TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY AND THE PHILADELPHIA ACADEMY OF SURGERY

JOINT MEETING HELD FEBRUARY 8, 1933, AT BELLEVUE HOSPITAL, NEW YORK CITY

LUMBAR SYMPATHETIC NEURECTOMY FOR HIRSCHSPRUNG'S DISEASE

DR. EDWARD J. DONOVAN presented a man, aged twenty-four years, who, in May, 1921, when twelve years old, was first admitted to St. Luke's Hospital, New York, complaining of constipation since birth. X-ray at that time disclosed a dilatation of the colon, but it was thought to be acquired rather than congenital in spite of the fact that no cause for it could be found. He was discharged eighteen days later on cascara and milk of magnesia, and it was stated in the discharge note that his bowels were moving well. He was readmitted one year later with fecal impaction and a history that for several months past his bowels had moved only once or twice a week. Impaction was removed; X-rays taken showed that the sigmoid and descending colon were very large. July 22, 1922, Doctor Bolling removed twenty-four inches of the sigmoid and did a side-to-side anastomosis. Convalescence was uneventful. He was discharged twenty-two days later with satisfactory bowel movements as result of a daily enema. Pathological diagnosis of the colon was megacolon. All the muscular coats were hypertrophied.

Three years after this operation he was again admitted with fecal impaction. He had felt improved for two years after his operation, but now his condition was just as bad as ever. An X-ray taken at this time was reported as showing great dilatation of the colon. He was also shown by Doctor Bolling at the New York Surgical Society about this time to demonstrate the fact that he believed resection in these cases was hardly worth while as the condition recurred promptly in the remaining colon.

January 15, 1932, he was admitted on account of a fecal impaction which was so great that it was necessary to give him an ether anæsthetic to remove the impaction. His X-ray at this time showed the rectum and sigmoid tremendously dilated with considerable dilatation of the descending, transverse and ascending colon. February 9, 1932, a sympathectomy was done. There were many adhesions around the site of his previous operation which it was necessary to dissect. The sigmoid and rectum were so large that it was necessary to mobilize them to remove them from the field of the contemplated sympathectomy. This operation was done under spinal anæsthesia which was a great help in keeping the large intestine out of the field of operation. The peritoneum in the mid-line of the posterior abdominal wall was incised directly over the bifurcation of the aorta. This incision was carried downward over the brim of the pelvis to the left common iliac vein and upward to the origin of the inferior mesenteric artery. The pre-sacral nerve was then found just to the right of the left common iliac vein. In 80 per cent. of the cases that have been operated upon, the pre-sacral nerve exists as three trunks. In 20 per cent. of the cases, these three trunks are fused to form a single nerve. This is the condition, a single trunk, that existed in this case. The pre-sacral nerve was then cut below just before its entrance into the hypogastric ganglia, and dissected upward to the origin of the in-

ferior mesenteric artery as this is the method recommended in finding the inferior mesenteric nerves which lie one on each side of the inferior mesenteric artery. In this dissection from below upward, the connecting branches from the third lumbar ganglia are divided as they pass beneath the common iliac arteries. Branches from the first and second lumbar ganglia are then severed as the nerve is traced upward. About one inch of each inferior mesenteric nerve was then resected with the pre-sacral. The incision in the peritoneum was then closed and the abdomen closed in layers. He had a slight upper respiratory infection with a troublesome cough that bothered him quite a little but it was not considered post-operative pneumonia. His convalescence was otherwise most uneventful. On the third day after operation he received his first enema which was expelled with much force. He was very much pleased with this result and stated of his own free will that it was the first time in his life that he could remember being able to expel an enema. He was given half an ounce of mineral oil t.i.d. and a daily enema for the twelve days that he was in bed with equally good results each day. His bowels moved spontaneously before he received his enema the first day that he was out of bed. He has had mineral oil only since he left the hospital and has one or two very satisfactory bowel movements every day.

CASE II.—A twelve-year-old Jewish girl was admitted to the Babies Hospital, November 17, 1932, for the second time with complaints of abdominal distention, vomiting and failure to move her bowels for the past several days. She was a known case of Hirschsprung's disease, the diagnosis having been made when she was three days old. She was one of twins, the other twin having died at the age of three days, probably from the same condition as her abdomen was very much distended, and she had passed nothing by rectum.*

Since birth this patient, whom he presented, has had to have a daily enema with frequent cathartics and mineral oil. In spite of this treatment, she has often gone several days without having a bowel movement. Three years ago, she was also under treatment for intestinal obstruction due to impacted fæces. By means of numerous hot oil enemata, colonic irrigations and the manual removal of fæces, the obstruction was relieved. Operation was advised at this admission, but was refused. Since that time she has been seen frequently in the clinic.

A sympathectomy was done December 6, 1932, a resection of the pre-sacral with both inferior mesenteric nerves in the usual manner by incising the peritoneum in the mid-line over the promontory of the sacrum. The pre-sacral nerve, which existed as one single cord, was picked up in the region of the left common iliac vein, and dissected upward to the inferior mesenteric artery where about one inch of each inferior mesenteric nerve was removed with the pre-sacral.

The patient had an uneventful convalescence, had a spontaneous bowel movement on the thirteenth day after operation, and was discharged from the hospital on the seventeenth day at which time she was able to expel an enema forcefully.

It is now two months since her operation. Her bowels are moving once or twice a day, and she is having nothing but mineral oil twice a day by

* These cases were reported as Hirschsprung's disease by Dr. Joseph Popper in the New York Medical Journal, December 25, 1920. He was the physician who attended her since she was three days old.

mouth. A barium enema a few days ago shows considerable decrease in the size of the colon. The patient has gained weight, her abdomen is very much smaller, and she is feeling better than she has felt in years.

DR. EDWARD W. PETERSON (New York), said that three cases of Hirschsprung's disease had been subjected by him to lumbar sympathectomy since January, 1932. In the first and third cases the pre-sacral, the inferior mesenteric nerves, and the left lumbar ganglia were resected; in the second case the pre-sacral and inferior mesenteric nerves, as recommended by Rankin, were resected. The relief of symptoms was most gratifying in all three cases. He had reported these cases on November 9, 1932, before the New York Surgical Society. One of these cases, the most advanced and the least promising, had movements on February 2, 1932. At the present time the bowels are moving normally and naturally each day without any medication, and his abdominal distention is no longer present. The apathy and lassitude, so pronounced before operation, have entirely disappeared. He has gained twenty-five pounds in weight, and several inches in height. His general health is excellent and his whole outlook on life has improved.

Hirschsprung, in 1886, described the disease which has since borne his name as "a condition of congenital high-grade dilatation of the colon, with thickening of all its tunica, especially the tunica muscularis, and retention of large quantities of fecal matter." The dilatation and hypertrophy may affect a part of or the whole of the large bowel. To the cardinal symptoms—dilatation of the colon, abdominal distention and obstipation—may be added languor, apathy, loss of weight, anæmia and general muscular weakness. Occasionally there may be abdominal discomfort, vomiting, fever, and evidences of auto-intoxication. Usually when diarrhœa occurs it is merely the overflow of fecal retention.

The treatment of idiopathic dilatation of the colon in the past, by both medical and surgical measures, has, for the most part, proved unsatisfactory. Following the work of Hunter and Royle, of Sydney, Australia; Wade and Royle, in 1927, reported a case of Hirschsprung's disease, treated by ramisection of the lumbar sympathetic ganglia, with excellent results. Later Judd, Adson, Rankin, Learmouth, of The Mayo Clinic; Wade, Robertson and others gave encouraging accounts of their experience with this operation. There were no deaths recorded. All cases, it seems, were benefited and the end-results, in properly selected cases, were "spectacular." (Rankin.)

There are many theories as to the cause of Hirschsprung's disease, which will not be discussed here. It seems probable that the underlying factor is neurogenic, for there is definite neuromuscular imbalance and dysfunction, and the colon seems incapable of emptying itself of the large fecal accumulations. Section of the lumbar sympathetic nerves causes a break in the hyperactive inhibitory control. The relative safety of the operation and the highly gratifying results obtained by a number of surgeons make this procedure the method of choice in the treatment of properly selected cases of megacolon.

DR. THOMAS A. SHALLOW (Philadelphia) said that since 1886 when Hirschsprung first wrote his article on this condition, which bears his name, there has been a gradual understanding of the pathological lesion. It is accepted, by most, that Hirschsprung's disease originates as a result of some intrinsic disturbance in the wall of the colon, at the junction of the sigmoid and rectum. As a result of this disorder the sigmoid, some of the colon and indeed, in some cases, all of the colon becomes hypertrophied, thickened and elongated. The management of this condition from the time of its description to the year of 1923 was more or less haphazard. Appendicostomy, ilio-colostomy, colectomy and resection of the bowel were performed. Because of the relatively high mortality by these methods of treatment many patients selected the medical plan of treatment.

In 1923, Royle wrote his epoch-making article on the surgical treatment of the sympathetics to control this disorder. Royle believed that the removal of the second, third and fourth lumbar sympathetics removed the inhibitory influence of the sympathetic nerves. That this belief was founded on fact there is no question, numerous cases in literature and some done by myself certainly justify this operation. However, with the increase in our knowledge of the sympathetic nerve system, and with the disease in question, it was found that the lesion was not limited to the sigmoid but also involved, in most cases, the descending colon.

In 1927, Wade, of Australia, developed a new operation for the management of this condition, it was his belief, and this belief has been fortified by subsequent observers, that it was unnecessary to subject the individual to the extensive operation of ganglionectomy. It is now known, conclusively, that the sympathetic inhibitory nerve fibres to the descending colon have their origin in the upper sympathetic ganglia, the semilunar and the celiac plexus, from these plexuses the sympathetic fibres pass along the aorta from the superior mesenteric to the inferior mesenteric artery. Between these two structures the sympathetic nerve system is known as the intermesenteric plexus. It is from this plexus that the inferior mesenteric nerve has its origin. The distribution of the inferior mesenteric nerve is to the middle and descending portion of the colon. Not only does the colon receive the sympathetic nerve supply, of the inferior mesenteric nerve, but it also receives, from the second, third and fourth lumbar ganglia, the pre-sacral sympathetic nerve. The method of formation of the pre-sacral nerve is interesting from an anatomical standpoint but from a surgical standpoint it is no more important than the inferior mesenteric nerve.

Therefore, the plan of procedure for the treatment of Hirschsprung's disease, which includes the removal of the inferior mesenteric nerve and the pre-sacral nerve, is based on sound anatomical and physiological facts.

DOCTOR PETERSON added that at present one did not know how much or how little to do in resecting the lumbar sympathetic nerves in Hirsch-

sprung's disease. Wade advocated, through a long incision in the flank, an extra-peritoneal division of the mesially directed branches and the main chain itself below the fourth lumbar ganglion. Judson and Adson have advised, through a transperitoneal operation, the resection of the second, third and fourth lumbar ganglia on both sides. Rankin and Learmouth believe that resection of the pre-sacral and the inferior mesenteric branches will sever all the nerves to the parts of the bowel chiefly affected, thus avoiding the minor disadvantage of disturbing the neurovascular supply of the lower extremities.

DR. FREDERICK A. BOTHE (Philadelphia), said that surgeons who prefer the operation that Doctor Donovan has employed in these two cases, to lumbar ganglionectomy, believe that the nerve section is limited to the actual fibres supplying the intestine, that this procedure insures the interruption of all the fibres reaching the distal part of the colon from the thoracico-lumbar sympathetic outflow. The anatomical and physiological reasoning is that first we may attempt to diminish the dilatation of the colon, and leave its motor nerves in less disputed control by division of the inferior mesenteric nerve, and attempt to relieve any opposition to the expulsion of the contents of the bowel offered by the internal sphincter of the anus, by the division of the pre-sacral nerve.

The lower end of the pre-sacral nerve should be clamped before it is cut, to avoid hæmorrhage. Should hæmorrhage occur, difficulty may be experienced in controlling it, and damage to the pelvic plexus and sacral nerves may result. Injury to the pelvic plexus may result in disturbances of micturition, and injury to the sacral nerves may result in a disturbance of the reflex of defecation. He reported a case which was operated upon by Doctor Speese at the Presbyterian Hospital in Philadelphia.

The patient, G. H., was born in the maternity department of the Presbyterian Hospital in 1929. After birth the child did not take feedings well, vomited considerably, and abdominal distention gradually developed. The bowels moved with difficulty and even rectal irrigations were not very successful. Rectal examination revealed a stricture which felt like a membranous band just at the tip of the little finger. A catheter was introduced with difficulty past this constriction. A copious evacuation of foul fecal material was obtained and an abundance of gas was passed with total relief of distention. A barium enema was given with the catheter in place, and it showed a marked degree of dilatation of the entire colon. Subsequently, the infant proctoscope was passed its full length, no evidence of obstruction was found, and the mucosa appeared normal. The child remained in the hospital for a period of five months. On a few occasions it had a natural bowel movement, but daily strenuous colonic irrigations were necessary for a complete evacuation. The child was thought to be too young to consider sympathectomy at this time, so the mother was taught how to give a colonic irrigation and continued this treatment after dismissal from the hospital. Two months later the child was readmitted to the hospital, as home conditions were most unsatisfactory and the mother was unable to care for the child properly. Under hospital management and blood transfusions the general health improved,

He became more alert and active and gained in weight, but the abdominal distention became progressively more pronounced and successful evacuations became more difficult to obtain by colonic irrigations.

When the child was twenty-three months of age, the X-ray report of a barium enema was: "The enema passed without delay or discomfort to the child. The entire colon was greatly dilated, the ascending and descending portions considerably more in proportion to the transverse. At two years of age, the pre-sacral nerve and inferior mesenteric plexus were resected by Doctor Speese. There was some post-operative distention for a few days but on the fourth day the child began to have good results from soapsud enemas and the distention was relieved. Subsequently the child's general condition was definitely improved and the distention was diminished, and on many days natural bowel movements occurred. The patient was discharged thirty-five days after operation. An X-ray study made at this time showed a definite decrease in the size of the descending and transverse colon, and a few haustrations could be seen. There was little change in the ascending colon. One month later the child was readmitted because of improper management at home and a return of the distention. This time the child remained in the hospital for three weeks and at the time of dismissal was again having one to two soft formed stools daily, and the distention was again relieved. Six months after operation the patient was readmitted for follow-up studies. He had grown an inch in height, was much brighter, more alert and active. The abdominal distention had decreased, about 60 per cent. In the course of preparation for a barium enema, he developed a series of convulsions, never regained consciousness, and died in six hours.

POLYPOSIS AND CARCINOMA OF COLON; COLECTOMY FIVE YEARS WITHOUT RECURRENCE

DR. HENRY F. GRAHAM (New York), detailed the history of a woman who was admitted to the Brooklyn Methodist Hospital, November 30, 1927, on account of intestinal disturbances, with discharges of mucus and blood, at intervals during the preceding seven years.

For two months prior to admission she had noticed a tendency to constipation instead of diarrhœa.

At a first operation a large adeno-carcinoma of the sigmoid was drawn out through a lower left muscle-splitting incision and the two limbs of the loop sutured together as in the Miculicz procedure.

The loop was removed nine days later. In addition to the carcinoma several polypi were found in the loop, some of which prolapsed from the upper opening of the colostomy. In a few places carcinomatous degeneration was commencing.

Several transfusions were given and a month after the first operation an end-to-side anastomosis of the terminal ileum to the rectum was made with a Murphy button. By the last of January, 1928, her red cells were normal and the hæmoglobin was 77 per cent. She was allowed to return home for a month and a half. Her stools were somewhat fluid at this time. She gained fifteen pounds in weight and returned to the hospital apparently in perfect health except for occasional blood from her isolated colon.

March 5, 1928, the colostomy was divided; the lower end was closed and the entire colon was removed to a point just about the cæcum. The specimen showed an adeno-carcinoma near the cæcum and numerous adenomata, many

of which were pedunculated, forming true polypi. Two weeks later the remaining cecal pouch and the end of the terminal ileum were removed. There were no polypi in the ileum. She showed wonderful recuperative ability. Every wound, with the exception of the last one, healed without infection.

This patient has remained in good health, a period of five years.

Dr. Damon B. Pfeiffer (Philadelphia), remarked that Doctor Graham's case represented a happy solution of a very difficult problem. The desirability of total colectomy in certain conditions is unquestionable. Especially is this true in diffuse adenomatous polyposis of the colon. In the majority of such cases, cancer of the colon is inevitable. And even before such malignant transformation takes place such individuals are often incapacitated by disturbances of the bowels associated with ulceration and continuous loss of blood, sometimes even massive hæmorrhages. It may be possible in certain cases to deal with single polyps or in others to resect a limited segment of the bowel containing the polyps but it not infrequently happens that the polypoid structures involve the entire mucosa of the colon and the rectum. In such cases the colon must be sacrificed. Palliation may be accomplished by excluding the colon by ileostomy, an offensive condition. It is attractive in such cases to remove the colon and to unite the ileum with the lower segment or rectosigmoid to preserve the natural avenue of discharge. He had undertaken such a procedure only once but unsuccessfully. The patient was a man aged forty-four, who had been subject to intestinal disturbances for several years. Three weeks before admission he had a very severe attack of diarrhœa, pain and bleeding from the bowels. The rectum and colon were seen to be full of polypi. The blood showed hæmoglobin, 53 per cent.; red blood cells, 2,420,000; white blood cells, 9,800. His plan was (1) to make an ileostomy; (2) to remove the colon down to the lower sigmoid; (3) to make an ileo-sigmoidostomy to restore continuity; (4) to fulgurate away through the proctoscope and sigmoidoscope the papillomas of the lower bowel. The ileostomy was made satisfactorily and seventeen days later he removed the colon. In the light of this experience he now believed that a considerably longer interval should elapse between these two steps. There was no difficulty from the operative standpoint and the patient stood the operation well. During the operation the presence of large lymph glands in the lymphatic distribution of the colon and evidence of cellulitis of the retroperitoneal cellular tissue were evident. The patient did well enough for eight or nine days and then became distended, complained of pain and died on the fourteenth day of peritonitis. Autopsy showed no leakage from the bowel and it seemed to him that the infection came from the disturbed retroperitoneal tissues. Later Rankin reported several successful cases of this kind in which he had waited longer between stages. This operation is subject to modifications as in the case just reported but fundamentally it will consist in preliminary drainage of the bowel followed by removal of the whole or the affected part of the colon and by restoration of continuity.

As to the relationship of papillomata or polyps to the development of carcinoma a number of cases of simultaneous, independent carcinomas of the colon in association with polyposis are now on record. He had had no personal case of this sort but had had two cases of independent primary carcinomas of the rectum and sigmoid. In neither of these cases were polyps present in that portion of the colon and rectum which was removed. In his experience, polyps have been associated with carcinoma of the colon or rectum in more than 10 per cent. of the cases. In a case of carcinoma of the rectum which has just left the hospital a large polyp gave considerable difficulty in establishing the function of the colostomy. After the bowel had been opened and the first escape of gas and liquid fæces had subsided, the patient continued to have colicky pains and the colostomy did not functionate properly. Finally, in about a week, she extruded a large globular polyp about three-quarters inch in diameter with a long pedicle attached just inside the opening. The resident removed it and there was no further trouble.

TRANSMANUBRIAL ENLARGEMENT OF UPPER THORACIC APERTURE FOR REMOVAL OF INTRATHORACIC GOITRE

Dr. Emil Goetsch (Brooklyn), reported the following case to illustrate the advantages of a transmanubrial division for the removal of a large intrathoracic goitre:

This patient was a woman aged fifty years, admitted to the Long Island College Hospital May 25, 1931.

About twelve years previous to admission, she began to have severe choking sensations and coughing spells. A mild enlargement of the neck first appeared on the right side of the neck four years later. At the same time the symptoms of pressure and hyperthyroidism became increasingly severe. Seven years later after a period of X-ray treatment, the enlargement diminished in size, with a period of comparative comfort. In November, 1929, symptoms of palpitation and dyspnœa became more severe. Occasional œdema of the legs was noted. She was in bed for five months and lost a great deal of weight. She also suffered fatigue and weakness and severe choking, more upon lying down. Shortly before admission she suffered with a cold which seems to have precipitated a crisis. Coughing, choking, dyspnœa and hoarseness became more severe, being almost constant. Loss of weight and weakness were progressive. X-ray examination of the chest showed a large mediastinal shadow, and the diagnosis of intrathoracic goitre was made.

The neck was broad and thick and showed a globular fullness low in the right anterior triangle just above the clavicle. The larynx and trachea were displaced to the left. Just above the clavicle on the right one could feel the dome of a firm, oval adenomatous mass which extended downwards into the mediastinum. The left thyroid lobe was slightly enlarged and irregular and tender but no nodules were found. A pulse was felt at the pole on the right but no thrill. No increased circulation was noted on the left. The percussion note over the manubrium and along its right margin was dull. Forced respiration produced a definite tracheal stridor. The voice was husky, low-pitched and very weak. A large, globular shadow occupied the right mediastinum, displacing the trachea to the left. The shadow was oval, circumscribed and about the size of a large orange. Examination of the lung fields was negative. The pulse was 100; the blood-pressure 148/80 and the

weight 156½ pounds. Laboratory tests were negative. The diagnosis was of intrathoracic goitre. The patient was given pre-operatively Lugol's solution M.VIII three times a day. She was considerably benefited, the pulse coming down to 92.

Operation April 27, 1931, anæsthesia of nitrous oxide, oxygen and a small amount of ether being employed. The usual collar incision for the exposure of the thyroid was made. The dome of the adenomatous mass on the right was uncovered. This dome-shaped upper pole was the size of a small lemon and projected as it were upwards from the mediastinum. It was dissected free from its attachments to the larynx and trachea in the usual manner. Clamps were then placed on the capsule for the purpose of traction upon the intrathoracic mass. The capsule, however, proved to be very thin and the dome of the tumor, being composed of friable nodules, fractured off from the main mass flush with the clavicle. There was some bleeding at this point and it at once became evident that it was clearly impossible to raise the tumor through the available space in the thoracic aperture. The trachea was displaced to the left and because of its compression against the upper margin of the manubrium there resulted increasing respiratory difficulty when an attempt was made to raise or dislocate the intrathoracic mass. The latter had assumed the shape of a pear, produced by compression of the clavicle and the first rib. By far the larger part of the mass was in the mediastinum below the groove produced by the clavicle and first rib.

In order to gain more space, the manubrium was exposed by a vertical incision downward from the centre of the collar incision. The fascia and tissue of the jugular notch was carefully freed from the manubrium. A finger was inserted behind the manubrium to free its posterior surface of blood-vessels, fascia and possibly pleura. Two perforator-burr trephine openings were made in the body of the manubrium. Through these in turn and over the upper margin of the manubrium a Gigli saw was inserted and by this means a vertical division of the manubrium was readily performed. By means of retractors and with fair ease the two halves of the manubrium were then separated until a gap of about an inch or more was obtained. This gave a striking increase in size of the thoracic aperture and the mediastinal mass was then surprisingly readily brought up into the neck. It was the size of a grape fruit, oval in shape and showed the grooving of the clavicle and first rib. The mass was encapsulated and composed of colloid nodules, many of which showed old fibrous change but no calcification. There was complete atrophy of the former right thyroid lobe. The right recurrent nerve was exposed during the dissection. The isthmus and left lobe were practically normal in size and appearance. A small gauze pack was placed immediately in front of and behind the manubrium and another in the mediastinal cavity. The two halves of the manubrium were brought together by chromic cat-gut sutures of the periosteum and the fascia at the upper border of the manubrium. Throughout there was no great difficulty with respirations and the condition of the patient at the end was good.

In the evening of the day of operation, the patient's speech was definitely better than before operation. The drains and gauze pack were removed within the first forty-eight hours. On the third day following operation, there was some cough and expectoration which soon cleared up. During the following two days, the patient complained of some pain in the region of the manubrium. This was not severe, however. The wound healed normally and on the tenth day a check-up of symptoms revealed that all choking, cough, dyspnœa, palpitation and nervousness had disappeared.

She was discharged two weeks after operation in excellent condition. Nearly two years later, when seen on February 8, 1933, she stated that she had been entirely well since leaving the hospital. She had gained considerably in weight; five pounds over her previously greatest weight. The voice was clear, the so-called asthmatic attacks were entirely relieved as also the previous symptoms of hyperthyroidism. There were no symptoms referable to the division of the manubrium.

Doctor Goetsch stated that he had found no reference to a similar operation for the removal of large intrathoracic goitre which cannot be brought up through the thoracic aperture in the usual manner. It is rarely necessary to resort to this measure, but, as in this case reported, the procedure described became imperative.

Kerr and Warfield* described an operation based on much the same principles, namely, the vertical division of the manubrium and sternum, with raising one-half of the divided sternum and attached ribs, for the exposure and removal of an intrathoracic dermoid.

DR. GEORGE P. MULLER said that as a rule intrathoracic goitre can be removed by simple luxation and excision. As these goitres almost always maintain their blood supply from above, the inferior thyroid should be ligated first. Sometimes alarming hæmorrhage results from the tearing of veins going to the surrounding fascia and hence luxation should not be attempted where much force is necessary to elevate the mass. He had removed the tumor by morcellement several times but this is an untidy operation. In a few cases he had cut away the top of the sternum with rongeur forceps in order to get room for the luxation, and had found this very satisfactory.

Resection of the manubrium and anterior mediastinotomy should find its greatest use in those cases of intrathoracic goitre when the diagnosis from tumors such as dermoids is difficult and where the goitre practically has no connection with the lower pole or isthmus. In this procedure as well as in the luxation of tightly wedged tumors anæsthesia is greatly facilitated by bronchoscopical control.

As illustrative of a typical case he cited the history of a man aged forty-two, who was admitted to the University Hospital, December 14, 1931, on account of dyspnœa and cough which had persisted for three months. Röntgen-ray examination showed a tumor about the size of a lemon behind the right second rib. In October he was given ten deep X-ray treatments over a period of three weeks but because of increasing severity of cough operation was finally decided upon. It was noted that when the patient coughed there was a definite bulging of the lower neck. The basal metabolic rate was plus 15. There was a slight tremor but no tachycardia; the thyroid gland was just palpable but the lower poles apparently could be identified. An electrocardiogram showed frequent ventricular extra systoles, but was otherwise negative.

Fluoroscopical and film examination showed a tumor in the anterior mediastinum displacing the trachea to the left, and posteriorly. Swallowing changed the conformation of the tumor and this is considered an important differential point from aneurism. December 17, 1931, under ether anæsthesia and with a bronchoscope introduced to the bifurcation, usual exposure for

* Kerr and Warfield: Trans. Amer. Surg. Assn., vol. xlvi, pp. 291–313, 1928.

thyroidectomy was done by a low transverse incision. The tumor could be felt but could not be budged nor could the finger be introduced below it. Therefore a T-incision was made, the sternum split to the second rib and outwards to the left and the incision spread. The tumor could then be dislocated upwards and outwards. A pedicle was found prolonged from the right lower pole. This was divided and the mass removed. The parts of the sternum were brought together by an encircling chromic catgut. Two large cigarette drains were placed in the cavity. The patient breathed easily throughout the operation. The specimen measured 9 by 8 by 4.5 centimetres and was a thyroid adenoma (non-toxic).

The patient seemed to be making an uninterrupted recovery when on December 28, the Röntgen-ray disclosed a large shadow equivalent to the shadow of the tumor. This was thought to be a hematoma. Laryngoscopy showed no evidence of tracheal compression, nor interference with phonation. The subsequent course of events justified the diagnosis of a hematoma because a bloody serous fluid discharged until March, 1932, at which time the wound was healed. On November 17, 1932, he was perfectly well and driving a wagon.

A few months prior to the operation on this patient Doctor Muller had attempted to remove a large intrathoracic goitre which was located in the posterior mediastinum after a trans-sternal mediastinotomy. Considerable manipulation was done but the mass could not be brought up and the operation was abandoned. The patient died.

In the average case the exposure suffices to enable the surgeon to dislocate the tumor and if care is taken to prevent tearing of the pleura there should be no serious complications. The cut surfaces of the sternum bleed freely. His experience justified the statement that large intrathoracic goitres with marked tracheal deviation justify the routine use of anæsthesia through the bronchoscope.