

and Murphy, and I think we must all take them as a joke. Dr. Ferguson has insisted on saying that this is the Mayo operation. My own feeling is that all this stuff about priority is bosh. I have no doubt that this operation was done by Hippocrates; he was a very sensible old fellow and quite likely, as they get in deeper in the Egyptian ruins, they will find that this operation was performed by the inhabitants several thousand years ago.

REPORT ON OPERATIVE TREATMENT OF GRAVES' DISEASE.*

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CASE 1.—In April, 1895, a patient presented herself for treatment suffering from a well-developed Graves' disease. Exophthalmia was not marked, but the cardiac frequency and the thyroid enlargement was present. Tremor, loss of flesh and bowel symptoms made the case one of undoubted Graves' disease. She submitted to partial thyroidectomy under chloroform and made a nice recovery. Two years afterward I received word from her through a friend that she was well and strong, able to attend her duties and suffering none of the former symptoms.

CASE 2.—In 1898 a patient was sent me who suffered from a similar condition. She was 52 years of age, very thin, having lost a great many pounds of flesh, suffered from recurring diarrhea and was very weak, practically bed ridden. The pulse rate was 140 to 160, the thyroid very large and vascular, exophthalmia not marked. The right lobe being the larger was removed under chloroform anesthesia. There was very free hemorrhage from the inferior thyroid, and on account of pulse weakness she was given a pint of saline under the skin while on the table. This was repeated in two hours. Within six hours the pulse had regained the rate and quality which characterized it when she went on the table. During the night it began to increase in rate and lose in strength. There was no response to stimulants and in forty-eight hours she died.

CASE 3.—The third case on whom I operated was a woman 59 years of age. She was born in Missouri and had lived in St. Louis for many years. Her first visit to me was in September, 1899, at which time she suffered from very evident Graves' disease. The goiter was well marked, the right thyroid lobe being the larger, there was moderate exophthalmia and the pulse rate was from 130 to 150. She had lost a good deal of flesh, the skin was always moist because of an exhausting sweating, the nervous symptoms were marked, heard strange noises and had ideas of persecution; the respiratory movements were extremely shallow and pectorals wasted, bowels were diarrhetic, urine contained casts and albumin, and was slightly increased in the 24 hour amount. A diagnosis was made of chronic interstitial nephritis associated with Graves' disease. I was of the opinion that her general condition contraindicated so extensive an operation as partial thyroidectomy and advised a double sympathectomy. September 10 the three ganglia on the right side were removed and on the 21st those of the left, under chloroform. The healing was primary and shortly after the second operation the pulse showed improvement in quality and rate. Her general condition was likewise benefited, the bowels ceased to become overactive, the sweating stopped, the weight improved. December 14 she had so far recovered that she took a trip into the country to take advantage of the fresh air and outdoor life possible there. From her son I learned later that in the latter part of the month of February while out riding she became chilled and died two hours afterward. He states the pulse rate had become normal before her death, the exophthalmia had almost entirely disappeared and the goiter fully half. Her mental condition was normal and the nervous symptoms had cleared up to a large extent. What part was

played by the nephritis in her sudden death can, of course, be only a matter for conjecture, but it must be admitted the operation was followed by decided relief.

During the last twelve months I have had a series of six cases presented me for operation in all of which partial thyroidectomy was performed. They were as follows:

CASE 4.—About the first of May, 1902, S. S. was sent to me with a pronounced exophthalmic goiter. She had been under treatment without benefit and an operation was advised. She was born in Germany, came to St. Louis when 16 years of age, and has lived here since, a period of 23 years. There is nothing of note in her family history. At the time of her first pregnancy the thyroids became larger and remained so afterward. There were no symptoms of Graves' disease until about a year before I first saw her. At that time she noticed an increased nervousness and rapid heart action. At the time of the examination she had a well-marked exophthalmia and stated that the intensification of the symptoms dated back five months at which time she became pregnant. Her general condition indicated a process of only moderate severity. There was not a great loss of flesh and her appetite and strength were fair. She did suffer from a marked degree of nervousness, however, and insomnia was distressing. The pulse rate varied from 100 to 120, exophthalmia marked, Graefe symptom present, the right thyroid lobe the larger. Other symptoms were present, as tremor, sweating, headache, recurring diarrhea. She had had attacks which resembled asthma for years, and these had been intensified.

May 6 the right lobe was removed under local anesthesia. After finishing the operation and while putting on the dressing she had a slight tetanic attack, general in character and accompanied with a loss of consciousness for the moment. No ill effects followed this, and after being placed in bed she felt quite easy, except for a mild degree of burning in the area of the wound. This lasted only two hours and disappeared. The improvement in her condition was apparent in two days, and within the next week she was fairly free from nervousness. The pulse dropped to 74 in forty-eight hours. There was rapid improvement in the exophthalmic condition also. During the remaining time of pregnancy she showed only such symptoms as are characteristic of the period. She was delivered at full time of a healthy child, making a nice recovery herself. At the present writing her condition is quite normal.

CASE 5.—Mrs. B. came to me in June presenting the following history and conditions: Born in St. Louis, lived here all her life, 35 years, parents were German, she was married some years, but had no children; examination revealed no pelvic disturbance. Gives no family history which could shed light on her trouble. About nine months before coming to me she noticed the first marked symptoms of her present disease, although for some months prior to that time she had noticed an increased nervousness and a tendency to tremble when using the hands. I found on examination well-developed thyroids, larger on right side, pulse varied from 120 to 130, exophthalmia marked and Graefe and Moebius symptoms were demonstrable. The other symptoms were present, tremor of the hands, diarrheas, sweating, loss of flesh, sleeplessness, easily excited, headaches, dry hair coming out in rather large quantities. The right vessels gave both a distinct bruit. An interesting feature was the pronounced prominence of the left eye.

The right lobe was removed under local anesthesia and betterment of the condition immediately followed. At the present time all of the old symptoms have disappeared, including the exophthalmia. She has gained in flesh and feels well.

CASE 6.—In July I removed the right thyroid lobe of a patient in one of the city institutions. She presented the usual symptoms and had in addition a movable right kidney and slight uterine prolapse. After the operation she made a rapid recovery, sleeping well, no tremor and gaining in strength. After leaving the institution I lost track of her.

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CASE 7.—Mrs. W., age 62, born in Switzerland, lived in St. Louis eighteen years, was sent to me in July for an operation. There was no family history of importance except that a daughter of 36 years of age has at the present time a simple goiter. She had a goiter herself for twenty years, during which time there was no indication of trouble from it. The symptoms of Graves' disease dates from the time of the death of her child three years ago. This daughter died of tuberculosis. In January, 1902, she suffered an attack of pneumonia, from which she did not fully recover. Effusion into the left pleura followed it and on May 17 three pints of this was removed. Again on the 27th this was repeated, removing the same amount. The physician in charge at the time reported on the character of this fluid, stating it was not purulent nor bloody. The expectorate was likewise examined and found to contain no tubercle bacilli. At this time the symptoms of Graves' disease became very pronounced. The tremor marked, muscular weakness with emaciation sufficient to cause her to remain abed, insomnia, emotional perturbations, pulse varying in rate from 135 to 160, and frequent diarrheic attacks. The exophthalmia was not readily noticed unless attention was called to it.

The right thyroid lobe was the larger, and this one was removed July 20. It had grown downward into the chest behind the sternum and was adherent to the trachea for a short interval. The vessels were very friable and the forceps pinched through the inferior thyroid during the operation and bleeding became very active. This necessitated a haphazard catch, which included the inferior (recurrent laryngeal) nerve. Immediately a fluttering vocal cord was the result. In tying the vessel after stopping the hemorrhage it was carefully separated from its surroundings. The voice returned very slowly afterward, never to its normal quality. A pneumonia was set afoot, which appeared on the fifth day in the left lung, the seat of the former attack. Eventually this subsided in part and the patient began to improve. A careful examination still failed to reveal tuberculosis. In six weeks the nervous symptoms had nearly disappeared and the rate of heart action was between 90 and 100. There was a slight, constant fever and cough and the fluid reaccumulated in the side. On aspiration this was found to be purulent. An operation was strongly advised, but refused until late in October. By this time she had lost the flesh gained just after the operation on the thyroid and was very weak. The process had extended to the lung and a large quantity of stinking pus was being expectorated constantly. A portion of rib was removed under local anesthesia and a drain established. She never rallied, however, and died about Christmas last. There was a complete disappearance of those symptoms which were distinctly characteristic of the Graves' affections before her death.

CASE 8.—A widow, aged 44, born in Germany, came to St. Louis 16 years ago. She has one living child healthy. She gives no history of former trouble which could bear on the present trouble except that 18 years ago she contracted a venereal disease from her husband which confined her to the hospital for several months. The cervix of the uterus is entirely gone and a small opening in the midst of scar tissue is the os uteri. Menstruation is normal except scant in amount. She gives no history of syphilis. Her pulse varied from 95 to 110, some degree of exophthalmia, goiter goose egg in size, the right lobe the larger. A fine tremor, muscular weakness, diarrhea, sweating, nervousness, sleeplessness, headaches were present. I removed the right lobe of the thyroid in September. The pulse rate became normal after the operation, the general condition improved and the tremor left. She still suffers, however, from headache, fullness in the throat and complains of weight in the pelvis. This, I believe, is due to the uterine condition.

CASE 9.—Just operated on. Patient is 20 years of age, born in Kansas, and has lived in various parts of the country during the last ten years. Of herself she writes the following history, and because of its exactness I give it in full. Rather anemic looking since fifth year, scrawny shoulders and small arms. All through life frequent headaches in forehead. In sixteenth year moved to Colorado, living in altitudes of from

6,000 to 9,000 feet, where was employed as a railroad clerk for three years. Felt well greater part of the time. Eyes would occasionally become inflamed; riding on trains augmented this trouble. Vision was not impaired for three years after first inflammatory attack. About twentieth year moved to Memphis, Tenn., eyes becoming more often sore. Oculist advised against glasses and used some drops in eye for two months daily. Vision now became impaired, objects blurred, lines of type ran together. Saw another oculist, who fitted glasses, said trouble was flattened cornea. Wore these glasses with some relief for about a year, eyes gradually becoming worse; inflamed with imperfect vision. In twenty-fourth year another oculist fitted glasses, saying the trouble was compound myopic astigmatism with the consequent inflammation. Great relief followed; worn the glasses since with improved vision, inflammation lessened. Past three years has had many spells of aching back of left eye and followed by reddened conjunctiva. About the twenty-fourth year hand became unsteady when writing. During the summer months each year while in Memphis got debilitated and irritable. During the winter of the twenty-fifth year worked all day and until 11 o'clock at night. Kept up by large quantity of alcoholics. In spring of same year, 1899, passed first-class examination for old line life insurance. No enlargement of neck was noted at the time. Pulse was a trifle quick, attributed to running up stairs. During the summer became gloomy, brooded over unfair treatment thought she had received at the office where working. Spent month of July in St. Louis, read much pessimistic and agnostic literature. Thought a great deal about suicide, did not contemplate suicide, but the subject was more attractive than others. Returned to Memphis August of the same year in the same state of mind. Friends tried in every way to divert her mind into new channels without success. Again worked hard the fall and winter of the twenty-sixth year. Gradually mind became normal. December, 1899, noticed neck seemed to look too full in front, friends thought it was all right. In winter was tired all the time, sore and ached all over on awakening; very nervous and irritable. Hands and feet became swollen and red, burned and itched when taking exercise. For last three years perspired profusely on slightest exertion. Hands and face would be moist and clammy while those about were dry and comfortable. Did not sweat at night when quiet in bed. Hair became faded and dry, but did not fall out to any appreciable extent. During the summer of 1900 lost much flesh and became more nervous and weak. In the fall some improvement.

About Jan. 1, 1901, noticed rapid heart action and shortness of breath. Remained in bed for a part of February complaining of prostration, nervousness and insomnia. At this time the goiter became quite perceptible. Dr. R. Maury prescribed tr. iodine applications without benefit to the goiter. Massage was then resorted to for a month with no benefit. If anything this last increased the nervousness. The professor of nervous diseases at the Memphis Medical College then prescribed Norwoods tincture of veratrum viride, to be taken constantly and a mixture of hyoscyamus, potassium bromid and chloral to quiet. This latter was taken at bed time for two years. For the remaining time the bromid alone has been used to produce sleep (60 to 100 grs.).

Exophthalmia was noticed in June, 1901. At this time she gave up all stimulants, as they caused a sense of weakness and she had to go to bed after taking them. Later in same summer went to Lake Superior for a visit and improved remarkably, gaining 18 pounds. In fall relapsed into old condition on returning south. Complained at this time of having both knees give away while walking, causing her almost to fall at times. Arms and legs became numb after resting in one position for a while. Last summer spent at Put-in-Bay, but an exhausting diarrhea prevented improvement.

In fall went to Colorado, where nervousness and rapid heart increased and mental condition became worse than ever. Had maniacal spells, screamed, tore clothing and refused to remain in the room with any one. Physician in charge gave thyroids and strychnin, and if anything the symptoms were

intensified. Pulse was frequently as high as 150 and felt like a pile driver in the neck. Thyroid increased in size. Took 400 grains of bromid in two hours to quiet. Later returned to the chloral mixture and a tonic. During the last three months suffered from alternating diarrhea and constipation. Appetite fluctuated from a craving for food to a distaste for it. Limbs twitched in bed and insomnia continued. Sore around body and hung clothes from shoulder; temperature of 99 to 100 in the late afternoons. Has a cough which developed in December, 1901, and has continued more or less ever since. At menstrual periods the gland seems to become turgid and causes a sense of choking from pressure.

The only family history which could bear on this condition is on the mother's side. She had asthma until her sixteenth year, always had an affection of the right side of the mouth and jaw. Right lobe of thyroid slightly enlarged and had been so from childhood. Never had the other cardinal symptoms of Graves' disease. Mother of seven children, three died in infancy; one son and three daughters are living. Son as a child suffered from nervous twitching, is now 40 and healthy; daughter, aged 32, has writer's cramp at present, always nervous. Other daughter always free from nervousness. Mother in good health at present.

July 15, 1903.—This patient is in better health than for some time. Exophthalmia gone. Pulse 80 to 90.

These cases of Graves' disease have been in the past most unsatisfactory to treat. Nearly every effort to bring about permanent relief has been fruitless. We have all seen temporary benefit follow the administration of different remedial agents, and have been at times tempted to believe that much of permanent character had been accomplished, only to be disappointed later when, after losing sight of the patient for a while, they would return in a more deplorable condition than ever. Failure in this disease has, as in many other maladies, led to the adoption of a host of remedies for its cure.

It is exceedingly interesting to follow the views of the various writers of the different decades on the subject, and note the changes in the methods of treatment. We read of the disease being a dyscrasia, then, again, a blood impoverishment expressing itself by changes in the thyroid, eyes and heart; later the opinion of alimentary intoxication, a sympathetic disease or a pathologic condition of the central nervous system located in the area of the pons or medulla. Of the recent authoritative writers Moebius adheres to the belief that the seat of the lesion is in the thyroid gland, while Kocher, of Berne, considers the thyroid condition an expression of a central lesion located in the cerebrospinal axis. Mention should be made of the work done by Gley, of Paris, showing a disturbed parathyroid relation with the thyroid as a possible cause of the disease symptoms. As from time to time new light has been shed upon the subject, bringing modified ideas of its pathology, the methods of treatment have accordingly been modified or changed altogether. Iodin, strophanthus, veratrum viride, bromids and chloral, galvanism, thyroid extract, adrenalin, sodium phosphate, sodium salicylate, dietetic regulation, massage, the serum of thyroidectomized goats, the flesh and milk of these animals, and lastly, various surgical procedures, have each been advocated as most helpful.

Naturally, the question arises, what are we to do for, how are we to relieve this class of patients when they come to us for relief? Is there an underlying cause for the condition which can be attacked alike in each case, is there a procedure which could become universally applicable? In the light of our present knowledge we can not hold to too strict limitations, though no doubt were the exact nature of the disease known some rule of action would become applicable to all cases. At the

present time a certain degree of empiricism must enter into the treatment; our conduct toward these cases must rest to a large extent on our experiences in the past. We must notice where the internist obtains good results, weigh carefully the data he presents; likewise have we to consider the surgeon's side of the question, and in weighing here success and there failure, obtain an explanation of the different results by the different manners of operation, and the individual characteristics of the patients.

I present here the results which I have obtained in cases in which internal medicine failed to give relief. The outcome has been very satisfactory to me, and has helped very materially to lead me to the belief that these cases are eminently surgical. Since reading Kocher's article, this belief has been confirmed, and I feel enthusiastic in supporting proper surgical methods for the relief of Graves' disease. Of course, do not understand this to mean that I advocate operation in every case, regardless of all conditions, local or general. In the first place, we must be governed by those rules which are followed in advising operation on any part of the body for the various conditions which fall to the surgeon's hands. In the second place the symptoms which characterize Graves' disease must be given due consideration, and proper value placed on the conditions which characterize each individual case.

A number of surgical procedures have been proposed. The injection of agents into the gland which tend to destroy its secreting power is dangerous, and should never be resorted to.

Ligation of the thyroid arteries to reduce vascularity of the gland has a warm advocate in Kocher. This method was recommended by Woelfler for the common goitre, but Kocher put it to use in the exophthalmic variety. Rehn, Trendelenburg, Rydygier, Wilmers, Rehn, Bach and Mikulicz have reported cases treated in this way. Ligation of the superior thyroid is relatively easy, but the inferior can not be gotten at through an incision in front of the sternocleidomastoid, except by luxating the gland upon the surface, in many of the cases. In selecting the vessels, attention will be paid to the amount of vascular degeneration of the different parts of the gland. It is rare that the whole gland is alike affected. Those vessels are ligated which best control the vascularity. The operation is simpler than removing the lobe, and is to be recommended in those cases where the symptoms remain intense after resting the patient. Later, however, this procedure should be supplemented by a partial thyroidectomy in the large percent of cases. The initial ligation always renders the removal of the lobe easier than where this is done primarily.

Unquestionably, the operation which gives the greatest degree of satisfaction is the removal of the most involved lobe of the thyroid gland. Very frequently this is the right. Why this should be so is difficult to understand. Many explanations have been given, but none satisfactory. Two incisions are to be recommended, one in front of the sternocleidomastoid parallel to its anterior border, and the U-incision recommended by Kocher across the convexity over the sternal notch. Kocher recommends the latter because it allows easy access to the median line, where after separation of the muscles which lie upon the trachea the thyroid lobe can be readily reached. This avoids cutting any of the muscles of the neck. The scar is low and not readily seen. Personally, I prefer the incision anterior to the muscle edge. The length need never be more than 4 inches, and it allows the least bloody handling of the gland. The one objection to the incision is that it necessitates the cutting of

some fibers of the sternothyroid or the sternohyoid. This is inconsequential, for the fibers of these muscles run nearly enough parallel to allow of separation directly through their bellies, and only a few fibers of the one or the other have to be cut at the ends of the incision. This opens the field perfectly for the largest goitre I have had to deal with. The scar is small and located in an anatomic position which to some extent renders it less apparent.

There are some precautions to be mentioned. The capsule of the gland is usually adherent to it, thickened and very vascular. In separating it from the enclosed gland a very considerable amount of hemorrhage follows. This is avoided to a certain extent by ligating the superior thyroid artery first. Just under the muscles, coming from above and entering the top of the gland, this vessel is easily found. It frequently enters as several branches, and care must be exercised to ligate all of these if the main trunk can not be gotten at. The next difficult step is securing the inferior thyroid artery. This can only be done after raising the gland from its bed and carrying it toward the median line. The whole vascular apparatus is so friable that it is possible that some vessels of size be torn in this separation and bleeding hard to control. To render this less difficult, bring about very careful, gradual luxation, catching each bleeding point with a forcep as it occurs. After reaching and ligating the inferior thyroid all forceps can be removed, as these two vessels supply the area with blood. It is wise to ligate the large veins, however, for, though forcipressure suffices to check their bleeding for the time, their lumens are apt to open later and allow of a large clot formation in the wound. A very difficult point in the operation is catching hold of the highly vascular gland with any instrument with which to hold it. Vulcella forceps tear out and cause very serious hemorrhage. I find it expedient after exposing the anterior surface of the gland, to pass heavy mattress stitches of silk from side to side, and when these are tied the forceps catch better, and bleeding does not follow any little glandular laceration. Great care must be used in avoiding the recurrent laryngeal nerve, while dealing with the inferior thyroid.

This operation should always be performed under local anesthesia. Kocher recommends a 1 per cent. solution along the line of skin incision. I prefer a 0.125 per cent. solution. It is incorrectly stated that there is no pain after reaching the deep structures of the neck. These patients, very nervous and strung to a high pitch by the thoughts of the operation, do complain of pain in handling the deep structures, and are more readily controlled when the whole area is infiltrated. Eucain, being non-toxic when used in reasonable amounts, can be freely injected in very dilute solution. Infiltration is made between the gland and its capsule just ahead of the separation. I have never required more than $\frac{1}{2}$ gr. of the drug to complete the entire operation. It is wise to reinfiltrate the skin before attempting to stitch the wound. All ligatures are made with a fine silk. I have not drained my cases. At one time there was a fear that the secretion expressed during the operation into the wound, and that formed and given off from the cut surface afterward were dangerously toxic. Drainage allowed these to escape, and therefore was recommended. There is some danger from the bleeding into the closed wound afterward, this causing suppuration and septic symptoms. A twelve to twenty-four hour drain is allowable when there is likelihood of much oozing.

Socin proposed the excision of enlarged nodes. This is not to be recommended, as it is incompetent and bloody, and many thyroids are uniformly degenerated. The Mikulicz operation, proposed for the ordinary parenchymatous goitre, has been resorted to in some cases of exophthalmic goitre with double enlargement. This operation consists in exsecting a portion of each lobe. This is too bloody to be recommended. A ligation of both superior thyroid arteries and a later removal of one lobe will accomplish more, and is more readily performed.

Jaboulay's operation of exothyreopexy is not to be recommended. The process of healing is too tardy, and the benefit not as assured as by either the ligation of the vessels or the partial removal of the gland. I do not know that this method is being adopted by any other than Jaboulay.

Lastly, I shall mention the operations on the sympathetics. Surgery of the cervical sympathetics had its initiative with Alexander, of Edinburgh, who resected the superior ganglion on both sides for epilepsy. This was in 1889. Jonesco, in Aug., 1896, resected the superior and middle cervical ganglia for Graves' disease, and the operation has since borne his name. A Russian surgeon by the name of Barocz proposed the operation as early as 1893. In my one case for exophthalmic goitre the operation was done in two sittings. The incision being made along the posterior border of the sternocleidomastoid. It can be readily done under eucaïn anesthesia.

Whatever the operation performed, general anesthesia should not be used. The myopathy and the vaso motor disturbance makes it exceedingly dangerous. This caution against general anesthetics holds also where the operation is for some other purpose than to relieve the symptoms of the exophthalmic goitre. Strange to say, the condition which follows operation upon these cases under general anesthesia is alike, whether done for the relief of the goitre or for other purposes, indicating that handling of the gland is not an explanation for it. I recall a case in which I used general anesthesia in the curettement of a bleeding uterus, following an abortion, in which all other means had failed. For two days following the operation the pulse rate was between 190 and 210. Eventually, she recovered from the immediate danger, only to succumb to an enteric attack later.

An objection to the use of cocain based upon the report of Riviere and Edmunds is not well taken; they assert the symptoms of cocain intoxication correspond to those of Graves' disease. Even if so, I can not agree with those who consider a unity of action in the two cases. However, in using eucaïn anesthesia, the amount of the drug is too small to produce additional intoxication.

The results from operative treatment of Graves' disease have been, on the whole, gratifying. Naturally, they vary somewhat with different operators, and also with the character of operation. Mortality has been surprisingly low; in 1896 Starr gave a record of 190 cases collected, with a mortality of only 12 per cent. Kinnicut the same year presented the record of 187 cases with 7 per cent. mortality. Schulz records 20 cases without mortality. The most valuable record of the present time comes from Kocher, of Berne, in which he had four deaths in 59 cases operated upon by himself. In these, the operation could not be held entirely responsible. Ligation had in the past a larger per cent. of mortality than thyroidectomy, but there should be no reason for this at the present time. In the group of cases

I present, the one death was undoubtedly the result of having given a general anesthetic.

The relief of the symptoms of Graves' disease has been gratifying. A fair average for the cures from operative procedures during the last ten years may be stated as 60 per cent.; of decided benefit 15 per cent.; and of deaths and failures, the remaining. In the 7 cases surviving the partial thyroidectomy performed by myself, the symptoms in all practically disappeared. Betterment was noted in all but one within forty-eight hours. The continuation of a high pulse in Mrs. W. was due to the pulmonary complication. Nervousness in each case disappeared almost completely before leaving the hospital, with the exception of the last case operated on but a few days since.

In one of my cases the nerve was injured by being grasped by forceps, and though the ligature was put about the vessel afterward, in such a manner as to avoid including the nerve, the voice was never quite normal afterward. Two of the cases had a slight tetanic convulsion immediately following the operation, but recovered as speedily as the others, without apparent ill effects. Mrs. B. had an interesting condition in that the right lobe of the thyroid was the larger, while the left eye was most protuberant. Exophthalmia in her case disappeared entirely after operation. Case S. S. carried her child to full term under a far more comfortable condition than was possible without relief of the exophthalmic goitre symptoms. After the operation certain symptoms may continue for a longer or shorter time before disappearing. The most persistent of these is the exophthalmia. In my cases ocular co-ordination was one of the first noticeable benefits. The psychic disturbances which follow, I believe, may be attributed to an infection of the wound in the majority of cases. This is illustrated by my last case. Three days after the operation she sat up, declaring herself better than for sometime. Her pulse and nervous symptoms certainly indicated this. On the sixth day she began to complain of pain in the area of the wound, which was the result of a slight inflammatory reaction. After that she became extremely irritable, taking marked dislike for her nurse. In her case the whole of the left thyroid was removed, with the exception of a small portion of the upper end, containing an apparently normal para-thyroid.

The question arises did the presence of the para-thyroid produce this excitation, or was it septic? The removal of the para-thyroids in animals gives rise to symptoms like those of Graves' disease, but I am at a loss in the absence of the thyroid proper to account for the presence of these bodies producing any such effect.

The character of the gland changes differed in the various cases. Vascular degeneration was apparent in all, but in many there were primary conditions not related to the exophthalmic goitre, and in some, undoubtedly secondary changes, consequent upon the marked vascularity of the thyroid.

As time will not permit a discussion of these differences in detail, I shall have to present them in a later paper.

DISCUSSION.

DR. W. W. GRANT, Denver—I have had no experience, whatever, with the operation for the treatment of exophthalmic goiter. The operation is more particularly appropriate to certain cases of traumatic epilepsy and glaucoma. Kocher, in 200 or 300 operations performed during the last two or three years, has used a solution of cocaine. He has abandoned the use of general anesthetics, because of the unsatisfactory results, one of which is vomiting, which may occur during the progress of the operation, and if any surgeon attempts to

perform this operation on a reasonably large tumor, particularly on a vascular one, without due consideration of the difficulties and complications that may arise, he is to a rude awakening. I have performed only a few of operations, but I invariably open the capsule. It is easier to make the incision through the skin, dissect the tumor, and then open the capsule. It is much easier to ligate the arteries, and the operation can be done much more quickly; and this is an operation demanding all possible celerity. I had a case two or three months ago, the last of these tumors that I have ever removed. It occurred in a woman 40 years of age, and the tumor had existed twenty years. Whether or not we can explain it, it is a fact that the condition of many of these patients, although seemingly good, is not so in reality. They have but little fighting power. They succumb to the slightest hemorrhage as well as to anesthetics, their condition becomes alarming times during the most critical period of the operation. When opening the capsule I had no difficulty in ligating the thyroid vessels, but in separating the tissues for the supra-thyroid I opened a sinus with the finger and a blood clot came out, which, it seemed, was as large as the little finger. It was quickly arrested, and although but a small amount of blood was lost, it was noticed that the patient was in a state of collapse. I proceeded with the operation, my assistants used restoratives and the patient recovered quickly and her convalescence was uneventful. I always prepare the patient for such an operation. I insist that the patient should remain in the hospital for three or four days (or a week or more) and use 1/30 of a grain of strychnia three or four times a day. I have found this to be very useful. If necessary, atropin may be administered before the operation as a heart tonic. I have found it very appropriate in many cases. The amount of cocaine which Kocher uses is a 1 per cent. solution, but I have not employed it because of its effect on the heart, especially in large tumors. I have used chloroform, but fear general anesthesia also.

DR. EMMET RIXFORD, San Francisco—Goiter is a disease which produces fearful suffering to the patient, and while we can cure those patients by operation or not, we are doing a tremendous service to them, if we can alleviate their symptoms. But the operative treatment is not so simple as it may appear. The problem is an extremely difficult one. Exophthalmic goiter may be said to be of two sorts, primary exophthalmic goiter and secondary exophthalmic goiter, the latter I mean those cases in which the disease or symptoms supervene in the presence of existing goiter, and proper from operative procedure is infinitely better in the latter class of cases. In these cases there is very often an enlarged thyroid adenoma, which is the seat of the goiter. The operation is much simpler in those than in the so-called primary exophthalmic goiter. It simply requires the removing of the adenoma, if the capsule can be identified. The operation should be undertaken with the greatest caution in those cases in which the heart shows degeneration. Confidence is the greatest value to such a patient, and he should be allowed to rest and become accustomed to the surroundings in the hospital, mental as well as physical preparation for the operation being necessary. The greatest danger, as Kocher has definitely demonstrated, is the anesthetic. I have seen the greatest trouble from an anesthetic, the heart beating faster and faster until it reached 200, then 300 per minute, and finally became too fast to be counted. These patients perish tremendously. They do not stand antiseptics well, and the operation should be used with the greatest caution. They do not respond to sepsis well and, therefore, the greatest care should be taken to have a perfect technic. I have operated on four cases of exophthalmic goiter, protecting the wound by a piece of sterilized cloth around the neck, and held up by upturning at the end of the table, so that the patient cannot see the hemorrhage, and so that he could not see what was going on. The sight of the forceps and instruments, etc., increases the nervousness of the patient. I employ 1 per cent. cocaine as a local anesthetic. I prefer to make the transverse incision where the tumor is not very large, principally because

the cosmetic effects. Women are much more likely to have this condition than men, and the transverse incision can be made very low down and the scar can always be covered by a bit of ribbon. The vertical scar always sticks up above the collar. The incision along the sternocleidomastoid always gives more room and where the tumor is large, it is the preferable operation. I was interested in hearing Dr. Witherspoon speak of opening the posterior fascia of the neck and enucleating the tumor. Kocher speaks of cocaine being of assistance. In my last case that I operated on I thought that it was so simple that I could remove it without much of a wound. I did not draw the gland to the middle line, but worked from the outside. I passed the ligature around some vessels and the man indicated that he could talk. The ligature was removed and the man has since recovered his voice. As to the relief of these exophthalmic symptoms, in certain cases, it is wonderful and often immediate. I had one case that had been having from fifteen to twenty passages from the bowels a day. She suffered from profuse perspiration, the sheets had to be changed several times during the night. The patient did not expect to recover; in fact, she preferred to die. Within a week from the time of the removal of the thyroid adenoma she had lost thirty pounds in weight. She had been practically bedridden and unable to walk more than half a block before the operation, but within three months thereafter she had ridden a bicycle twenty miles over a rough country road.

DR. J. SHELTON HORSLEY, El Paso, Texas—I think we can not determine the proper surgical treatment of this condition until its pathology has been more definitely settled. There are two theories; one is that the disease is due to morbid impulses originating in the medulla and sent out over the sympathetic nervous system, the excess of thyroid secretion being due solely to these impulses. The other theory is, that the disease is caused by an excess of thyroid secretion in the blood, which acts on the nervous system. We know that in cases of exophthalmic goiter there is nearly always present an excess of thyroid secretion. However, this is not universally true, for some French surgeons have observed this disease in cases in which the thyroid gland had been previously removed by operation and in cases in which it was apparently congenitally absent, or at least so small as to escape detection. These facts have been very well brought out by Dr. Alfred Gordon, of Philadelphia, in a paper in the *Philadelphia Medical Journal* a few years ago. If this first theory is correct, Jonnesco's operation is unquestionably the correct procedure, as it permanently interrupts these impulses by taking out all of the cervical sympathetic ganglia. If, however, the second theory is correct, Jonnesco's operation is clearly inapplicable, and the only logical procedure is excision of the thyroid gland. As these two operations are founded on pathologic theories that are diametrically opposed to each other, it does not seem proper to use indiscriminately either the Jonnesco operation or excision of the thyroid, depending on whichever may be easier performed in a given case.

About three years ago I operated on a case of exophthalmic goiter having all the classical signs and symptoms of that disease. I did a partial Jonnesco operation, removing the cervical sympathetic ganglia on the right side of the neck. I intended removing them on the left side also, but the patient's condition forbade it, as her pulse was about 200 when the right side was finished. The operation was reported in the *Annals of Surgery* about eight months later, as it was one of the first cases in which the Jonnesco operation for exophthalmic goiter had been done in America. At the time of the report, she had improved wonderfully; pulse was 100 and she had gained in weight more than 30 pounds. The swelling in the thyroid, however, had not perceptibly decreased. Soon after this time, the patient began to get worse, and is now in the same condition she was in when first operated on. A second operation for removal of the ganglia on the left side of the neck, though proposed, has been rejected. It seems that cases of exophthalmic goiter may be cured, or at least relieved and improved, by either Jonnesco's operation or excision of the thyroid—operations which are founded on entirely different

pathologic theories. It has occurred to me, in view of the improvement and subsequent relapse of my case and after reading the literature on the subject, that operation may have the same effect in exophthalmic goiter that is attributed to trephining in epilepsy. In other words, any operative procedure that is sufficiently severe to affect profoundly the nervous system, may result in relief of this disease, just as epilepsy is often apparently cured by simply trephining.

DR. T. C. WITHERSPOON, St. Louis—In regard to the indication for operation in exophthalmic goiter I believe that these cases should first be subjected to internal medication and then, if that fails, we should operate. In regard to the last Jonnesco operation I am not in a position to express an opinion on it. I was not gratified by the results obtained in these cases. I have not done it in exophthalmic goiter but once, but I have tried it three times in epilepsy and in none of the three cases did I secure results that were very gratifying. The one important thing that I want to speak of is the giving of a general anesthetic to these patients. We should not forget that when they are operated on for removal of the thyroid or for any surgical condition whatever they suffer tremendously from the effects of a general anesthetic. I remember a case I had in which the pulse was from 140 to 150, and I gave chloroform to allow of uterine curettement, and her pulse ran up to between 190 and 220, but she ultimately recovered from this condition. A general anesthetic is dangerous, and those who operate under general anesthesia are going to obtain poor results. In the next place those gentlemen who prefer simply to deal with the gland by primarily shelling it out I think are going to regret it some day. You should tie the blood-vessels early. There is but one way to tie them, and that is to get back of the fascia. If you get back of the fascia above the gland and run your finger behind the gland you can separate the carotid sheath and vessels from the gland, and render ligation and separation of the structures easy. I had one case in which a portion of the gland had grown down back of the sternum and another in which the gland was very deep in the neck, so that they are very different in shape and can not be dealt with alike.

PATHOLOGY AND TREATMENT OF SMALLPOX.

AN ANALYSIS OF OVER TWO THOUSAND CASES AND OF FIFTY AUTOPSIES.*

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CLASSIFICATION.

It is not my intention to discuss in detail the problem of the pathology of smallpox, but only to utilize in so far as practical the knowledge acquired by personal observation and autopsy in the treatment of this disease. The subject of the pathology of smallpox is in itself one of large scope and bearing, and worthy of single effort. Inasmuch as the tendency of medicine at the present day is to build the treatment of disease on the knowledge acquired of anatomic defects, it seems consistent to group the two headings.

The pathology of smallpox comprises at least three distinct considerations: First, the conditions arising from the poisonous influences of the variolous contagion itself (mainly purely speculative and relating to black smallpox). Second, the conditions arising from the maturation stage; and third, the incidental complications and sequelæ. In the latter class are considered boils, abscesses, phlegmonous conditions, erysipelas, the eye symptoms and the accidents to pregnancy.

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