

# TRANSACTIONS

OF THE

## NEW YORK SURGICAL SOCIETY

STATED MEETING HELD APRIL 12, 1933

The President, DR. JOHN DOUGLAS, in the Chair

### TONSILLECTOMY, BRONCHIECTASIS, LOBECTOMY

DR. FRANK B. BERRY presented a woman, aged thirty-nine, who was admitted to Bellevue Hospital May 25, 1932.

In the preceding January, 1932, she had a tonsillectomy. Three to five days after the operation a large swelling developed in the right tonsillar region. This drained into the mouth and about the same time she began to cough and bring up large quantities of foul sputum. She has had two or three small hæmoptyses and lost eighteen pounds in weight. She left the hospital after three months. Since then she has regained ten pounds but has continued to expectorate. Sputum now amounts to twelve ounces a day and she complains of slight pain in the left back.

*Physical Examination.*—Negative except for left chest where there was dullness from the second to eighth spines posteriorly and over the middle third anteriorly. Over this area there was bronchovesicular breathing and a few râles were heard at the base. The bronchoscope showed pus from left lower lobe bronchus, with bronchiectasis of left lower lobe.

*Course.*—Pneumothorax on left started June 2, 1932, and left phrenic crushed on the same date. First-stage lobectomy June 14. Portion of ninth rib removed and sixth, seventh and eighth ribs divided at angles. Chest opened. Upper lobe collapsed. This and parietal pleura rubbed with gauze. Lower lobe found adherent to pericardium and diaphragm; this was completely mobilized. Wound closed without drainage. June 15 200 cubic centimetres bloody fluid aspirated. June 16 500 cubic centimetres bloody fluid aspirated. Smooth convalescence.

June 28.—Second stage. Both lobes adherent to chest-wall. Lower lobe mobilized. Payer clamp applied at root and lobe amputated. Stump transfixed and ligated and wound packed loosely with iodoform gauze. Temperature 101° and pulse 130 the night after operation. Five hundred cubic centimetres blood given. Smooth convalescence and patient returned to chest service August 16, 1932, with wound healed and no cough.

December, 1932.—Follow-up. Occasional dry cough. Lungs clear and resonant.

### TUBERCULOSIS. THORACOPLASTY. HÆMORRHAGES TWO YEARS LATER. EMERGENCY THORACOPLASTY

DOCTOR BERRY presented a woman, aged twenty-four, who was admitted to Bellevue Hospital January 15, 1931. She had been coughing blood for two days. She had a history of tuberculosis for five years. Thoracoplasty in three stages at another hospital in 1929. Improved for a short time but cough returned and since has been a semi-invalid. Three days before admission she had an hæmoptysis of several ounces and this was repeated the day before admission.

## PYOGENIC-TUBERCULOUS PYOPNEUMOTHORAX

Sputum positive for tubercle bacilli. X-ray showed inadequate thoracoplasty with a fibrocaseous lesion.

*Course.*—Hæmoptysis continued several times a day in one- to three-ounce amounts. Temperature dropped to 100°. Phrenicectomy January 21, 1931, without benefit. Hæmoptysis increased to four- to six-ounce amounts and tended to recur every other day.

January 27, 1931, upper stage thoracoplasty under local anæsthesia. Patient had an hæmoptysis and a convulsion during the operation. Former operation revised and large segments of the first six ribs removed.

Temperature to 104° and pulse to 140 immediately following operation but dropped promptly to 102° and 120 and continued down. Convalescence smooth although there were several small hæmoptyses during the first few days. Transfusion.

Second stage of thoracoplasty revision performed March 3, 1931, with removal of lower ribs. This was preceded by a transfusion of 500 cubic centimetres. Smooth convalescence and wound healed well. Returned to chest service and from there went to a sanatorium for further convalescence. Sputum became negative and has remained so. Now has very little cough or sputum and is allowed to do as she wishes.

Case presented to show the failure of an inadequate thoracoplasty and the response to a proper type of thoracoplasty which was performed as a life-saving procedure for continuing hæmoptyses.

## PYOGENIC-TUBERCULOUS PYOPNEUMOTHORAX WITH BRONCHIAL FISTULA

DOCTOR BERRY presented a man, twenty-four years of age, who was admitted to Bellevue Hospital August 20, 1929, with cough and expectoration, and a history of tuberculosis for nineteen months before admission. Lesion confined to left side and pneumothorax started. Fluid present since inception of treatment. Three months before admission he began to bring up small amounts of non-foul, bad tasting fluid on stooping over. During this time lost ten pounds. Gentian violet injected into pleural cavity is brought up in the sputum.

Physical examination, negative except for signs of a pneumothorax with effusion in left chest. Sputum positive for tubercle bacilli. Thick green pus aspirated from chest. X-ray in complete collapse of left lung with fluid present. Right lung clear.

*Course.*—Patient did poorly and September 19, 1929, a catheter was inserted through the ninth space into the left chest. Tube drained well and chest was irrigated gently with mercurochrome and boric acid.

October 3, 1929, extensive resection of upper four ribs under local anæsthesia. Wound healed well and patient did well although he ran a septic temperature, at times to 102° and 103°.

November 12, 1929, extensive resection of third to eighth ribs inclusive. Patient did well and temperature and pulse gradually subsided except for occasional flares.

December 28, 1929, ninth to eleventh ribs inclusive resected. Bronchial fistula still open. Wound healed well about sinus tract to empyema cavity. From January to late March, 1930, he ran a low-grade, irregular temperature thought to be due to a slight infiltration of the right middle lobe. In October, 1929, weight was 112 pounds. By April, 1930, it was 130 pounds. By August, 1931, his weight was 148 pounds. Still wearing a tube. Sputum negative. Wound closed in October, 1930.

January 13, 1931. Two small abscesses developed recently near old sinus tract. Operation showed a small pleural cavity in axilla. Third to seventh anterior rib ends removed. Wound closed and drained. Did well and went home on the eighteenth day. Two more small operations of the Schede type were necessary before permanent closure was effected, one November 9, 1931 and the last, his sixth, on March 6, 1932. This consisted of merely laying open a short sinus tract. This healed in May, 1932. Since then he has remained well, weighs about 180 pounds, and is working.

Case presented because it presents one of the worst complications of pulmonary tuberculosis—spontaneous rupture of the lung with the development of a bronchial fistula and pyogenically infected tuberculosis empyema. This responded to radical surgery and then persistence in pursuing and eradicating the resultant sinus. In addition he developed and healed a small area of tuberculosis on the opposite side during his convalescence.

DR. HOWARD LILIENTHAL called attention to the rapid onset, in the first case, of the coughing up of pus. It is rare to have the symptoms come on so suddenly as they usually occur about two weeks after tonsillectomy. As to the various methods of drainage. In this case there was no drainage after the first stage lobectomy. After the second stage when the lobe was excised the wound was packed loosely with iodoform gauze. Doctor Lilienthal called attention to the advantage in lobectomy of suction with no packing after the lobe has been removed. He uses a valve suction and there has been no mortality among his last four cases. Two are entirely well and two have a bronchial fistula although this was present before he operated on them and the fistulæ may be expected to close spontaneously. In Doctor Berry's third case, Doctor Lilienthal called attention to the advantage of carefully graded work in thoracoplastic operations. He does not believe it is necessary to take out large sections of the first rib; there are certain disadvantages in doing that. It takes longer and there is always the danger of injuring one of the large vessels as they cross over the first rib. After it has been denuded of periosteum it gives a good support for the operator's hand when pushing down the pulmonary apex. Regarding the case of the woman who had the hæmorrhages, Doctor Lilienthal thought it sometimes wise in these cases to have the patient bronchoscoped to show where the hæmorrhage is coming from; this may make a difference in what is to be done. The blood may come from a bleeding ulcer of the bronchus. As to the use of thoracoplasty for the checking of hæmorrhage, this is an excellent measure. In a case with active hæmorrhage brought in an ambulance a distance of one hundred miles, Doctor Lilienthal did a first-stage (upper) thoracoplasty and the bleeding immediately ceased and did not recur. Regarding the convulsion which the second patient had during the upper stage of the operation, Doctor Lilienthal believes in operating in all these cases where there is manipulation of the pleura with the patient's head lower than his chest. Most of these convulsions, probably all of them, occur from emboli and usually air emboli in the brain. (Schlaepfer's theory.) As to the shortness of breath, that

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is not due to the amount of lung put out of commission. It may be caused by a pull on the mediastinal structures, and it is usually cardiac.

## GALL-STONES IN WOMEN

DR. EDWARD D. TRUESDELL presented four patients illustrating features of his paper "Incidental Gall-stones in Women" read before the New York Surgical Society a year ago.

CASE I.—Was a young woman, seventeen years of age, who was referred to the Lincoln Hospital in August, 1932, by her family physician as a case of acute appendicitis. There had been a history of five months of attacks of abdominal pain. This diagnosis was concurred in by the admitting physician at the hospital, two members of the surgical interne staff, an associate attending surgeon and the assistant attending surgeon who operated upon the patient. At operation a greatly distended gall-bladder was uncovered containing a large quantity of turbid fluid, a dozen or fifteen small stones and putty-like material. It was thought best to drain the gall-bladder at the time. A month later the gall-bladder was removed by the speaker because of continued pain, evidences of persisting inflammation and because it was felt that it would be necessary to do so eventually in any case. Doctor Truesdell presented the case as an example of gall-stones in a young woman of seventeen years where, because of the patient's age, it was generally assumed that the symptoms were those of appendicitis and disease of the gall-bladder was not even considered. It was his opinion that many patients developing symptoms of gall-bladder disease during middle-age were possessed of gall-stones that had had their incipency during the second and third decades of life, and had remained quiescent for long periods of time, as brought out in his paper. While cases of gall-stones under twenty years of age are reported from time to time, these represent chiefly the cases that have developed acute symptoms and must be considered as only a proportion of the number of cases actually originating and existing during this period of life. He felt that gall-stones might be more frequently diagnosed in the younger patients were the possibility of the existence of this condition held more prominently in mind. It would seem probable in the case of the patient presented that the gall-bladder might have been palpated under ether relaxation had the attempt been made.

CASE II.—Was a woman, forty-three years of age, who had married at the age of fourteen years and had had seven pregnancies, three of these before the age of twenty years. Symptoms of gall-stones had developed at the age of thirty years, which persisted at intervals for six years when she was operated upon for the removal of her gall-bladder. This was said to have contained gall-stones and to have been removed. The operation had not been performed during an acute attack. One year after this operation, or six years ago, her symptoms recurred and gradually increased in severity, having been exceedingly severe during the past few months. At operation the gall-bladder fossa was found filled with omental adhesions which also extended to the region of the gastrohepatic omentum and duodenum. These were separated with some difficulty and a small pouch-like structure uncovered containing a medium-sized round gall-stone. This was continuous with a normal appearing cystic duct. This case was presented as an example of marriage with multiple pregnancies at an early age and the probable development of gall-bladder disease during the second or third decade of life even though definite symptoms of gall-stones did not appear until the patient was thirty years old. The case was of particular interest to him as an example of incomplete cholecystectomy, the ampulla of the gall-bladder and a stone the size of a small marble having been left behind, as was no doubt the case in view of the normal cystic duct. In his paper of the year before, Doctor Truesdell had expressed himself as opposed to the removal of the gall-bladder when this operation was superimposed upon any other of considerable extent. He felt that operations upon the gall-bladder were of sufficient importance and difficulty to entitle them to a separate procedure in the majority of cases and should not be merely incidental to some other operation when

the time already consumed, and the patient's condition might be a cause of hasty and inadequate procedure. Gall-bladder operations not infrequently turn out to be difficult and complicated which when begun had seemed to be simple, and it is of great importance that at the first attack upon the biliary structures a complete and satisfactory operation be performed through an incision advantageously located, and not through an incision located for some other operation even if extensively and unduly extended.

CASE III.—Was a woman twenty-eight years of age who had been married at twenty but had had no pregnancies. At the age of twenty-two years she developed quite typical attacks of biliary colic marked by severe abdominal pain, nausea and vomiting. Five weeks before, she had removed her gall-bladder containing ten medium-sized faceted gall-stones and fragments of still others. Four years ago, or two years after the development of her gall-bladder symptoms, she had undergone a gynecological operation, the appendix was removed and also a cyst of the ovary, and a ventrosuspension performed. It was reported that the gall-bladder had been palpated through the lower abdominal incision and that no gall-stones had been felt, although it would seem most improbable that they were not present at the time.

CASE IV.—Was a woman twenty-four years of age who had been married at eighteen years and had had two pregnancies. At the age of twenty-three years, or one year ago, she began to have attacks of acute abdominal pain. These attacks persisting for eight months, she had undergone a gynecological operation in September, 1932, the appendix being removed. It was reported that the gall-bladder had been palpated through the lower abdominal incision but that no gall-stones had been felt. The attacks of pain continuing, she was admitted to the Lincoln Hospital in January, 1933. Through a gall-bladder incision the gall-bladder was found to be free of adhesions, although the gall-bladder wall showed evidences of pathology. Only after prolonged and very careful palpation of the gall-bladder was it possible to discover what was thought to be a solitary, small, shot-like stone. After the removal the gall-bladder was found to contain some sixty-five very small round stones. Even with the advantage of an incision directly over the gall-bladder, the stones had almost escaped detection because of a rather large gall-bladder with a considerably thickened wall and a quantity of very thick mucilaginous bile which did not escape from the gall-bladder upon moderate pressure.

These last two cases were presented to show two young women who had married early in life, one of whom had had pregnancies and both of whom had developed gall-bladder symptoms at an early age. In both cases the gall-bladder had been palpated through a lower abdominal incision and in neither case had gall-stones been detected. It would seem that in the first case stones readily palpable had escaped detection because of unfamiliarity with the manœuvre, but in the second case stones barely palpable through a gall-bladder incision might readily have escaped detection by palpation through an incision in the lower half of the abdomen. In his paper, Doctor Truesdell had reported thirty-one women possessed of gall-stones among 350 women whose gall-bladders he had palpated during the course of an abdominal operation. In none of these had the presence of gall-stones been suspected before operation. This was an incidence of approximately 9 per cent. of the cases examined, which had seemed exceedingly high. However, it was maintained that this might be even lower than the actual occurrence of gall-stones among these 350 patients, since it would seem not improbable that gall-stones present had escaped detection by palpation alone in one or more cases, particularly when the incision was not advantageously located for this procedure. It was also pointed out that six of these thirty-one

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women, or 19 per cent., of the entire number, were twenty-nine years of age or younger. This would seem to support the supposition that gall-stones had their origin in the latter part of the second decade or in the early part of the third more frequently than realized, and that one or more pregnancies early in life might favor the development of gall-stones even if not being directly responsible for them.

DR. JOSHUA E. SWEET said that the one thought that occurred to him was that Doctor Truesdell, in presenting his interesting cases, said that he found "gall-stones." One can think, off-hand, of at least six different kinds of gall-stones which would indicate at least six different varieties of metabolic disturbances resulting in gall-stones. For fifty years surgeons have been in the habit of sending their gall-bladders to a pathologist who has sectioned the gall-bladder, returned a microscopical report, and apparently poured the gall-stones down the sink. The speaker thought the surgeon should be able to write the microscopical report himself after his study of the gall-bladder during removal, and so at least save the patient some of the high cost of medical care. In the time thus saved to a pathologist, he might pour the gall-bladder down the sink, and learn more by a study of the stones.

DR. HENRY F. GRAHAM remarked that Doctor Truesdell had emphasized the fact that many patients were young. On the speaker's service recently there was a patient nine years of age with acute cholecystitis. There are cases in the records of gall-stones in the newborn so age is not a significant factor. As to the etiology, Joshua Sweet has said he believes the metabolism of vitamins comes into this. Many consider it a question of infection of some kind in every case. One man who has done a great deal of experimenting found that 50 per cent. of women who are pregnant show a bacilluria. The wisdom of performing only one operation at a time in a case where two operable conditions exist has been shown by The Mayo Clinic; the mortality was doubled when two operations were done at one time. As to the technic, if the gall-bladder is going to be examined for stones, it is better to do it at the beginning of the operation instead of at the close because of the increased danger of infection. Also if novocaine is used for spinal anæsthesia it gives the patient a chance to come out while the surgeon is examining in the upper abdomen.

DR. HOWARD LILIENTHAL said that some years ago he had a girl patient eleven years of age whose gall-bladder he removed because of multiple pigment stones.

DOCTOR TRUESDELL, in closing the discussion, said that on the basis of the experience obtained in collecting the material for his paper he had become greatly impressed with the tendency of gall-stones to remain quiescent in the gall-bladder for considerable periods of time. He believed for this reason that cases of gall-stones encountered from time to time during the early years of life were, because of their acute symptoms, only a part of those

originating and existing during this period, many not asserting themselves until the fourth or fifth decades. He had also been impressed with the ease with which gall-stones escaped detection by palpation through an abdominal incision; such factors as the size of the gall-bladder, the condition of its wall, the size and number of the stones, the consistency of the bile, and the ease or difficulty with which the gall-bladder emptied upon pressure, all having much to do with the detection of stones present.

#### HÆMANGIOMA OF SPLEEN

DR. OTTO C. PICKHARDT presented a man, thirty-three years of age, who was admitted to Lenox Hill Hospital in September, 1929. He had enjoyed good health up to about a year before admission. During the year of 1928, he had had mild attacks of abdominal discomfort described as cramps in the lower abdomen. At first these attacks occurred several times a week, later becoming less frequent and occurring only several times a month. About six months before entering the hospital he had noticed swelling of the ankles and puffiness of the eyelids and at about the same time a yellow tinge to the skin had become apparent. This was followed by gradual general weakness for which he sought relief. Another symptom that to him was very important was his impotence.

On physical examination a mass was found occupying almost the entire left side of the abdomen and extending as far as McBurney's point on the right side. In the left upper quadrant there was a definite bulging of the mass which shaded off to a deep oblique groove in the left lower abdomen. The mass was moderately movable and not tender.

On X-ray examination this mass was found to have pushed the stomach and descending colon to the right. No organic disease was noted in the gastro-intestinal tract. A pyelogram demonstrated a normal left kidney outline and normal filling of the calyces. Chest examination was negative.

The blood count on admission was 3,440,000 red blood cells with 55 per cent. hæmoglobin. The leucocyte count was normal. Blood smear examination showed anisocytosis, poikilocytosis and polychromatophilia. Wassermann negative; blood grouping II Jansky; urine and blood chemistry essentially normal; icterus index normal; temperature normal.

Blood-picture did not help in making a diagnosis. A provisional diagnosis of tumor of spleen was made and five deep X-ray therapy treatments were given. There was immediate recession of the size of the tumor, but this lasted only a short time and within a few weeks the mass had grown to its former tremendous size.

In order to prepare for operation, a transfusion of 500 cubic centimetres of whole blood was given and here the first peculiar symptoms showed themselves. Immediately after the transfusion the patient had a rise of temperature to 105°, but without chills and without showing blood in his urine the next day. The reaction lasted forty-eight hours following which there was a return to normal. The following week, using another donor, transfusion of 500 cubic centimetres was repeated and again the patient had the same reaction—very high fever without chills and with a negative urine. It is needless to say that meticulous care had been taken to group and cross-group both patient and donor.

On November 13, 1929, splenectomy was performed. On opening the peritoneum, no fluid appeared. The spleen appeared as a greatly enlarged mass, deep red to purplish in color, with numerous rounded protuberances of

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varying sizes. It was firm in consistency. There were only a moderate number of adhesions. The weight of the spleen and blood immediately after the operation was 2,600 Gm.

While still on the operating table, immediately post-operative, a transfusion of 500 cubic centimetres of whole blood was given, using one of the same donors from whom blood had been taken before. But now there was absolutely no reaction similar to the previous experiences. In fact, post-operative, the patient never ran a temperature above 100°, and that for only forty-eight hours, when it became normal. One could feel that something had been removed from this patient that had a destructive action on his red blood cells. The general post-operative course was quite uneventful, and within a month the patient was discharged from the hospital.

The organ removed consisted of two separate pieces. (a) A spleen, measuring 30.6 by 14.8 by 6.5 centimetres and weighing 2,020 Gm. It is irregular and very nodular, the nodules varying considerably in size and consistency; some being soft and feeling very cystic, others firm and hard. The spleen tissue itself felt fairly firm in consistence. On section, the organ is quite definitely lobulated, with prominent fibrous strands running throughout the structure. The chief characteristic of the tissue is its spongy appearance, due to the presence of open minute spaces in it. There are some depressed areas, and others slightly raised. The color also varies—many of the nodular areas appearing darker than the surrounding splenic tissue.

Sections of the spleen show microscopically multiple hæmangiomas of different sizes, separated by varying amounts of sclerotic splenic tissue. The tumors are usually poorly demarcated, though some of the smaller growths are circumscribed, but are not encapsulated. The structure consists of dilated, thick-walled sinusoids lined with prominent proliferating endothelial cells and filled either with blood or serum mixed with blood cells, lymphoid cells, desquamated endothelial cells and phagocytic cells containing erythrocytes or blood pigment. These vessels vary widely in size from very small calibre channels to wide irregular spaces often showing papillary ingrowths. The vessel walls contain varying quantities of lymphoid cells, blood and intra- and extracellular blood pigment. The uninvolved splenic tissue shows generalized thickening of the reticulum, with a reduction in the lymphoid cells and atrophy or disappearance of the Malpighian bodies. In localized areas, there is the formation of dense scar tissue. The capsule and trabeculæ also show fibrous thickening.

Section of a fragment from the liver shows slight cirrhosis of many of the sinusoids, associated with parenchymatous degeneration or fatty infiltration of the liver cells. The dilated sinusoids are usually free from blood. The capsule of the liver is slightly thickened by fibrosis, and there is slight increase in the interlobular fibrous tissue. Scattered through the fibrous tissue are collections of small round cells.

A follow-up of his blood-picture shows that he has a polycythæmia and that his blood platelets have risen from a pre-operative count of 15,000 to at present 250,000.

Two years post-operative the patient was readmitted to the hospital with a moderate jaundice which was diagnosed as a simple catarrhal jaundice. All examinations for bilhiasis were negative.

The two symptoms of which he now complains are (1) impotence; (2) tremor of hands.

This man is well after three and one-half years without evidence of metastases and one may conclude that this was probably in him a benign condition.



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DR. WILLIAM CRAWFORD WHITE said that he had looked up the records at Roosevelt Hospital and could not find a single record of such a case. Charles E. Peck reported a case of hæmangioma of the left lobe of the liver about ten years ago which was interesting from the standpoint of the differential diagnosis. The gastro-intestinal series showed the stomach pushed down and the colon pushed down with it. At the time of the operation he was not sure he was dealing with the spleen or the liver.

DR. ALLEN O. WHIPPLE asked two questions: (1) whether the blood-vessels in the hilus of the spleen showed marked abnormality and, (2) whether there was present the physical sign of doughiness and pitting at the time of palpation. At the Presbyterian Hospital there have been cases of hæmangioma of the liver in which applied pressure showed a temporary pitting. Doctor Whipple also asked if there were thrills or bruit; these are points described by Alesandri of Rome in hæmangioma of the liver.

DOCTOR PICKHARDT, in closing the discussion, said that to the best of his knowledge there was no elasticity in this particular tumor. It was of great size. There was no bruit and no thrill. He listened for that for he felt there was something peculiar about the mass, but the diagnosis of hæmangioma was not made because this was the first case of hæmangioma of the spleen ever seen in the Lenox Hill Hospital. As far as the blood-vessels were concerned no observation was made at the time of operation, entire attention being concentrated on the problem of getting the spleen out. However, they were not friable and came out without much difficulty. There was no mass of varicosed veins.

### PLEURO-DIAPHRAGMATIC CYST

DR. OTTO C. PICKHARDT presented a woman, fifty-three years of age, who was admitted to Lenox Hill Hospital in January, 1931. She had been complaining of sharp pain, knife-like in character, over the precordium for a period of several weeks. She also described a slight steady pain over the left lower antero-lateral region of the chest. Two years before admission she had been told she had a pleurisy on the left side and she described her recent complaints as being quite like those at the time of her previous illness.

Clinical signs were not definitely diagnostic, chest examination being essentially negative. X-ray examination revealed the presence of a circular shadow just above the left diaphragm. A thorascoscopy with the aid of a Jacobeus thoracoscope was done under local anæsthesia and there could be seen a tangerine-sized, yellowish, smooth, glistening tumor mass in the left pleural cavity. Better vision was obtained after the production of an artificial pneumothorax. A second X-ray examination at this time with the lung in a state of collapse showed the spherical mass separated from the heart shadow and lying in intimate relation with the diaphragm.

Thoracotomy was advised and after an interval of several months patient returned to the hospital for this procedure. Under general anæsthesia thoracotomy through the left eighth intercostal space was done.

The two operative procedures were recorded as follows:

(1) In the anterior axillary line of the left side, at the ninth interspace, a small nick is made in the skin and a Jacobeus trocar inserted into the pleural

cavity. Obturator removed and replaced by eye-piece. This eye-piece is gently inserted under direct vision and pushed antero-medially until it reaches the area of the left pleural cavity where the diaphragm, the anterior parietal pleura, the mediastinum and the pericardium meet. Here may be seen a tangerine-sized, yellowish, smooth, slightly lobulated, tumor mass, which glistens. The lung impedes the vision although not attached to the mass and therefore through the seventh interspace a needle is inserted and artificial pneumothorax induced. The globular mass may now be seen to better advantage and is found to have smooth edges; appears to be moderately pedunculated, although the base cannot be seen definitely because of the overhanging edges. Running over the glistening pleural covering are numerous blood-vessels. It does not pulsate within itself but it moves secondarily with spasmodic jerks. In appearance it suggests a lipoma, although, as this is the first view of an intrapleural mass with this instrument, only the findings should be described and the diagnosis left for an exploratory thoracotomy which is advised.

(2) An eight-inch incision is made through the left eighth intercostal space with fracture of the eighth and seventh ribs at that angle posteriorly.

The lung appears normal but has pleuritic adhesions posteriorly. The diaphragm is normal in its centre. At the anterior inferior medial aspect, in the costophrenic angle, at the junction of the diaphragm, apex of the pericardium and thoracic cage, there is seen a thin-walled cyst, the size of an orange, with a small, nipple-like projection towards the pericardium. This is covered by diaphragmatic parietal pleura and medially by fat pads from the pericardium. (It was this fatty appearance that gave rise to the possible diagnosis of lipoma at the time of the thoracoscopy several months previous.) Where this cyst lay tightly up against the ribs and costal cartilages anteriorly, a line of cleavage is found with the finger, and the cyst is then easily shelled out, leaving a raw area inferiorly on the muscle of the diaphragm. This area is easily covered by the diaphragmatic pleura which had covered the cyst, the free edge being sutured down by three interrupted plain gut sutures. Very little bleeding occurs, and it is decided not to drain.

The wound is closed, first by approximating the seventh and eighth ribs with several surrounding chromic sutures, and then the muscle layers closed separately with chromic sutures, and finally the skin with interrupted silk. During this procedure the lung is blown up several times so as to touch the chest wall.

The lung and pleura are everywhere normal in color and texture. There is no pleural effusion whatsoever. The portion of the pleura which covers the cyst, and is raised by it, is shiny and normal in appearance. The shelling out of the tumor is easily accomplished.

The pathological diagnosis was pleural cyst, probably of endothelial origin.

The thin-walled cyst was about 8.9 centimetres in diameter, roughly globular in shape. There is a main cystic mass and a smaller one about 1.5 centimetres in diameter. There seems to be no direct connection between the two cavities. There are a number of strands of muscle along one aspect of the main mass.

*Microscopical Examination.*—Section of the small cyst shows a very thin wall composed of dense, laminated fibrous tissue, the greater part of which is acellular or hyaline. The outer part of the wall is looser and rather rich in small cells resembling lymphocytes. The blood-vessels are very scanty. The inner surface is covered with small, deeply staining cells of the type of endothelial cells.

The post-operative course was uneventful, and the patient made an easy recovery, leaving the hospital within three weeks. She had a little temperature for a few days and had possibly more pain for several weeks after the operation than she had had before. Clinically, the application of diathermy gave her the greatest relief, and I believe helped to restoration to normal of the affected area. Follow-up X-rays show that there is now a perfectly normal and clear lung field with possibly a slight hardening of the diaphragm, and the presence of some adhesions in the left costophrenic angle.

The relief from her (pseudo)-pleuritic pains is complete.

#### METASTATIC OSTEOMYELITIS OF THE CERVICAL VERTEBRÆ

DR. OTTO C. PICKHARDT presented a man, forty-three years of age, who was admitted to Lenox Hill Hospital in August, 1932, for relief of a painful swelling in the neck and behind the right ear. The swelling had been present for four days, and before admission a small incision had been made, but no relief had been obtained. His previous health had been good and there was no history of an otitis media.

The patient had a temperature of 103.6° and looked acutely ill. There was a brawny induration and redness over the right upper neck region extending over the parotid region and behind the ear. The entire area was tender but no fluctuation could be made out. There was a moderate leucocytosis. X-ray examination of the right mastoid region revealed rarefaction over the knee of the sinus, and there was lack of detail in the tip on the right side as compared with the left.

A mastoidectomy was performed on the day of admission. Except for slight congestion of the mastoid bone, the findings were negative.

On the day after admission a blood culture was positive for *Staphylococcus aureus*. The blood-sugar was 250 milligrams. On the following day, the patient's temperature rose to 106.6° and fell to normal within the next twenty-four hours. For the next two weeks the fever varied from 99° to 103.6°. Repeated blood-cultures during this time were still positive. Leucocytosis persisted with only slight variations. For a time the induration in the neck seemed to extend both anteriorly and posteriorly. Thereafter, there was a gradual decrease in both the amount of tenderness and in the extent of the induration. The mastoid wound healed progressively in about the usual time for such a wound. After the first two weeks, repeated blood-sugars were all within normal limits. Albumen, pus-cells, and occasional red blood-cells were repeatedly found during his four months in the hospital. The Wassermann examination was negative.

In the third week of his illness the patient appeared to be doing quite well, and for the first time the blood culture was found to be sterile. At this time he had a chill and eight hours later complained of severe pain in the back of his neck and in the right shoulder region. There were tenderness and a doughy induration over the posterior cervical region. This was four weeks after admission. An X-ray examination revealed a small, pea-sized area of rarefaction with some thinning of the cortex in the anterior and superior angle of the body of the fourth cervical vertebra. It was considered very suspicious of a suppurative focus. After a two-day interval, there was an apparent breaking through of the cortex of the articular surface of the vertebra. In two weeks' time a still larger area of bone destruction in the anterior and superior angle was found. The patient continued to have a fever of 101° to 102.5° during this time, and the essential treatment was confinement to bed in a plaster shell. X-ray examination six weeks after the onset

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of the process in the cervical vertebra revealed a much more extensive destruction with a great deal of bony detritus in the joints between the third and fourth vertebræ, and a reëxamination a few days later showed destruction of the inferior articulate surface of the body of the third cervical vertebra with a swelling of the soft part just anterior, suggesting a retropharyngeal abscess. Two weeks later there was very marked involvement in the third cervical body with considerable fragmentation of the bone, and with still greater swelling in the retropharyngeal structures. At this time the retropharyngeal swelling had reached a point where it could easily be felt by the examining finger through the mouth as a hard, indurated, moderately tender mass. The patient was now wearing a reinforced leather collar. This gave a support for his head, and was sufficiently strong so that neither flexion, extension nor rotation of the head and neck was possible. He has worn this to the present time, except lately when in bed.

Röntgen examination in December, 1932, three months after the first X-ray examination, revealed a reparative stage. The detail was much clearer; calcification was taking place; and the bodies of the third and fourth cervicals were regaining their normal contour. The patient was seen at a follow-up clinic several months ago, and his general condition was excellent. The induration in the neck had almost entirely disappeared. X-ray examination at this time did not show any active bone destruction. There was considerable deformity of the fourth cervical vertebra, the body being almost half destroyed. There was, however, no angulation or curvature of the cervical spine. The involved margins of the vertebræ were sharply outlined, indicating excellent healing. X-ray examination during the present month demonstrated osteogenesis, and no active recognizable bone destruction was present.

DR. ROBERT H. KENNEDY said that reviews of a large series of cases of osteomyelitis showed that lesions of the vertebræ comprised less than 1.5 per cent. of these. The occurrence is probably much more common than the statistics show because of the difficulty in diagnosis. It is more rare in the cervical than in the lumbar or dorsal regions. Moreover, one would not expect this lesion in a man of this age as it usually occurs before the age of twenty. Considering the excellent result in this case, the usual mortality is interesting. It averages 60 per cent. in osteomyelitis of the vertebræ in general and about 30 per cent. in the cervical region, according to the statistics of large groups of cases. It is probable that infection of the bone was present at the time of admission, for one would expect a period of at least two or three weeks to elapse before the X-ray findings would be so definite. Doctor Kennedy said that he did not think he would have refrained from operating because of apprehension lest the pus extend downward behind the pre-vertebral fascia into the mediastinum. The retropharyngeal abscess could have been drained through a lateral incision in the neck. However, the result could not have been better than that shown in this patient.

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DR. JOHN J. MOORHEAD presented a man sixty years of age who was admitted to the Post Graduate Hospital February 8, 1933. On the day of admission in a hold-up he was shot at very close range with a 38-calibre revolver. The wound of entrance was in the left supraclavicular region one

inch internal to the outer end of the clavicle and about three-fourths inch above it. The left cheek and left side of the neck showed powder marks and there were swelling and ecchymosis on the left side of the neck and considerable swelling of the left upper extremity. He was able to elevate the arm to about half a right angle. There was no apparent neural damage except for a complete loss of sensory distribution on the hand corresponding to the ulnar distribution. The left-sided Horner's syndrome was established by Doctor Sherwood, the neurologist, who saw him in consultation.

The X-ray examination showed the pointed end of the bullet lodged in the interspace between the lateral border of the seventh cervical and first dorsal vertebra and apparently it had entered this space forcibly enough to spread the vertebral bodies apart. Twenty-four hour later, under general anæsthesia, the wound of entrance was débrided; finger palpation located the bullet, a counter opening was made and through this a clamp was introduced as a guide and the entire tract was laid open. Small fragments of bone were removed first and then with a strong clamp the bullet was grasped and removed. Also soft part débris was removed and the tract was lavaged with ether and partly sewed. Vaseline gauze drain and heavy dressings. Convalescence was uneventful except for the development of a very curious pallor and coldness affecting the right hand and the right forearm which developed the day after operation and persisted in diminishing degree for about a week, but was unaccompanied by any motor or sensory loss. There was considerable swelling of the left upper extremity but this gradually decreased and at this time with the aid of physiotherapy it has largely disappeared. The neck motions are free and the involvement of the ulnar nerve is much less.

DR. BYRON STOOKEY said that since the War no one is amazed at what a bullet may do. In fact, the unexpected may prove to be the expected. In this particular case the fact that the bullet stopped immediately at the intervertebral foramen is of only passing interest. Doctor Moorhead stated that the patient had a paralysis of the ulnar nerve and Horner's syndrome; by that he means an injury to the component roots which make up the ulnar nerve, namely, the eighth cervical and the first thoracic. Watching the patient one would gather that he is unable to extend his wrist and it is probable that the seventh cervical root is injured as well. Exploration of the damage done to the nerve roots by a collar incision would have been advisable had this been possible since early suture of the nerves before scar tissue is formed makes for a better end-result and certainly much simpler operation.

#### FRACTURE DISLOCATION OF CERVICAL SPINE

DR. JOHN J. MOORHEAD presented a seventeen-year-old boy who was admitted to the Staten Island Hospital November 22, 1930, in the service of Doctor Driscoll with a history of having sustained a fracture dislocation of the fifth cervical vertebra on the day of admission in a football game. He was not unconscious; when carried off the field he was unable to use his arms but their function was regained en route to the hospital and on arrival in the institution it was noted that there was free movement of the arms and legs. The first X-rays taken by Doctor MacBrayer disclosed a very extensive fracture dislocation at the fifth cervical level. He was immediately placed in traction

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and during the ensuing two days motor and sensory involvement appeared in both arms, being more marked on the right.

On the night of the twenty-fourth an attempt was made to reduce the dislocation manually but this did not succeed and thereafter the repositor was applied under fluoroscopical control. It was felt a definite gain had been made and this was verified by subsequent X-rays. However, on the twenty-eighth it was noted that there was apparently a total paralysis of the right arm and both legs and an incomplete paralysis of the left arm so that the forearm could only be flexed weakly. The arms and legs were flaccid and there were no abdominal or cremasteric reflexes. Doctor Masson, the consulting neurologist, stated that the cord condition was very much worse than before the attempts at reduction.

On the twenty-ninth a laminectomy was done with the removal of two spinal processes and it was then seen that the cord was sharply angulated and that there was considerable œdema and that a locking of the articular processes had prevented complete reduction. At the operation no attempt was made to unlock these because the laminectomy apparently provided ample decompression. Five days later improvement was noted in the left upper extremity; there was no power in the legs or in the right upper extremity and pain and temperature was lost on the trunk and thighs and in addition there was a left-sided Horner's syndrome. A plaster-of-Paris neck and body case had been applied and eleven days after laminectomy considerable improvement was noted, particularly of the lower extremity and in the left arm and finger motions were noted on the right hand noted marked improvement.

December 30, three weeks after the operation, there was still further improvement. The worst remaining symptom was an atrophy of the intrinsic muscles of both hands.

He was removed to the Post Graduate Hospital January 6, 1931, and discharged February 24, 1931. The original plaster dressing was removed December 15. Primary union had been obtained and thereafter he wore a metal head and neck support for many months. February 3, 1931, another repositor reduction was attempted but without changing the bony contour, but with rather striking improvement as to the arms. His improvement was continuous and prior to the time of his discharge from the Post Graduate Hospital, namely, three months after the injury, he was able to walk about the ward with considerable ease and had excellent motion of both lower extremities, with little if any sensory involvement therein, and likewise there was considerable improvement of the right upper extremity, but there was still considerable loss of power in the left with some sensory disturbance.

He has been seen at intervals since and at this time, approximately three and one-half years after injury, function is practically normal in all the extremities except for some lessened muscle power in the left upper extremity when unusual use is made of this extremity.

DOCTOR STOOKEY said that dislocations of the cervical vertebræ, if seen early, should be reduced early and that as little time as possible should be allowed to elapse before reduction. Of all methods available the method devised by Alfred S. Taylor is by far the best. By use of the Taylor method he has not experienced any great difficulty in reducing cervical dislocations when they have been seen early. On the other hand, when seen late, reduction may be impossible by any method due to contracture and shortening. Reduction by traction with the hands is seldom successful due to the fact that sufficient traction cannot be exerted in this manner. In Taylor's method of re-

duction is used a chin and occiput strap made of moleskin adhesive, the ends of which are tied to a rope which is passed around the hips, the hips being protected by a pillow, or folded blanket. Thus, the trunk musculature can be used and sustained and steady traction exerted, leaving the hands free to guide the vertebræ and manipulate them so as to obtain reduction. Locking of the articular processes can be overcome if adequate traction is applied. In Doctor Stookey's opinion this can be done only by a method which exerts steady, continuous traction and not if the traction is alternately exerted and relaxed. In early cervical dislocations successful reduction will result if this method is followed.

#### KNEE ARTHROTOMIES

DR. JOHN J. MOORHEAD presented a man, March 3, 1928, from whose right knee-joint eight ounces of clear yellow fluid were aspirated, the history being that there had been a progressive painless swelling in that joint without known cause for two years. Examination at that time disclosed evidence of a hypertrophic synovitis without any corroborating signs of semilunar cartilage or of any other joint calculus involvement. X-rays were negative. The fluid recurred and April 9, 1928, through a mediolateral incision, an arthrotomy was done on this knee at which time a moderately complete synovectomy was performed together with the removal of some hypertrophied fat pads and an eroded internal semilunar. The convalescence was uneventful and he had no difficulty with this joint for about a year. On March 7, 1929, an aspiration of the same joint for a recurrence of symptoms yielded approximately fifty cubic centimetres of clear yellow fluid. On both occasions this fluid was negative to culture.

April 8, 1929, another synovectomy was done on this knee-joint through an identical incision and at the same time the external semilunar cartilage was removed because it also was eroded. A pathological examination of the removed material in each instance showed evidence of chronic inflammation. This right knee has remained well to date, namely, for four years.

December 4, 1930, the left knee was operated upon for a condition practically identical with that originally encountered on the opposite side and at this arthrotomy a very extensive synovectomy was performed, together with the removal of excessively large fat pads and an eroded internal semilunar. There was a recurrence of the painless swelling in this left knee after approximately two years and under date of November 17, 1932, another arthrotomy of this left knee was performed and at this time great masses of hypertrophied synovial lining were excised together with the external semilunar. This knee has remained well until about six weeks ago and he now tells me that it is beginning to swell and examination (eight days ago) verifies this, but as can be seen there is not swelling enough to warrant interference.

Here is a case of bilateral hypertrophic synovitis without bone involvement in which, during a period of five years, the right knee has been aspirated twice and two extensive arthrotomies have been performed and the left knee has also undergone a similar sort of exploration minus the aspiration. The notable features are that no known focus has been ascertained although diligent search has been made. The culture of the fluid and the removed synovial lining remained sterile. All serological tests remained negative. These knees demonstrate the reformation of their lining and also demonstrate that the

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very extensive removal of intrinsic structures does not interfere with function. These arthrotomies were performed by the technic presented before this society January 27, 1932.

### EXPERIMENTAL AND CLINICAL STUDIES OF THE RELATIONSHIP OF THYROID DISEASE AND PANCREATIC FUNCTION

DR. J. WILLIAM HINTON read a paper with the above title and presented six patients to illustrate his paper.

CASE I.—Female, aged twenty-eight years, was first seen August 27, 1931. Chief complaint was nausea and vomiting, with pain in epigastrium for the past ten years, which was generally worse around 10 or 11 o'clock at night, or when she was unduly tired. In 1920, she was having abdominal discomfort and had X-rays taken in the Boston City Hospital. The X-rays were reported suspicious of an ulcer, although a positive diagnosis was not made. She had had two gastro-intestinal X-ray series done in August of 1931, the first revealing a slight tenderness over the duodenum and suggestive of a filling defect, but repeated studies two days later did not reveal any organic lesions of the stomach or duodenum. There was persistent abdominal pain. Physical examination did not reveal any epigastric tenderness but her skin was dry, pulse 64 and the patient's hair was very thin and she complained of it falling out. Her finger nails were brittle, skin chapped easily and she complained of tiring very easily. She frequently vomited undigested food. A diagnosis of hypothyroidism was made and a basal metabolism done on August 28, 1931, revealed a minus 18. Patient was put on thyroxine one milligram, intravenously, and thyroid extract gr. 1, T. I. D. This was continued at weekly intervals until November 11, 1931, when a basal metabolism was a minus 8, at which time she was still having some abdominal discomfort but greatly improved. She was seen again November 17 and 27, and was not seen again until January 30, 1932. At that time she stated she was feeling very well and only slightly nauseated, her hair was greatly improved, and she was encouraged. Basal metabolism at this time was a plus 3 and she was taking thyroid extract gr. 4, T. I. D., which she had been taking since her last visit in November. Patient was seen about every six weeks from January to July, and on July 22 she was complaining of being tired and having slight abdominal pain, although her weight was ten pounds over what it had been when she was first treated. Basal metabolism repeated on July 27, 1932, was a minus 14. The patient was then seen at weekly intervals and given one milligram of thyroxine, and thyroid extract gr. 6, T. I. D., for a six-week period, and her symptoms entirely disappeared and she has had no complaints referable to her stomach condition since. On January 4, 1933, her basal metabolism was a plus 3, and she had no complaints. The patient was taking thyroid extract gr. 2, B. I. D. When last seen on March 15, 1933, she was feeling very well and symptom-free. This patient has to continue taking thyroid and thyroxine at fairly regular intervals or her basal metabolism will drop and her abdominal symptoms will return.

CASE II.—Male, twenty-nine years of age, seen June 4, 1932, complaining of upper abdominal pain which comes on one or two hours before meals and usually is relieved by the intake of food. He had been under the care of several physicians. X-rays revealed a duodenal ulcer, for which he had been treated. Five years previously he had had an appendectomy for chronic appendicitis but following the operation he continued to have the same discomfort as previous to the appendectomy. At the time he consulted me he stated the pain was through the upper portion of the abdomen, radiating directly through to the back, and was more annoying than the abdominal pain. Examination revealed definite tenderness in midepigastrium. A diagnosis of duodenal ulcer had been made, and he was referred to the reporter for operation. Operation was postponed and further medical treatment continued, which was persevered in for five months, but failed to make any satisfactory progress. All previous medication was then discontinued and he was



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placed on thyroxine one milligram intravenously, and thyroid extract gr. 1, B. I. D. This was continued at weekly intervals for the next four weeks. October 25, X-rays were negative for a duodenal ulcer. He continued to make weekly visits until December 13, at which time he was practically free from symptoms and was feeling better than at any time since under treatment. He was next seen on December 27, January 24 and March 7 of 1933, and was feeling very well but was continuing thyroid extract grs. 1, B. I. D., by mouth, and had gone from November 1 to March 7 with practically no discomfort whatsoever.

This is the first patient with an ulcer that was given thyroxine and thyroid medication. At a meeting of the New York Surgical Society on October 12, 1932, cases of abdominal pain with hypothyroidism were presented and Doctor Sweet suggested that patients with ulcers be treated with thyroxine and thyroid extract to see what effect it might have, and in view of the fact this patient had been put on treatment only two weeks before the meeting it gave him encouragement to treat a number of other ulcer cases that had not been on other medications.

CASE III.—A man, aged thirty-eight years, was admitted to the Gastro-Enterological Clinic of the Fourth Medical and Surgical Divisions of Bellevue Hospital, November 17, 1932, complaining of pain in his abdomen with nausea and vomiting for the past seven or eight years. He had periodicity of pain and at times the pain radiated to his back. During a recent attack he had lost ten pounds in weight and vomited daily. The patient had known for three years that he had a duodenal Ulcer as X-rays taken at that time revealed a positive ulcer. X-rays presented at the time of his first visit, taken October 27, 1932, revealed a persistent defective filling in the inner and outer borders of the duodenum. There was also a defective filling in the pre-pyloric region of the stomach, and a diagnosis of duodenal ulcer was made with no six hour retention. Physical examination was negative and the patient was placed on a fourth-week Sippy diet and given 1 milligram of thyroxine and thyroid extract gr. 1, T. I. D. He was seen at weekly intervals and thyroxine administered. On December 15 the patient stated he had a severe cold but no abdominal pain. Weight at that time was 175 pounds. From that period to the present date the patient has had no abdominal symptoms. He has been seen regularly every week and the thyroxine and thyroid medication continued. Basal metabolism done March 22 was a plus 11. X-rays taken on March 27, 1933 revealed an ulcer of the first portion of the duodenum but no six-hour retention. On March 30, 1933, patient weighed 196 pounds, which was the most he ever weighed, and twenty pounds over what he weighed when he entered the clinic.

CASE IV.—Male, thirty-eight years of age, admitted to the Gastro-Enterological Clinic of the Fourth Medical and Surgical Division, Bellevue Hospital, November 17, 1932, complaining of pain in upper abdomen for a period of two to three years, which comes on for a period of a month or two and then gradually subsides, without nausea or vomiting. He never knew what the trouble was until just before entering the clinic when X-rays were taken which revealed an ulcer of the first portion of the duodenum with no six-hour retention. Patient was put on a fourth-week Sippy diet and thyroxine 1 milligram intravenously, and thyroid extract gr. 1, T. I. D. On December 8 his only complaint was constipation but no abdominal pain. Since December 15 he has had no complaints and now is symptom-free. He has been seen weekly and thyroxine administered intravenously, as well as continuing thyroid extract by mouth.

CASE V.—Male, aged sixty years, admitted to the Gastro-Enterological Clinic of the Fourth Medical and Surgical Division of Bellevue Hospital on December 15, 1932, stating that five years ago he had gas and pain in the pit of his stomach and one month later he went to the Kings County Hospital where X-rays were taken and he was put on a Sippy diet for two weeks. He was told he had an ulcer of his stomach and advised immediate operation which he refused. He left the hospital and has not been under a doctors' care since but has watched his diet quite carefully and has been practically free from symptoms until six weeks ago when his original discomfort returned and now he has gas and pain in

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his stomach. Examination reveals tenderness in epigastrium but no masses felt. X-rays taken December 14, 1932, revealed the presence of an ulcer of the lesser curvature at the pars pyloric and media. The patient was put on a fourth-week Sippy diet, thyroxine 1 milligram, intravenously, and thyroid extract gr. 1, T. I. D. He was seen at weekly intervals and on December 29 he still complained of pain but was taking the thyroxine and thyroid extract. On January 5 he felt very well and had no complaints. Since that time he has been seen weekly, and thyroxine continued, and thyroid extract taken regularly by mouth; he has been symptom-free and was last seen April 6, 1933. X-rays taken February 27, 1933, revealed no organic lesions of the stomach or duodenum. Fluoroscopic examination revealed slight rigidity at the site of the ulcer which is now completely healed. Basal metabolism done February 17, 1933, was a minus 4.

CASE VI.—Female, age thirty-one years, admitted to the Gastro-Enterological Clinic of the Fourth Medical and Surgical Divisions of Bellevue Hospital on November 3, 1932, complaining of having had pain in epigastrium for the past year, with no vomiting but occasional nausea and constipation. X-rays taken October 28, 1932, revealed a pyloro-duodenal spasm with 30 per cent. gastric residue at the end of six hours. Patient was placed on thyroxine 1 milligram, intravenously, and thyroid extract gr. 1, T. I. D. but she did not return to the clinic and a home follow-up on January 30, 1933, revealed the patient continuing to have her abdominal pain and she was very much discouraged. She returned to the clinic on February 3, 1933, and was placed on thyroxine 1 milligram, intravenously, and thyroid extract and has been seen at weekly intervals since that time. On March 9, 1933, she was feeling well, without complaints, and when last seen on April 6, she was symptom-free but continued to take thyroxine and thyroid extract. Her basal metabolism done on March 24 was a plus 12 and her gastro-intestinal X-ray series April 5 revealed a duodenal ulcer, but no six-hour gastric residue.

DR. PAUL C. MORTON (by invitation) pointed out that the relationship of the histological picture to the chemical determinations of iodine in the gland were at variance with the usual and accepted picture. The general conception of this subject is that the iodine in the thyroid gland is in direct proportion to the amount of stainable colloid present. With this in mind, in looking over the sections, it was rather surprising to find that the amount of iodine in the gland did not apparently correlate itself with the amount of stainable colloid along the lines of this premise. A gland with a high iodine content would show very little if any increase in colloid in the sections. It was especially stressed that the observations on the clinical course of these animal experiments seemed to be of more value than the histological picture of the various organs examined.

It is impossible at this time to explain this variance between iodine content and colloid as stated above. On the other hand, in doing these experiments, certain very definite things were noted in the animals.

(1) When the pancreatic duct was tied and sectioned, these dogs developed colloid goitres.

(2) When they were fed potassium iodide with the ducts tied, they died within a very short time.

(3) When these animals were given thyroxin after the duct had been tied, they could be carried along in normal health for a considerable length of time.

It is hoped that this type of clinical observation together with the chemis-

try of tissues will lead to a better understanding of the problem than histological studies.

In all of these animals the adrenal glands were removed at autopsy and histological slides made. Tyrosine is the amino-acid from which both epinephrine and thyroxin are apparently made by the body. This close chemical relationship between these two secretions would make one consider that possibly the adrenal glands might show some disturbance along with the thyroid if the original assumption as presented by Dr. John Staige Davis is correct. Preliminary studies of these adrenal glands would indicate that there are abnormal changes in some of the sections. This will bear further study.

The speaker further emphasized that this work is based upon experimentation involving some sixty-five animals to date, and that this is a new approach to the question of diseases of the thyroid.

DR. CARNES WEEKS said that he thought one of the most important things Doctor Hinton has shown here tonight is the extreme variation in the histological picture of the so-called normal thyroid. As this varied picture is true of the human thyroid so is it true of the dog, and it is easy to see how careful one must be in interpreting the histological findings of experimental work done on the thyroids of dogs. It has been suggested to us that we give all our dogs iodine before any experimental work is done in order that their thyroids may show approximately the same picture. Obviously this would not have been possible in most of the work that Doctor Hinton has reported. In the small number of normal human glands which have been examined for total iodine content there has been as marked a variation as in their histological picture, the figures ranging from 50 to 200 milligrams of iodine per 100 grams of dried gland. The estimation of iodine content in conjunction with a study of the histological picture is being continued in these normal glands in hopes of obtaining some significant relationship.

DR. JOSHUA E. SWEET said that thyroid researches had been almost exclusively concerned with the study of iodine. This work has shown that the iodine in the thyroid is in combination with some protein derivative, but very little attention has been paid to this protein factor. The chances are certainly even that the trouble may lie in the protein fraction rather than in the iodine fraction; in fact certain studies have shown that substitution compounds, in which the iodine was replaced by another halogen, such as bromine, exhibit the same action as thyroxin. The whole problem of the thyroid is of interest and filled with inexplicable contradictions. No operation in surgery results in such satisfaction to both patient and surgeon and yet there is no operation so illogical. The authors of this paper are to be congratulated upon their effort to approach the problem by a new route.

DR. WILLIAM BARCLAY PARSONS said that in little ways here and there we have amassed information and knowledge about the various glands of internal secretion. Hypo- and hyperthyroidism, hypo- and hyperparathyroid-

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ism, hypo- and hyperinsulism are now readily recognized and may be treated with considerable success. The cross-relationship of the various glands is still obscure, and any studies along this line are most worth while. The speaker, however, could not follow Doctor Hinton's logic in reference to the accumulation of colloid in the experimental animals with the pancreatic ducts ligated. It is generally admitted that colloid consists largely of thyroglobulin, an iodine-containing substance in which the iodine occurs either in thyroxine or in diiodotyrosine; and unless the animal has been receiving large amounts of inorganic iodine for several days immediately preceding death, there will not be more than a trace of uncombined iodine in the glands. If tyrosine absorbed from the intestinal tract is the source from which diiodotyrosine or thyroxine is produced, how can the gland increase its colloid content if tying the pancreatic ducts eliminates the possibility of the formation of tyrosine in the intestinal tract?

Doctor Parsons also could not understand the rapid deaths of the animals receiving potassium iodide following tying of the ducts; but the picture produced by the exhibition of tyramine suggests the findings reported by Cole and Womack in animals killed by infection or different chemical poisons. Whether or not some such circumstance has obtained in the animals reported tonight is worthy of thought.

In his paper Doctor Hinton spoke about the poor results in the use of thyroid extract alone in hypothyroid patients, and the necessity for the use of thyroxine in most of these patients. This is expensive and a nuisance to the patients, and very seldom results in a really satisfactory result. This is one of the main points in being somewhat conservative in the amount of tissue left behind after operation, and is why the speaker disagrees with those writers who have the production of hypothyroidism as their object in operating for hyperthyroidism.

DR. ARTHUR S. MCQUILLAN noted the fact that Doctor Hinton extirpated one lobe of the thyroid in all the dogs used in this series. This was done for purpose of control of the iodine content of the dog's normal thyroid tissue, and some time before the ligation of the pancreatic ducts. Doctor McQuillan emphasized the fact that extirpation of one lobe of a dog's thyroid gland resulted in the hypertrophy of the remaining lobe and an increase of iodine content up to 30 per cent. The fact has been well established in a series of experiments done by Dr. John Rogers at Cornell in 1921 to show the effect of iodine content of a dog's thyroid gland as a result of adrenal feeding. The increased iodine content was noted in the controls. Doctor McQuillan felt that Doctor Hinton's work should have had this control so as not to include this fact in the results of his work.

DR. EMIL GOETSCH pointed out that too much cannot be concluded from the mere appearance of the thyroid gland at any particular moment. Thus, in spite of the fact that the thyroid may contain a large amount of colloid, it may still be functionally rather active and the reverse may also hold. It is

essential that one determine the function of the thyroid cells themselves regardless of the amount of colloid present. He has been interested for a number of years in this problem and has been able to show that the best criterion of cellular activity that we know of at the present is the cellular content of mitochondria. An abundance of these intracellular structures indicates activity. A small part or relative absence indicates inactivity. He asked Doctor Hinton whether the dogs that were submitted to autopsy were sacrificed or whether they had died in the course of the experiment and were then examined. The reason for this question was that the thyroid, being exquisitely sensitive to any changes within the organism, would respond to the profound changes which occur during the latter days of any experiment in which the animal is allowed to die of natural causes. Thus one factor might be that of starvation, for the dogs as is well known will stop eating sometimes for several days before they actually die as a result of the experiment. This starvation alone has a profound effect upon the appearance of the thyroid as was shown some years ago by Jackson of the University of Minnesota.

DOCTOR HINTON, in closing the discussion, replied to Doctor Parsons that there is considerable debate among investigators as to how the iodine is stored in the thyroid gland. It is maintained by some authorities that iodine is in the form of thyroxine, or a composition that is physiologically equivalent to thyroxine. Others maintain that 50 per cent. of the iodine is in the form of diiodotyrosine. The question of tyrosine and how it works was the basis of this study. If thyroxine is formed from tyrosine, and the protein metabolism is interfered with, and by so doing eliminates the supply of tyrosine to circulate in the thyroid gland, then the iodine content of the gland is increased, due to the fact that the iodine cannot combine with tyrosine to form diiodotyrosine that finally changes to thyroxine, which is the active principle of the gland.

Urinary diastase was not done on these patients but the amylase and lipase of the blood were determined in both dogs and humans. The dogs had their pancreatic ducts ligated, but no increase was found in either of these constituents in the blood. In humans, suffering from ulcers with a history of chronic pancreatitis, it was not possible to determine an increase in either amylase or lipase of the blood. Twenty-five determinations were done on human subjects, and fifteen dogs were used with repeated blood examinations.