (44 days).

January 1930 - Constipation for many years. Started getting worse at this time. Slight red blood in stools occurred at intervals.

September 1930 - Pain on defecation. Weakness and loss of strength.

December 1930 - Lost 12# in weight. Patient consulted physician who sent her into this hospital.

Past history - Patient has had dizzy spells for 3 years. She had an amputation of the right leg about 8" below the knee for tuberculosis ? of the right ankle. No cardio-respiratory symptoms. Appetite good. Infrequent abdominal pains, and nausea and vomiting. Has occasional pains in joints, principally during fall and winter months. Menopause at 50 years of age. Patient states that left leg occasionally swells.

Physical examination - T. 98.2, P 80, R 20. Patient is a fairly well nourished and developed white female, age 66, lying quietly in bed. No discomfort. A sizable lesion is present on hard palate behind upper incisor. Heart - enlarged to left by percussio. Extrasystoles were heard. Rate irregular. Abdomen - a palpable nodule is present in the left costal margin. The right leg has been amputated about 3" below the knee. A few moles are scattered over the body which are benign in appearance. Rectal examination revealed an indurated, flat, non-polypoid mass at the anal canal and 1 cm. from the anal orifice and extending into the rectum, which bleeds very easily on examination. Hemorrhoids are present. Impression: 1. Carcinoma of the rectum. 2. Gunnats. Laboratory examination: (January 5, 1931) - Urine negative except for an occasional Wbc. Hb. 83%. Wbc 9.050. P 80. L 18, E 2. Urea nitrogen 28.9 mg. per 100 cc. Sugar .086 gr. per 100 cc. NaCl 512 mg. per 100 cc. X-ray of chest is negative.

Progress - 1-5-31 - Liquid diet. S.S. enema. Returned highly colored with particles of constipated fecal material. Prepared for proctoscopic. M. S. gr. 1/6, atropin 1/180. To the operating room. Anoscopic examination shows a hard, indurated, cauliflower lesion 1 cm. from anal orifice. This involves the right half of the circumference of the anus and extends 4 cm. proximally. It was slightly fixed and bled easily. Further proctoscopic and sigmoidoscopic examinations up to 17 cm. from anal orifice was negative. Medical consultation: No signs of cardiac decompensation. Rate is regular, but every 3rd to 5th beat has an extra systole. Heart not enlarged and normally shaped. No therapy indicated. Blood culture negative.

1-6-31 - Dermatology consultation - Very old lesion of hard palate is probably a fibroma. Advise excision.

1-7-31 - Mineral oils ox. 1 b.i.d. Stools contain small blood clots. No complaints. Surgically prepared.

1-8-31 - 8 A.M. M.S. gr. 1/6, atropine sulphate, gr. 1/180. Patient complains of a slight sore throat. She caught a little cold during the night. T 98. P 84 B.P. 120/27. To operating room. Anesthesia: Spinal and spinocaine. The carcinoma of the rectum does not seem to infiltrate deeply. It is flat, ulcerated and with elevated edges. No palpable nodes regionally or elsewhere. Procedure: a Harrison-Kripps type of operation. Anus closed. Incision made posteriorly up and over coccyx, cutting the sphincter in the posterior midline. Incision

carried forward to the vagina. The rectum was dissected from the vagina inside of the sphincter. The rectum was freed up to the reflexion of the peritoneum on all sides. The rectum was then cut across 1" above the upper margin of the carcinoma. The remaining portion of the bowel was then pulled down and the mucous membrane sutured to the skin. The rectum was then reinserted within the sphincter sutured in the midline posteriorly so that it again surrounded the new anal canal. The incision was closed with silkworm gut with 2 Penrose drains, one anterior and one posterior to the anus. A hard lymph node about 1 1/2 cm. in diameter was found in the hollow of the sacrum and excised. B.P. after operation 90/45. P 140, R 24. Returned from the O.R. at 11:50 A.M. 2 P.M. 2,000 cc. normal saline hypodermically. Complains of severe pain. Emesis. Small amount of watery fluid 4 P.M. M.S. gr. 1/4 9:30 P.M. Has not voided. Sleeps for short intervals. Pathological report: 1. Adenocarcinoma of the rectum. 2. Metastatic adenocarcinoma of lymph gland.

1-9-31 - Hb. 75%, WBCs 8,550, RBCs 3,470,000. Mineral oil oz. i.b.d. 2:30 A.M. morph. sulphate gr. 1/4 for pain and discomfort. 6 A.M. voided 25 cc. 9 A.M. voided 35 cc. 10:35 A.M. voided 35 cc. Buring on urination. Position changed frequently. Restless and complains of pain. 3:40 P.M. Morphine sulph. gr. 1/4. 6:30 P.M. Voided 25 cc. Catheterized - 750 cc. of retention. 10 P.M. resting well. T 98, P 80.

1-10-31 - 8 A.M. 300 cc. retention. Fairly comfortable. 4:30 P.M. catheterized 275 cc. retained. Complains of pain in bladder region. 5:15 P.M. morph. sulph. gr. 1/4 11:30 P.M. catheterized 150 cc. Urine shows many bacteria and occasional WBCs. Nb. 50%. Blood typed and matched.

1-11-31 - Catheterized P.R.N. 8:30 150 cc. per catheter and 5 P.M. 255 cc. Liquid diet. Discontinued mineral oil. 8:45 A.M. Pain in back. Cod. sul. gr. i. 10:10 P.M. Severe pain. Cod. sul. gr. i. T. 99.6, P 92. Fluid intake 180 cc.

1-12-31 - No complaints. 2 P.M. 600 cc per catheter. Pain in bladder region. 7:30 P.M. 450 cc. per catheter. 10 P.M. Cod. sul. gr. i.

1-13-31 - Voids only small amounts frequently. 8:30 A.M. 450 cc. per catheter. 6:30 P.M. 525 cc. per catheter. 6:50 P.M. m.s. gr. 1/4. Silkworm sutures removed. Dry dressing applied. T 102, P 60, R 20. Fluid intake 1800 cc. Output 975. Rebound tenderness present in the lower abdomen. Probably peritoneal irritation.

1-14-31 - T 100.4, P 94, R 20. Hot water bottle to abdomen. 7:30 A.M. catheterized with 450 cc. retention. 10 A.M. voided 300 cc.

1-15-31 - 8th postoperative day. Patient is voiding. Hot sitz baths for 20 minutes t.i.d.

1-16-31 - T 102.2, P 80, R 22. Intake 1950, output 1500 cc. Urine - occasional WBC. Is very tired. Chest examination negative. Incision draining some. Blood culture negative.

1-17-31 - T 103, P 90, R 24. Intake 2650 cc. Output 1500. Large amount of drainage from incision. Complains of gas pains. Wound opened. Irrigated with Dakin's solution. Large amount of purulent drainage obtained. Irrigated with Dakin's through catheter. Urine shows occasional WBC.

1-18-31 - T. 101. P 100, R 22. Wound probed and dressing changed. Less drainage.

1-19-31 - T 101.2, P 100. Intake 4,000 cc. Output 3,600. Pain in abdomen. Sweet oil oz. iv given as retention into bowel. Patient is tired and weak. 12 postoperative day. Urine - occasional WBC and RBC. Large bowel movement.

1-20-31 - T 102, P 100. Intake 1000, output 900. Feels better this morning. Nauseated. Emesis of undigested food. Urine - numerous pus cells.

1-22-31 - T 99.2. Sinuses anterior and posterior to rectum. Draining well. Some abdominal pain. 3 bowel movements.

1-23-31 - Mineral oil oz. i. b.i.d. Soft diet. T 101, P 98. Emesis of 350 cc reddish brown fluid at 3 A.M. Weak. Abdomen distended. Urine catheterized. Shows numerous puscells.

1-24-31 - Acid sod. phosphate gr. x. Urotropin gr. x t.i.d. Feels better. Urine albumin 1 plus. Numerous pus cells.

1-25-31 Discontinued Dakin's irrigation. No drainage through incision.

1-27-31 - Pain in left leg.

1-28-31 - T. 100, P 90. Patient up one hour in chair. Emesis 200 cc. Pain in leg. Hot water bottle to leg.

1-29-31 - T 103, P 100. Emesis 250 cc. Intake 2500, Output 900 cc. Pain in left leg. Leg was elevated. 7:40 A.M. cod. sulphate gr. 1. 1:30 Severe chill. T 102.6. Perspired profusely. Nauseated. Took fluids well. 2:30 A.M. Chill lasting 15 minutes. Followed by T 104.4. 4 PM. Pain in leg. Emesis 150 cc. Urine shows pus cells 3 plus.

1-31-31 - Urine shows pus cells 2 plus. T 102.4, P 110, R 24. Nauseated. Frequent emesis. Intake 800 cc. Output 425.

2-1-31 - Left leg is tender. Nauseated and vomiting. 2500 cc 10% glucose in saline intravenously. Stomach lavage. Nothing by mouth. light cradle to left leg. T 101, P 110.

2-2-31 - T 100.4, P 98. Following chill. 2:30 P.M. 1500 cc. intravenous glucose 10%. 7 P.M. Emesis. 7:30 Gastric lavage. Urine - Albumin 1 plus. Pus cells 2 plus.

2-4-5-6-31 - Nausea and vomiting. Intravenous glucose 2,000 cc. 10%. Decubitus ulcer left buttock. Oil retention enema. Liquid diet.

2-7-31 - 8 P.M. T 103, following chill. Liquid diet. Emesis 50 cc. Urine alkaline. Alb. 3 plus. 4-5 RBCs. 6-5 WBCs. per h.p.f.

2-9-31 - Patient weaker. Can't take fluids so well. T 100.6, P 100. Drowsy. Pain in left leg. 2,000 cc. intravenous 10% glucose. 10:30 P.M. Restless and unable to sleep. Pain in right arm. Intake 2800, output 300 cc.

2-10-31 - T. 98.8, P 115. 2,000 cc 10% glucose intravenously. Weaker, listless. Drowsy. Emesis. Involuntary defecation.

2-11-31 - Blood transfusion. Pain in leg and abdomen.

2-12-31 - Unable to talk. P 100. R 24, labored. Comatose. Condition poor. Does not respond.

2-13-31 - T 100 (axillary) P 100, 2,000 cc. 10% glucose intravenously. Hyperventilated. R deep, slow and labored. Drowsy. Color poor. Stuporous. Pulse weak. B.P. 138/58 Abdomen soft. Dullness in both bases. P.M. Unconscious. Involuntary micturition and defecation.

2-14-31 - Discontinued mineral oil, Sodium acid phos. and urotropin. T. 101.6 (ex) P 100. Hyperventilated. Body edematous. 3,000 cc. 10% glucose intravenously. Discontinued. B.U.N. 140 Mgn Condition poor. Resp. shallow.

2-15-31 - Hypodermoclysis 2,000 cc. N.S.S. 5% glucose. Resp. shallow. Pulse weaker. B.P. 120/48. Pulse pressure 72.20 cc. 50% glucose given as a diuretic.

2-15-31 - PSP - No return in one hour. 2 specimens obtained. Blood sugar .154. B.U.N. 143, Van Slyke 28, Blood culture negative. 1/2 cc. salyrgan intravenously. Pulse rapid and thready. 4:25 Patient expired.

AUTOPSY The body is that of a fairly well developed and nourished white female 160 cm. in length weighing approximately 150 #. Rigor is slight. Hypostasis is purplish and posterior. There is a generalized edema of the entire body with the exception of the face and right lower extremity where the condition is not so marked. The edema is of the soft type. The skin is very pale, and there is a yellowish discoloration of the conjunctiva (jaundice). The pupils are 6 mm. in diameter and equal. There is slight muco-purulent conjunctivitis, the left eye. The mouth is edentulous. There is a small bluish hemangioma at the upper lip just to the left of the midline. The right lower extremity shows absence at the junction of the middle and lower thirds of the distal portion. The stump is well healed, and there is atrophy of the thigh muscles. There are bluish discoloration varying in size in the lower portion of the left lower extremity behind the knee (decubitus).

The subcutaneous fat is 5 cm. in thickness. There is a small amount of yellowish fluid in the pelvis in the right gutter. The APPENDIX is subcecal and free. The CECUM is mobile. There are a few bands that run from the upper portion of the ascending colon to the region of the gallbladder. The liver extends 3 cm. below the costal margin in the right midclavicular line. 8 cm. below the angle of the xiphoid, and is under the left costal margin. The DIAPHRAGM is at the 3rd rib on both sides.

The LEFT PLEURAL CAVITY contains 250 cc. straw colored fluid. No adhesions. The PERICARDIAL SAC is normal.

The HEART weighs 325 grams. The chambers are flabby and distended. There are hyaline plaques over the anterior surface of the ventricles and the right auricle. The left ventricle is slightly increased in thickness. The coronaries show a few patches of hyaline thickening. There are raised, yellowish, calcified sclerotic plaques at the root of the aorta and the base of the aortic valve and the base of the aortic leaflet of the mitral valve. The valve edges are free. The root of the aorta shows moderate ectasia but not so much atherosclerosis.

The RIGHT LUNG weighs 350 grams, the LEFT 300. Both are collapsed. They show moderate anthracosis. On section no abnormal changes are seen.

The SPLEEN weighs 250 grams and is enlarged. There is a yellowish structure in the left upper pole which on section reveals central softening (infarct). The pulp is dark red and the follicles are prominent. The LIVER weighs 1600 grams. On section the cut edges evert and moderate cloudy swelling is seen. There is a small, multilobulated cyst in the right lateral lobe. The centers of the lobules are prominent, but no definite chronic passive congestion is seen. The GALLBLADDER is small and contracted. There is a slight increase in subserous fat. The

The MUCOUS MEMBRANE shows diffuse cholesterosis. There are bands running from the gallbladder which have been previously described. The GASTRO-INTESTINAL tract is normal except in the lower portion. There are dense adhesions in the pelvis about this region ( a tumor of the rectum has been removed by the perineal route). There is no definite tumor tissue demonstrated. There are a few enlarged nodes which were removed for further study. (negative)

The PANCREAS weighs 120 grams and is apparently normal. The ARSENALS are normal. The KIDNEYS weigh 240 grams each. The capsules strip with difficulty exposing very rough irregular surfaces. There is a large cyst in the middle portion of the right kidney containing clear fluid, 2 1/4 cm. in diameter. There is a tumor at the lower pole of the right kidney 2 cm. in diameter. It is apparently partially encapsulated. The out surface shows fibrous appearance although the general impression is one of a soft growth. It is greyish in color and does not show a yellowish change. Both kidneys show scarring and the presence of arteriosclerosis and infarcts. In addition they are swollen, red and show multiple firm and nodular greyish infiltrations and numerous abscesses are seen, especially in the left. These abscesses contain yellowish material (purulent exudate). The general appearance is that of acute suppurative pyelonephritis. The PELTS are slightly distended and there is a marked increase in peripelvic fat. The pelves are thickened, red and covered with crusted exudate. The aorta shows slight uniform thickening but no distention. A probe is passed easily in the pelvic region. THE GENITALIA are semile. THE ABDOMINAL AORTA shows marked sclerotic changes and calcification. The BLADDER WALL is thickened. The MUCOUS MEMBRANE is edematous. Multiple hemorrhagic blebs are seen, especially in the region of the trigone. The organs of HEAD AND NECK are not examined.

DIAGNOSIS:

1. Carcinoma of rectum. (Post operative).
2. Perineal removal. (scar)
3. Acute suppurative pyelonephritis and cystitis (non-obstructive).
4. Infarcts of spleen.
5. Generalized edema.
6. Phlebitis, left leg, (probable)
7. Slight jaundice.
8. Blebs of left lower extremity.
9. Cloudy swelling of heart, liver and kidneys.
10. Acute splenitis.
11. Obesity.
12. Hyaline epicardium.
13. Left hydrothorax.
14. Generalized arteriosclerosis.
15. Puncture wounds.
16. Cholesterosis of gallbladder (chronic cholecystitis).
17. Acute conjuntintis.
18. Hemangroma of lip.
19. Absence of lower extremity (distal)
20. Atrophy of muscles (stump)
21. Slight peritonitis.
22. Gallbladder adhesions.
23. Cysts of liver and kidney.
24. Fibroma of kidney.
25. Generalized arteriosclerosis.

Comment:

Rectal symptoms about a year. Low growth allowed excision (Node containing tumor found.) Urinary symptoms soon after operation (sepsis, pyuria, local bladder signs) source infected operative site? B. coli? Bilateral lesion (uremia) Renal infections from bowel (frequent source). 3-19-31.

CASE 2.

HYPERTROPHY OF PROSTATE, MYOMALACIA CORDIS, ENCEPHELOMALACIA.

Path. Henrikson.

The case is that of a white male laborer 77 years of age, admitted to the University Hospitals 2-14-31 and died 3-2-31 (16 days).

1906 - Nocturia 4-9 times at night began. Some urgency at times.

1913 - Developed "blister" on lower lip which discharged for a few days. Consulted physician who treated it with salve. Apparent healing in 6 weeks. Scar itched and tingled every few days.

1914 - Slight swelling of the ankles lasting 5-6 weeks which patient considered due to rheumatism.

1916 - Noticed little sore on lower lip which grew rapidly.

9-20-16 - Entered University Hospitals 2-1/2 months later. A firm nodule the size of a Canadian 5¢ piece on the mucous membrane of the lower lip; the surface rough and abraded. A diagnosis of carcinoma was made.

9-21-16 - A V-plastic of the lower lip was performed by Dr. Ritchie. The sub-maxillary and submental glands were removed.

9-30-16 - Discharged in good condition.

1925 - Gradually developed deafness in the left ear.

1926 - Developed severe attacks of left tempero-frontal headaches lasting 1/2 to 1-1/2 hours with slight nausea and a little blurring of vision.

1928 - Gradually developed frequency, nocturia, burning, dribbling, reduction in size and force of stream, irregular starting and stopping of flow during urination. Ears began to itch and this itching has annoyed him since.

1929 (Dec.) - Pain and swelling of the right testicle. Used suspensory until April when most of the symptoms disappeared.

1930 (Jan.) - Developed slight edema of feet. Began to lose weight gradually.

1930 (July) - Dyspnea on exertion. No angina. Heart began to skip beats occasionally. Edema of feet disappeared.

1930 (Aug.) - Turned quickly in bed; heard something snap in the left sacro-iliac joint. Developed severe pain in the muscles of the leg and thigh which increased with movement. Wears cane for relief.

1930 (October) - Entered University Hospitals. Loss of 20# in a year, most of it recently. Physical examination: Old, fairly well developed white male, moving slowly without evidence of much pain. Has fairly marked intention tremor of right hand especially. Old operation scar to right of midline on lower lip. Lungs - Few rales on bases. Heart - Slight enlargement to left. Faint systolic at apex. B.P. 168/80, P 56. Abdomen - Small, slightly tender epigastric hernia. Rectal examination - Under anesthesia - consistency of left lobe typical of carcinoma. Extremities - Muscles of the left leg are tender along the sciatic. No limitation of motion; some pain on motion. Laboratory: Hb. 88%, WBCs 4,150, P 58, E 2, L 38, M 2. Group II. B.U.N. 13.06 and 25.6. Wasserman negative. Urine - Faint trace of albumin occasionally. Water concentration test: Range: day urine 1007-1020. Night urine 1027. PSP - 30 plus 32 is 62% in 2 hours.

10-9-30 - X-ray of pelvis and lumbar spine: Findings are those a slight bilateral sacroiliac arthritis and atrophy, and chronic hypertrophic arthritis of the lumbar spine. Heart is normal in size, shape and position. The aorta is considerably dilated particularly in the descending portion. Electrocardiogram: Sinus arrhythmia, Bradycardia and prolonged R-T interval.

10-11-30 - Cystoscopic: Bilateral intraurethral enlargement of prostate with considerable elongation of the prostatic urethra. 75-100 cc. residual. Trabeculation grade II. Chronic diffuse cystitis grade II. With history and findings this is suspicious of carcinoma of the prostate with metastases in the vicinity of the left sciatic nerve.

10-17-30 - Neurological consultation: Sciatic neuritis probably on basis of arthritic spine. 1214 mc. hrs. in 16 gold implants inserted into the prostate. X-ray treatment began. 140% S.E.D. to anterior and posterior lower abdomen and pelvis in 4 treatments in 7 days.

10-23-30 - Discharged with some urinary symptoms. Told to return to Out-patient department for x-ray treatment.

2-14-31 - Readmitted to the University Hospitals with same complaints as previously.

Physical examination: Eyes: Arcus senilis. Ears: Diminished hearing in the left ear. B.P. 145/99. Prostate: Bilaterally enlarged, firm, but not hard or tender.

Laboratory: Urine showed occasional RBC and faint trace of albumin occasionally. Hb. 78%. RBCs 3,900,000, WBCs 8,000, P 62, L 37, E 1. B.U.N. 21.6 PSP 55 and 20 are 75% in 2 hours.

2-16-31 - Catheterized for residual urine. None obtained. Complains of headache.

Neurological examination: Excited and confused. (H.M.C.?) Eye grounds: low grade arteriosclerosis.

2-17-31 - Cystoscopy: (Under H.M.C. anesthesia) Lateral intraurethral prostatic hypertrophy grade III and with overlapping and median intravisceral prostatic hypertrophy, grade I Bladder normal except for elevation at base due to median lobe enlargement. Prostate which previously seemed malignant now seems typically benign and practically normal in size to palpation. Treatment advised: prostatectomy.

2-18-31 - Poor night last night; sleep very little. 9:45 A.M. - Amytal gr. iii.

Triple bromides gr. xxx. Hydrotherapy. Nervous and excited. Voided 750 cc. bloody urine. T 102.8 4 P.M. - Castor oil oz. ii. Up for a few minutes. 10:30 A.M. -

Extremely restless. Fell out of bed. Irrational. 11:30 A.M. - placed in restraints. 7:15 P.M. - Very restless. 1,000cc. hypodermoclysis begun but set-up pulled apart by patient. Involuntary defecations and urinations. 8:15 P.M.

Luminal gr. iii. 11P.M. - Very restless. 12,-Luminal gr. ii.

2-19-31 - Restless night. 11 A.M. - 1000 cc. normal saline intravenously. Involuntary urination and defecation. X-ray: Slight density at left base may represent early pneumonia. Moaning and very weak. Bilateral bronchial pneumonia suggested. Findings of hypostatic congestion a bases. WBCs 5,300. BU.N. 53. Sugar 150, CO2 combined power 48. Blood culture taken. T 105 R. 8:30 A.M. - Complaining of severe pain in chest. Permanent catheter inserted.

2-20-31 - Hyperventilation 5 min. t.i.d. begun. Complains of stiffness in arms and legs and pain in chest. Seems improved. 9:15 A.M. - 3 P.M. - 4,000 cc. 5% glucose intravenously. Pulse regular and of good quality. Cooperative and brighter. Respirations slightly labored. T 102.4 (R). Appetite good. Large soft defecation. Very comfortable.

2-21-31 - Cheerful and quiet. Hot water bottle to neck for sharp, catching pain in cervical vertebrae. Up 1/2 hour. Blood culture contaminated with gram negative bacilli. sporebearing and in pairs. T 101 (R).

2-22-31 - No complaints except frequency. Walked around a short time. 60 cc. residual.

2-23-31 - Sodium salicylate gr. x and sodium bicarbonate gr. v every 4 hours. No complaints. Up and about Hot sitz baths begun b.i.d.

2-24-31 - Feels tied and chilly. T 101.4 (R). 5 A.M. - WBCs 9,5000, B.U.N. 25.6. X-ray of cervical spine negative. Residual urine 25 cc. 12 M-T 105.4. 2,000 cc. normal saline started. Tired and body aches. 12 M-T 105.8.

2-25-31 - T 106.2 (R). X-ray Some evidence of pulmonary congestion. No definite evidence of pneumonitis. Nervous. Is weaker. Listless. 11:45 A.M. Having chills. Intravenous glucose 5% begun. 4,000 cc. taken. A few rales present at base of

left chest posteriorly. Frequent involuntary urinations. Breathing very hard at times. T down to 100 at 12 M. WBCs 6,750. B.U.N. 31.0.

2-26-31 - Poor night. Very restless. Hot sitz bath b.i.d. continued. Complains of pain in legs and arms. T 102.8 (R). Very weak. Takes fluids well by mouth. Hot mag. sulphate packs to perineum. WBCs 6,400.

2-27-31 - Still complains of pain in arms and legs and in chest. Magnesium sulphate packs to perineum. Seems much weaker. S.S. enema with good results. 2 P.M.- Having chill. External heat applied. Breathing heavily. 3:15 P.M. - M.S. gr. 1/6. Hyosine gr. 1/150. 5 P.M. - To O.R. Suprapubic cystotomy done. 6:15 P.M. Physiological? saline by hyperdermoclysis. 2,000 cc. normal saline given. Restless. Breathing is heavy and noisy. Moves legs continuously. M.S. gr. 1/6 given with relief of symptoms. T 105 (R).

2-28-31 - Complains of pain in wound and around it and in legs. Hot sitz bath discontinued but continuous mag. sulphate packs ordered to perineum. Very drowsy. Pulse slightly weaker. 8 P.M. Does not recognize friends. Suprapubic tube irrigated with 100 cc. boric acid. T. 106.4 rectally. Fluid intake and urine output satisfactory. WBCs 6,100.

3-1-31 - Very nervous at times. Trembles when moved or disturbed. Respirations labored. Pulse weaker. Unable to cough up or expectorate mucus. 8 P.M. - S.S. enema with good results. No urinary evidence of pyelonephritis.

3-2-31 - 4 A.M. R 41-52. Does not respond. 5 A.M.- Pulse much weaker. 5:20 A.M. respirations ceased. Caf. sodium benzoate gr. 7 1/2. 5:30 A.M. Pronounced dead.

AUTOPSY Length 178 cm. Weight 165 #. The body is that of a well developed, well nourished, white adult male. Rigor is present. Hypostasis is purplish and posterior. There is slight edema. There is no cyanosis and no jaundice. Slight pallor of the mucous membranes. The pupils are 5 mm. in diameter. There is a small, slightly elevated, light brown patch 6 mm. in diameter on the anterior surface of the left chest over the 2nd rib. Patient is edentulous. There is an old, slightly contracted operation scar 2 cm. from the right side of the mouth. This extends down 2 cm. There are 2 small whitish scars on the left side of the neck below the angle of the jaw. There is a recent suprapubic operative wound 5 cm. long with a #30 Rusgh catheter at the upper angle and a small, flat piece of rubber at the base of the lower angle. There are interrupted black silk sutures (3) between the 2 rubber drains. The APPENDIX is free, 3 1/2 cm. long. The DIAPHRAGM is at the 4th rib on the left, 5th on the right.

There is 150 cc. dark brown fluid in each PLEURAL CAVITY. The PERICARDIAL SAC is markedly distended and contains 400 cc. clot and 200 cc. fluid blood. There is a narrow, slit-like opening in the posterior wall of the ventricle 2 cm. below the peripheral ventral junction, just to the left of the intraventricular groove. A soft grey clot protrudes through the opening. After the ventricle is opened the inner opening of this is found to be located between the posterior leaflet of the mitral valve and the posterior wall. The CORONARY ARTERIES are carefully opened and a narrowing is found in the region of the hole through the heart wall. The MUSCLE is soft in this area and edematous, and an opening into it a walnut-sized cavity containing necrotic material and blood clot is found. The coronary arteries elsewhere show slight coronary sclerosis with moderate narrowing. The extraventricular wall of the right ventricle contains a purplish blue softened area 2 cm. in diameter, 1 cm. below the tricuspid valve. There is a reddened patch 1 x 2 cm. above the margin of the medial leaflet of the tricuspid valve. There is a markedly calcified thickened patch beneath the aortic leaflet of the mitral valve and one of the leaflets of the aortic valve is markedly calcified with reddish blue softened, discolored areas about the calcified patch. There is slight narrowing of the coronaries at their origin in the aorta. The AORTA is smooth and soft. The EPICARDIUM is covered with a thin layer of fibrin. It is bright red due to the dilatation of the tiny vessels. The HEART weight 480 grams.

The RIGHT LUNG weighs 400 grams, the LEFT 500 grams. They show slight congestion.

The SPLEEN weighs 250 grams and is swollen and extremely soft and hemorrhagic. The LIVER weighs 2,200 grams. There is a greyish thickening of the capsule over the anterior upper surface 6 cm. in diameter. On cut section the centers of the lobules are found to stand out prominently on the light tan background. The GALLBLADDER is distended with bile. The wall shows mottling by yellowish pin-head sized areas. A few large cholesterol stones were present. There were a few adhesions to the omentum. The GASTRO-INTESTINAL TRACT is negative. The PANCREAS weighs 110 grams and is apparently normal. The ADRENALS are negative.

The LEFT KIDNEY weighs 150 grams, the RIGHT 160 grams. Aberrant arteries are present from both lower poles. The capsules strip easily. There are hemorrhages in the surface. Both show cloudy swelling and congestion. There is a retention cyst in the right near the pelvis 1 cm. in diameter. There is an opening into the superior portion of the bladder containing calcium. The wall is thin, trabeculated, and there is a mild, old hemorrhagic cystitis present. The lateral and medial lobes of the prostate are moderately enlarged. A few areas show questionable hypertrophy or carcinoma. There are a few adhesions to the capsules. Radium has been implanted 6 months ago.

On opening the head there is slight edema of the pia arachnoid. Congestion of the vessels over the left frontal region. On cross section there is an area of reddened softening 2 cm. in diameter in the superior portion of the left frontal lobe.

#### DIAGNOSIS:

- 1; Benign hypertrophy of prostate.
2. Hemorrhagic cystitis.
3. Suprapubic cystotomy.
4. Coronary sclerosis (narrowing).
5. Necrosis and rupture of left ventricle.
6. Acute hemopericardium.
7. Acute fibrinous pericarditis.
8. Encephalomalacia of left frontal lobe. (metastatic?)
9. Edema of pia arachnoid.
10. Acute splenitis.
11. Slight bilateral pleural effusion.
12. Chronic perihepatitis.
13. Slight chronic passive congestion of liver, kidney and lungs.
14. Chronic cholecystitis and cholelithiasis.
15. Old operation scar of lower lip (squamous carcinoma).
16. Old scars at right side of neck.
17. Retention cyst of right kidney.
18. Bilateral aberrant renal arteries (lower pole).
19. Pigmented nevi of chest.

COMMENT: Note urinary symptoms for 24 years (age 53). Carcinoma of lower lip removed (1916, 14 year cure). Intracranial symptoms started in 1926 (4 years) Urinary symptoms marked (2 year). Epididymitis (1929) Cardiac signs. (6 mo) Hypertension discovered on admission. Prostate benign or malignant? Bone pain local tenderness and hardness. Picture changed under radium. Encephalomalacia and myomalacia cordis (rupture) may have been on a vascular or metastatic abscess basis. Vessels show changes and peri-urethral exudate was found (both possible sources). Probable explanation (vascular) although area in heart muscle showed many pus cells.

III. ABSTRACTS: Renal Infections: Abstr. Pearson and O'Brien.

A. Classification (Minnesota)

I. Glomerulonephritis (Infectious).

1. Diffuse glomerulonephritis: inflammatory changes of any kind in glomeruli (swelling and proliferation of capillary endothelium, formation of intracapillary fibers, accumulation of leucocytes, thickening of capillary basement membrane and proliferation of capsular and glomerular epithelium.) Result is narrowing or closure of glomerular capillaries which determines subsequent structural and functional alteration. Always some tubular injury (secondary importance).

a. Acute: due to sore throat, scarlet fever, infected wounds, erysipelas, otitis media, empyema, peritonitis, etc.

b. Subacute and chronic: blend (arbitrary separation). Many subacute cases have a history of infection which suggests origin of disease, but in great majority of chronic cases there is no history of primary infection.

2. Lipoid nephrosis. Glomeruli are described as almost normal by all observers. This feature prompted belief that disease is separable from glomerulonephritis. However, by use of special stains, changes in the glomeruli are evident. Transition forms exist clinically between two.

3. Focal glomerulonephritis: Some glomeruli show inflammatory lesions and others are normal. Usually percentage of involved glomeruli is small, and of these, only part of capillary bed is destroyed. Chief source (subacute bacterial endocarditis.) Uremia in subacute bacterial endocarditis usually due to diffuse glomerulonephritis (which apparently is more common than we have supposed in past). (Reproduced experimentally.)

4. Syphilis: Glomerulonephritis in syphilitics is not unlike usual forms. Demonstration of spirochetes in few reported cases?

5. Non-embolic focal glomerulonephritis: recognized clinically but has not been studied pathologically. It may well be pyelonephritis?

6. Benign hemorrhagic nephritis: (children) without pathological basis (no examples to study). Hemorrhage in pyelonephritis is not uncommon?

II. Nephrosis (Non-Infectious)

1. Simple form usually occurs as result of bacterial toxins (common accompaniment of most infectious diseases.) At times necrotic rare (diphtheria, streptococcic septicemia.)

2. Chemical poisons: Uranium nitrate, potassium bichromate, phosphorus, mercuric chloride, arsenic and racemic tartaric acid, etc. Necrosis is outstanding histological feature. (Occasionally necrosis in pregnancy.)

3. Jaundice: Common - simple type?

4. Pregnancy: Ordinarily considered tubular degeneration. Four fetal examples recently studied showed glomerular change. (transitional?)

Nephrosis of pregnancy may pass over to chronic renal disease? (Debatable).  
Pregnancy and chronic renal disease is apt to result in toxemia.

5. Amyloid mechanically resembles glomerulonephritis in effect (sometimes) but not directly inflammatory.

### III. Pyelonephritis (Infectious)

1. Acute interstitial nephritis. Apparently rare (pathologically) develops occasionally during scarlet fever, rarely after measles, diphtheria or pneumonia. (Renal insufficiency possible). Similar change (interstitial exudate) in leukemia and pyelonephritis.
2. Tuberculosis: nodular excretory pyonephrosis, miliary tubercles (simple nephrosis and amyloid disease secondary).
3. Pyelonephritis. (acute, subacute and chronic). Group characterized anatomically by exudative inflammation in parenchyma. Polymorpho-nuclear and round cells (acute and subacute), small lymphocytes (chronic). Found in interstitial tissue, and may penetrate tubules and glomeruli. Causative agent readily found in lesions (B. coli and staphylococci.) Lesion corresponds in all respects to simple inflammation of other tissues. Types  
1) abscess - circumscribed areas of suppuration, (postmortem usually bilateral, surgical frequently unilateral.) May break through capsule (perinephritis abscess.) May spread to pelvis and cause pyelitis and cystitis. 2) Descending pyelonephritis. (Hematogenous). Primary abscesses in cortex? 3) Ascending pyelonephritis. Obstruction causing stagnation, allows bacteria from lower part to reach upper. Obstruction does not necessarily mean infection is ascending as hematogenous lesions may develop in hydronephrosis. Acute and sub-acute types may die of sepsis or uremia. Chronic sometimes to uremia. Pyuria is important diagnostic sign. (Pus may be discharged intermittently.)

### IV. Vascular (Non-Infectious.)

Orthostatic albuminuria, chronic passive congestion, senile arterio-sclerotic kidney and arteriolosclerotic kidney.

Comment: Disease of kidney: 1) anomalies; 2) obstructive lesions; 3) glomerulonephritis; 4) nephrosis; 5) Pyelonephritis; 6) vascular conditions; 7) tumors. Following abstracts relate to some phases of pyelonephritis (exudative interstitial nephritis probably a better term for group) apparently much more common and less well generally understood at Minnesota than glomerular and other groups.

B. Frequency and incidence: Ref. Caulk, J.R., J. of Urology, 16:117 (1926). Material Barnes' Hospital, Children's hospital, and own private practice (St. Louis). 2100 renal infections found (adults (1191)), children (909)). Ratio: Barnes' Hospital 1:76. Children's Hospital 1:40; private practice 1:10. Occurs in two extremes of life (more common in females?). Children (females 684, males 225 (3 to 1). Adults: females 755, males 436 (2 to 1). 103 females had infections directly as a result of pregnancy. Exclude these cases and female predominance is not so marked. Age 50-80 (males 163, females 201.) Obstructive lesions in lower urinary tract in males was thought to be more frequent source of infection than was found in this group. Infections twice as frequent in children as adults, most occur under 10. 483 in childhood, all but 25 under 10. Very frequent in first year. 172 cases \*(deaths 69) 40%. Others 10-20 (219) 20-30 (342) 40-50 (147) 50-80 (364) (312 of 364 from 50 and 70.) Extra - renal infections are commonest source in childhood. Multiple possibilities frequently present. Greatest single factor (otitis media) (78 of 483). Comment: Group is more common than glomerular disease? Well known to surgeons, urologists and pediatricians. Obstruction in the urinary tract plays important role. Caulk points out that in addition obstruction is also important factor in treatment. (80%).

C. Other Factors in Infection in Childhood. Mertz, H. O. and Smith, L. A., Radiology, 12:193 (1929).

Spina bifida occulta.

1. Clinical importance: Pybus (1921). Usually symptomless. West (1929) army series, insignificant part in urinary incontinence. Woltman (1926) radiologists considered defect slight variation from normal. Preitz, spina bifida occulta present in patients with enuresis as follows: 68% adults, 55 % children.

2. Frequency. Wheeler (1920) 1,000 x-ray examinations of white adults found imperfect closure of last lumbar (2.3%). Roederer and Lagrot (1926) found deficiency in development of first sacral segment (posterior lamina) (9.9%). Rigler (5%).

3. Types: 1) Failure of calcification; 2) failure of fusion of arches in same plane; 3) nerve involvement (present or absent); Difficulty in demonstrating defect is technical, age, etc., e.g. 4th sacral vertebrae usually closes at 6th year; may be variable.

4. Symptomatology: (neurotrophic). 1) adherent to superficial structures (pressure). 2) meningocele; 3) touch membrane over defect; 4) perforation by dense band connecting surface with deep structures; 5) fatty tissue; 6) bulging of dura; 7) exostosis in canal; 8) fibromyolipoma; 9) nerve degeneration. Defect is frequent with other anomalies, or only manifestation? Studies of subdural space chiefly by French observers. Lipiodol (impingement) may be demonstrated. Not without danger and may not demonstrate change. Association between spina bifida occulta and anomalies of urinary tract in childhood should always be considered. (1) Incontinence (enuresis). (2) Retention (paralysis of detrussor muscle, with or without interference of bladder sphincteric control). (3) Ureteral paralysis? Experimentally produced (Audler), nerve section followed by atrophy of muscles and reflux. Authors report 9 cases as follows: ① 2½ year female, spina bifida occulta (cystica), operated on followed by incontinence, vesicular retention, bilateral reflux dilation of ureters and pelves. ② 3-year female, involvement of first sacral, paralysis of rectal and bladder sphincters; vesicular retention, bilateral reflux, marked dilation of right ureter and pelvis. ③ 1½ year female, all sacral vertebrae open, urgency and vesical retention, bilateral reflux (severe urinary infection 1 year). ④ 7-year? first sacral, enuresis since birth, urgency, vesicular retention, left reflux. ⑤ 3-year female, 5th lumbar, dilated ureters, right orifice gaping. Symptoms? ⑥ 3-year female, all sacral open (mental defect). Operated and large amount of fat removed. Enuresis, day incontinence, residual urine, bilateral reflux. ⑦ 7-year, sex? first sacral open, retention, dribbling (day and night), bilateral reflux, dilated pelves and ureter. ⑧ 3½ female, all sacral open, day incontinence, urinary frequency, urgency, left ureter and pelvis dilated, right dilated but not down to bladder. ⑨ 3-year, 4th and 5th lumbar open, all sacral, continual enuresis, residual urine, bilateral reflux, dilation of ureters and pelves. Comment: The finding of urinary infections in children (older?) is indication for study of sacral and lumbar vertebrae (x-ray). Finding of sacral and lumbar defects is indication for examination of urinary tract. We have had several examples of this association during the past year. Our teaching has been in accord with the "secondary" condition necessary in spina bifida (pathogenicity).

D. Pathology of so-called Pyelitis in Infants.

Wilson, J. R. and Schloss, O. M., Amer. Jour. of Disease of Children, 38:227, (August) 1929.

1. General Statement. Fever plus moderate or large amount of pus in urine in infants or young children is usually diagnosed pyelitis. Commonly made clinically, rarely at postmortem. Objection usually recover? but may die of intercurrent disease.

2. Material: 12 year collection 49 infants and young children pyuria during life. Many under 3. Authors believe chronic pyuria in older children often on a congenital basis. (obstruction). Degree of pyuria - mild or severe. (incidental finding to main diagnosis.)

3. Results: Inflammatory foci in interstitial tissue (mononuclears and polymorphonuclears,) mild forms arranged around small vessels severe (abscess formation). No destruction to marked injury of tubules and scar tissue. Often associated with disease of upper respiratory tract (portal).

4. Group 1 - (28) mild to moderate pyuria. Complicating acute infections. Males 11, females 7. (Note males). 22 of 28 showed lesions at autopsy. 6 showed none in kidney, one had cystitis, 5 without pathological findings. Group 2 - Marked pyuria (17). High fever, prostration. Suppurative nephritis found. Males 10, females 7. Only one showed involvement of pelvis. Authors admit pyelitis may be primary focus? which heals as they believe spontaneous recovery is not infrequent and this should not be used as argument against nature of disease. Group 3 - (3) Healed. All examined after complete recovery. Postmortem for death from other cause. Two clinical cases followed to recovery. All posts showed healing with scar formation (few patches of lymphocytes), indicating suppurative nephritis may get well.

5. Conclusion: 1) Pyuria is rarely, if ever due to pyelitis? 2) Post-mortem studies indicate interstitial exudative nephritis varying from round cell infiltration to abscess formation is basis for change. 3) Process may heal. 4) Source may be ascending or descending. 5) Reported predominance in females is not borne out in study. 6) Evidence points toward more blood stream infection (nephropylitis). Older children frequently have infection as a result of congenital lesion.

E. Carbuncle of Kidney - Lazarus, A., J. of Urology, 21:355, 1929.

1. Lesion first described by Israel. Infection due to staphylococcus, (usually aureus), secondary to same sort of lesion elsewhere (presenting same appearance.) May develop after original focus heals. Carbuncle of neck, furunculosis, osteomyelitis, paronychia. Lesion is rare? or probably confused with perinephritic abscess. Must be differentiated from metastatic abscess (multiple foci or bilateral).

2. Mechanism of infection: Lodgement of infectious material in lymph vessel (involvement of renal parenchyma?) No glomerular disease (bacteria not demonstrated). Comment: Bacteria quickly phagocytosed and disappear in glomeruli so not logical argument. Arterial or attenuated virulence. May begin during course of superficial lesion.

3. Gross: large central abscess surrounded by cluster of smaller abscesses (may fuse). Possibilities: 1) rupture into perinephritic space. 2) descending infection pyelocystitis. 3) heal.

4. Symptomatology: Pain localized over the kidney, lack of urinary symptoms usually frequency or urgency), local tenderness costo-vertebral angle, lumbar muscles tender, bulging and spastic. Urinary findings usually negligible. 12 out of 23 reported cases (only few pus cells). Pyelogram?, cystoscopic examination usually negative.

5. Diagnosis: Made on history of previous infection plus local signs. Only 4 of 22 have been preoperatively diagnosed (literature). Important are negative urinary and cystoscopic findings. Differentiate from multiple abscesses (bilateral involvement greater prostration).

6. Time factor may develop from 2-5 weeks after original infection. Infrequent development at same time. One 7 months after initial lesion?
7. Treatment: Preliminary drainage, secondary nephrectomy if first fails.
8. Summary: 1) Carbuncle of kidney is distinct clinical entity. 2) History of sepsis plus kidney localization minus urinary findings is diagnostic. 3) Urinalysis and cystoscopic examination chiefly of negative value. 4) Results of treatment usually good. 5) In exploring perinephritic abscesses possibility of carbuncle kidney (underneath) should be considered. 6) Treatment primarily drainage and only secondarily nephrectomy.  
Comment: One of our cases was followed after drainage of perinephritic abscess and scar was found in cortex.

F. Etiology pyelonephritis (usually B. coli and staphylococci) Barker L.F. Nature and Treatment of Typhoid and Para-typhoid Bacilluria and Cystopyelitis J. of Urology, 23:387, 1930.

Has been known for some time that typhoid and paratyphoid bacilli might be isolated from urine (with or without infection) in individuals who never gave history of having these diseases. During course of illness, organisms present (10-50%). Possible sources: descending blood stream or ascending (external) contamination especially in females. Urine in paratyphoid bacillus infection said to be characteristic, very foul (herring). Primary form in women recognized. Symptoms very. Frequency, urgency and turbidity of urine. May have recurring attacks (semi-chronic). All cases of cystopyelitis (pyelonephritis?) especially in women, should be cultured for these organisms. Lesions may be unilateral. Treatment: 1) Urinary antiseptics by mouth? ; 2) Irrigation of bladder and pelves of kidneys?. 3) Intravenous injections of meosalvarsan and mercurochrome? 4) Schottmüller treatment is said to be effective. Empty bladder, pass catheter, instill 2% silver nitrate in 100 cc. of distilled water (attempt to hold 5 minutes) Escape into urethra especially in males, is very painful. As general rule, urethra of female is not so sensitive. If leakage develops, empty through catheter at once. Most helpful in group where bladder is primarily involved but may be used in pelvis. Treatment is said to be very effective. (Report of one case! Impression from literature). Comment: Case observed at this institution (nephrectomy). Cure.

G. Etiology. Gonococcal infections of Kidney, Ureter and Bladder, Fisk, I. R. and Weir, J. B., J. of Urology, xxiii, 639:1930. Data must be critically analyzed. Gonococcal infections not of sufficient frequency to permit any one clinician to study large number of cases. Reported cases about 30. Accuracy of diagnosis questioned by many (Birkhaug and Parlow), who think only 4 can be definitely accepted. Does not necessarily form an index of frequency. May be spontaneous recovery? Young does not believe gonococcus can persist as sole infecting agent. Secondary infection dominates picture. Other bacteria may morphologically resemble gonococcus (meningococcus and others). Three cases reported in detail by authors. Routes of invasion are identical with other types of renal infection. (Ascending or hematogenous). Note frequency of gonococcal bacteraemia. Cystoscopic pictures resemble tuberculous cystitis? may be acute generalized type. Posterior wall and dome acutely inflamed. Many areas of superficial ulceration, entire mucosa highly inflamed and swollen, bullous edema present. Ureteral orifices visible, patent and very rigid, bladder capacity small, manipulation painful. Diagnosis: Birkhaug and Parlow believe should be done with fermentation or serological reaction. Difficulty of growing organism on artificial media generally recognized. Cultures may fail because of secondary contamination. Diagnosis made in author's cases by history of gonorrhoea; 2) presence of gram negative intracellular diplococci in expressed prostatic fluid in males, cervix and urethra in females; 3) presence of gram negative intra-

cellular diplococci in catheterized bladder and ureteral specimen. 4) Negative cultures on ordinary media; 5) Elimination of tuberculosis by stains of bladder and ureteral specimen inoculations (9 pigs); 6) Failure of cystitis to improve under usual treatment; 7) fairly rapid improvement with use of silver salts. Symptoms vary with location, severity of infection. Onset insidious and disease far advanced before treatment is sought. Symptomatology like that of acute pyelonephritis from other organisms. Kidney pelvis may be greatly dilated (little pain). In one case 800 cc. of fluid recovered from dilated kidney pelvis. Patient sought aid because of tumor, not pain. Treatment: Consensus of opinion favors use of silver salts for bladder and kidney. Prognosis guarded. Recovery may be prolonged and tedious. Reported cases where nephrectomy were necessary are many. Gonococcal pyelonephritis. Parmenter, F. J., Ford, A. G. and Leutenbeger, C. J., J. of Urology, xvi, 259:1930. 54 references in literature, (164 cases). 104 cases were discarded for one reason or another. All cases in which no laboratory work was done (102). Remaining 60 were grouped into 3 classes; possible (28), probable (27) or proved (4).

H. Comparative Pathology: Jones, S.S. and Little, R.S., J. of Exper. Medicine, 51:909, 1930. Contribution to the epidemiology of specific infective cystitis and pyelonephritis of cows. Specific disease in cows well known in Europe, recently seen in this country. Comment: Contribution from Minnesota - 1918. Infections occur in epidemic form in herds. Said to be due to diphtheroids? of which 5 different types have been recognized. Organisms apparently specific. Young calves, chiefly males, from infected herds were studied. (Only a few females available). Organisms found in lower genito-urinary tract. Had specific properties and when inoculated into older animals from non-infected herds, produced disease. (12 of 34 animals). Suggestion is made that these infections occur early in (animal) life and develop gradually. No mention made of possibility of diphtheroid infection in humans? Comment: Diphtheroid infections usually debatable? Disease of great importance in live stock.

- I. Relationship to Nephrolithiasis: Mathe, C. P. "The Present Day Management of Stone in the Kidney", J.A.M.A. 95:657, (February 28) 1931.
1. Material: 74 cases of renal calculi removed by surgical intervention or cystoscope, quiescent, non-obstructing calculi, unaccompanied by infection or untreated not included.
  2. Incidence: Sex. Male 44, females 30, (74).
  3. Age: 0-10, 1; 10-20, 4; 20-30, 13; 30-40, 13; 40-50, 13; 50-60, 12; 60-70, 16; 70 plus, 1. (74).
  4. Site: right 39, left 28. Bilateral 7 (74).
  5. Predisposing lesions: pyelonephritis 26; ureteral stricture, 15; renal abscess, 8; renal ptosis, 8; prostatic hypertrophy, 5; urethral stricture, 2; renal tumor, 2; bifid pelvis and ureter, 2; tuberculosis, 2.
  6. Pathological effect of stones: pyelonephritis 26; abscess 21, (multiple 15, single 6); destructive pyonephrosis 19, hydronephrosis 15; perinephritis 5, peripyelitis sclerosis thickening of perirenal fat 5; ulcerative necrosis 4; sclerosis of pelvis 3; perinephritic abscess 3; spontaneous rupture of kidney 2; renal tumor 2; streptococcal septicemia with endocarditis 2; lung fistula 1.
  7. Type of stone and location in kidney: pelvis (more or less smooth variety) 24, multiple 10, lower calix 10, bilateral 8, coral shaped involving pelvis and calices 7, irregular faceted 5, upper calix 5, middle calix 5 (74).

8. Results of examination: clinical roentgenographic examination positive 70, clinical roentgenographic examination negative 4. (operation 2, confirmed by passing stones) (74). In spite of usual treatment (clearing up foci and stasis, treatment of chronic pyelonephritis, diet based on chemical analysis of stone, intake of distilled water only, frequent subsequent examinations of patient) many stones recurred.

9. Recurrence: after pyelotomy 22 cases (22%), after nephrotomy (18%), after pyelonephrotomy (12%), after passing following cystoscopic (28%), in opposite kidney after nephrectomy (31%), total recurrence, all methods of treatment (20%), mortality (2.7%). Comment: Renal stone is common cause of renal infection. Also may develop secondarily to it. Attitude toward stones should be changed as far as treatment is concerned. So called non-surgical coral shaped, silent, unobstructive stone in which fragments break off and pass into pelvis and ureter, should be removed at once. Brassch discusses, "The more experience I have, the more am I inclined to advise operation in every case unless there is some reason against it. Stones may be silent as far as subjective symptoms are concerned, but they are never silent in their injurious effect on renal tissue, and usually cause destruction. Strictures of ureter may be primary or secondary. Chronic pyelonephritis is of common occurrence, and only occasionally complicated by secondary stones. True pyonephrosis is not common finding, although diffuse pyelonephritis is often observed. It would be reasonable to assume that pyonephrosis is result rather than cause. When hydronephrosis is large (say 150 to 200 cc.). It is usually primary and the stone secondary. Considering all cases of ptosis, it seems that this factor may be questioned? Note: nephro lithiasis remains constant factor in renal infection. Other predisposing factors are: Anomalies, horseshoe kidney, aplasia marked hypoplasia, dysplasia, polycystic kidney, hydronephrosis (moveable kidney), extra-ureteral tumors or intraureteral growths, bladder tumors, prostatic hypertrophy, ureteral and urethral stricture, aberrant renal arteries, paralytic forms, congenital and idiopathy group. In every case of renal infection (anomaly, obstruction and stone) must be ruled out before treatment.

J. Relationship between Hematuria and Pyelonephritis: Hyman, A. Amer. J. of Surgery, Vol. IV, (new series) 438, (April) 1928. Report of 2 cases with massive hemorrhage (pyelonephritis) (one suppurative). Male 42, hemorrhage did not clear up until kidney was removed. Male 51, one kidney removed because of infection and hemorrhage. Disease developed on other side. Comment: In our experience so-called essential hematuria with or without deformity of pelvis is frequently due to pyelonephritis. Such kidneys have been removed and show only this lesion. Possibility of acute hemorrhagic nephritis in children and non-embolic focal glomerulonephritis may be on this basis.

#### SUMMARY:

1. The chief diseases of kidney are anomalies, obstruction lesions, glomerulonephritis, nephrosis, pyelonephritis, vascular conditions, and tumors.
2. The two types of renal infection are: glomerulonephritis and pyelonephritis (exudative interstitial).
3. Pyelonephritis is of frequent occurrence (more so than glomerulonephritis).
4. Occurs in two extremes of life and is more common in females.
5. Extra-renal infections are a frequent source, especially in childhood.
6. Predisposing factors may exist in urinary tract.

7. Spina bifida occulta occurs in approximately 5% of all patients.
8. When uncomplicated, it apparently does not do any harm.
9. Complicating factors may produce secondary neurotrophic disturbances (urinary tract and lower extremities).
10. Pyelitis in infants, studied at postmortem, usually proves to be exudative, interstitial nephritis.
11. Females do not predominate in postmortem series.
12. Carbuncle of kidney is lesion similar to surface origin.
13. Characterized chiefly by local signs of renal infection without much disturbance in bladder or urine.
14. Probably many cases of perinephritic abscess originate from this source.
15. In addition to B. coli and staphylococci as etiologic factors, typhoid and para-typhoid bacilli and gonococci should be considered.
16. The treatment of typhoid and para-typhoid infections is said to be very satisfactory (medical).
17. Diphtheroids? are the cause of infection in cattle.
18. Nephrolithiasis is a frequent cause and accompaniment of renal infection.
19. Our attitude toward treatment of renal stone is changing because so many show destructive lesions in kidney (infection).
20. Hematuria may be caused by pyelonephritis.
21. Acute hemorrhagic nephritis in children and non-embolic focal glomerulonephritis in older persons may be pyelonephritis.
22. Pyelonephritis (exudative interstitial) is more frequent than ordinarily appreciated.