this is possible. The preparations which have been most extensively used are the milk, either natural or desiccated, from thyroidectomized animals, the antithyroidin of Moebius, the thyroidectin, i. e., the desiccated blood of thyroidectomized sheep, and very recently a serum prepared by Rogers and Beebe by the use of the nucleoproteid and thyroglobulin from normal and pathologic glands.

It is yet too soon to express a definite and final opinion as to the value of these various so-called specific preparations. The reports so far published are to the effect that most of the cases are improved, a small number are cured and an equally small number are unaffected. Were it not for the apparently well-grounded theories which underlie this work, we would, I believe, be justified in saying that these preparations are as futile as the other methods of treatment which have been outlined, and that the cures and improvements are to be referred to the rest, hygiene and passage of time rather than to the material administered. However, no definite judgment on the question can be reached until more cases have been observed, more time has elapsed, and probably until more perfect sera are prepared.

After this discouraging review of the methods of medical treatment, it would seem as if all cases should be treated surgically, and yet I think that many, possibly a majority of the cases, should continue to be handled by medical methods, for one must always remember that the natural evolution of the disease is toward recovery. I have endeavored to formulate some rules which might serve as a guide to the selection of the cases for surgical treatment, but can not, even to my own satisfaction, go further than to say that medical treatment should be employed in every case until it is seen that, in spite of rest, proper nourishment and hygiene and intelligent effort at the correction of individual symptoms, the patient is steadily getting worse. How long the employment of surgical measures should be delayed must be determined in each individual case, but it is far better to operate earlier than is necessary than to delay too long.

If in a given case the condition is not serious, but in spite of the best of help still remains bad enough to interfere with the usefulness of the individual, partial thyroidectomy should be employed.

The same thing must be said of the resection of the thyroid as has been said of the other methods of treatment—that the results are good or bad in direct proportion to the skill and intelligence with which it is advised and carried out.

THE SURGICAL TREATMENT OF EXOPHTHALMIC GOITER.*

ALBERT KOCHER, M.D.
BERNE, SWITZERLAND.

Out of 3,460 operations for goiter performed in Professor Kocher's clinics in Berne up to date, 315 have been done on 254 patients afflicted with exophthalmic goiter, of which I will speak here.

My father, Theodor Kocher, was one of the first to operate on the thyroid gland in this disease, which he always claimed to be caused by hyperactivity of the thyroid. The results of his operations on the gland have been up to date so satisfactory that he has proceeded in very much the same way for the past twenty-five years.

I will say only a few words of other operations. In three excisions of the sympathetic nerve, to which I referred in my paper in 1902, the operations had absolutely no permanent or progressive effect on any symptom of the disease. Another, done two years ago, following an operation on the thyroid gland, merely to influence the persisting exophthalmos, had a directly bad effect, so that plastic operations subsequently had to be done to the more protruding eyeballs. I need, therefore, make no further reference to this method.

Let me now, first of all, speak of the danger of the operation in exophthalmic goiter, which still keeps many a patient and often his physician away from the surgeon. We have had in the last 91 operations on 63 patients not a single death, and, in the whole, we have lost only 9 patients out of 254; that is to say, 3.5 per cent. There is no doubt that this percentage will still be lowered. If we ask why we have had a lower mortality than formerly, the answer is a very definite and short one. It is not only because of our improved technic, but because experience has shown that more prudence and care is necessary for operations in this disease than for the majority of other operations. It is not that in a greater number of cases surgical treatment has been refused, for, on the contrary, we have been able to operate in nearly all, but because we have learned to judge of the gravity of a case and to decide accordingly the extent to which the patient will stand operative measures.

Whereas, previous to my paper in 1902, extensive operations had been done (such as excision of one side and resection of a part of the other side of the gland, excision of one side together with ligation of arteries of the other, and ligation of more than two arteries in one session), in the last 100 cases such operations have merely been done exceptionally, and only when we were sure the patients could stand them. Very often we had to begin with the ligation of a single artery, and even this only after a long preparative treatment of the patient.

Let me tell you in a few words what we consider important for every surgeon to know before he attempts operations of this character. Above all, we have to investigate the strength of the heart. In the majority of cases, and especially if the disease has been of long duration or has presented sudden exacerbations, we find the heart dilated. We are then to decide whether or not we have to deal with a compensatory hypertrophy, the result of increased cardiac activity brought about by the tachycardia. If this is the case, the dilatation will be slight and constant, and, what is more important, blood pressure will be increased. This we find in the majority of cases. A systolic blood pressure, even of 195 mm. mercury (Riva Rocci), does not forbid operation, but we must be sure that the high pressure is proportional to the degree and constancy of tachycardia. If this is not the case, extreme care is necessary. If we find the blood pressure below normal and the disease highly developed, we must study the condition and especially note the action of the heart after exertion or excitement. Under these circumstances we might find a sudden, very marked dilatation of the heart, irregularity of pulse and a blood pressure which can not be measured with our ordinary methods. These patients must be carefully watched and prepared for operation and, what is

* Read in the joint session of the Sections on Practice of Medicine, Surgery and Anatomy, and Pathology and Physiology, of the American Medical Association, at the Fifty-eighth annual session, Atlantic City, June, 1907.

more important, they should never be submitted to an immediate extensive operation.

The second point which we have to consider is the degree of the disease at the moment we are asked to operate, and this particularly concerns the degree of intoxication presented by the patient at that moment. Intoxication is evidenced by special symptoms, such as sleeplessness, extreme nervousness, great fatigue, weakness, diarrhea, vomiting and a high degree of tachycardia, with irregular pulse and a very vascular thyroid. A highly vascular gland, with expansile pulsation—that is to say, with dilatation of the capillaries (what we call struma telangiectodes) is a sign of very severe intoxication. We find these symptoms more pronounced in the early stages, especially when there has been a rapid development of the disease. Such symptoms do not warrant an extensive operation, and the patient consequently should be prepared merely for a slight operation.

Of further importance is the examination of the blood in exophthalmic goiter, for through this we are apt to find an answer as to the gravity of the disease. Up to the present time 58 cases have been carefully examined by Dr. v. Steiger, who has done special work in hematology. In nearly all typical cases of the disease we find an increase in the number of lymphocytes and a decreased number of the polynuclear forms, the total number of leucocytes being normal or rather low. The number of lymphocytes is sometimes absolutely increased, but more often the increase is a relative one. This increase is proportional to the degree of the disease, and if there is no increase of lymphocytes the case is an especially serious one. Only in very early, undeveloped cases and in those of long standing which have improved do we find that lymphocytosis is absent. Some time after operation the numerical proportion of the different forms of leucocytes becomes either normal or nearly so, in accordance with the improvement of the patient. We know very little as yet of the significance of lymphocytosis. That form of lymphocytosis which follows infections must be regarded as a secondary hyperproduction in the lymphoid tissues, damaged by the acute infection. Lymphocytosis, on the contrary, is a primary and specific process and indicates a hyperfunction of lymphoid tissue, probably according to its want, and this can not be merely a local effect, as there is a substitution of the myeloid leucocytes at the same time.

We furthermore know very little of the function of the lymphocytes themselves. Their number is increased in slight or chronic infection, and more especially in intoxication, and we must admit that in exophthalmic goiter an analogous irritation of lymphoid tissue takes place. We know that wherever this irritation takes place lymphoid tissue can form, and it is an interesting fact that in exophthalmic goiter the lymphatic glands in the neighborhood of the thyroid are hypertrophic, and more especially lymphoid tissue and germinal centers are also present in the gland itself, which indicates that the thyroid body is the place of origin of this irritation. We find that this local formation of lymphoid tissue in the thyroid body is present also in early cases, even before there is evidence of lymphocytosis of and diminution in number of polynuclear leucocytes in the peripheral capillaries, which latter is the result of the toxic influence on the bone-marrow. After excision of a part of the gland, we also find the lymphocytes diminished, whereas their number increases after ligation of arteries.

It may be seen by this brief statement what important results the examination of the blood may give as to the gravity of a case. The very fact of substitution of myeloid leucocytes by lymphocytes seems to me of further importance. It might explain why an ordinary, even slight infection or intoxication acts so badly on a patient with exophthalmic goiter, because ordinary leucocytosis can not get so far or substitute lymphocytosis. Therefore, the patient's condition may be very bad with a slight infection, or the symptoms of exophthalmic goiter may increase often to a dangerous extent. We found, for instance, in a patient with this disease who developed tonsillitis, only 7,000 polynuclear leucocytes and 3,400 lymphocytes, though the symptoms of infection were very marked and a very high temperature was present. The same fact of substitution might explain some of the sudden deaths after operation in severe cases, in analogy to the sudden deaths in lymphatic conditions. When the gravity of a case has been thus established, we can determine the time and decide on the method of operating, for sooner or later we will be able to operate without fear.

Now the second and more important question arises: Can we cure the disease by operation? Most surgeons have noticed an immediate increase of the symptoms after operation, which symptoms can even become fatal. I have, in my paper in 1902, claimed that this postoperative aggravation is due mostly to hemorrhage and absorption of toxic blood, especially when gland tissue is resected and injured in any way during the operation. This opinion has since been widely confirmed. By most careful avoidance of any bleeding, by ligation of every small vessel, and by taking the greatest care not to injure the parts of the gland to be left, we can avoid alarming symptoms almost completely. As a matter of fact we see such symptoms at the present day only if, for any reason, the operation had to be done quickly and the gland tissue was injured.

When the immediate effect of the operation is over (and when it has been done under local anesthesia the disturbance lasts but a few hours), the surgeon is surprised at the striking improvement in the patient's condition. The very fact that the symptoms of the disease may disappear so soon after the operation, so that many times the patient is almost normal in a few days, seems to us to be the proof that we have touched the disease in its important place.

I think that it is generally admitted nowadays that the thyroid gland is diseased in every case of exophthalmic goiter, and it is also admitted that it shows functional alteration. It is much to the credit of American physicians that they have demonstrated what are the exact histologic changes in the thyroid gland in this disease. The proliferation of the epithelium, which assumes the cylindrical type, and the liquefaction of colloid are the most striking features and, especially when compared with the hypertrophic glands described in Halsted's classical experiments, these changes seem to furnish proof of a functional disorder. Still it has been difficult for those who have examined large series of cases and also for those who see a great deal of other diseases of the thyroid gland, to accept the above-mentioned changes as being specific for exophthalmic goiter. We find the same enlargment of follicles with formation of papillæ and high cylindrical cells, together with the decrease in thick colloid, in glands of normal size in hypertrophic as well as in nodular goiters, without the slightest symptom of exophthalmic goiter. But we find them in a part of the gland or in a nodule where

vascularization is rather diminished, while the diseased parts in exophthalmic goiter, even if present in areas only, will be found in very vascular parts, as, for instance, in the periphery of the gland or a nodule. We must conclude, therefore, that the histologic changes themselves do not account for the symptoms of the disease, but it is the change of metabolism which shows itself by the increased vascularization of these parts. Chemical experiments, which I can not discuss here, show that material, such as iodin, is taken up eagerly by the thyroid gland in patients with exophthalmic goiter and is not eliminated by the kidneys as it is in normal individuals.

Besides these histologic changes, we must consider, as characteristic for the disease, the formation of lymphoid tissue in the thyroid glands, and in special cases the presence of large cells with specially differentiated protoplasm. The diffuse infiltration with leucocytes and the desquamation of the epithelial cells, which we find very often in the inflamed gland in exophthalmic goiter and which have been described by several authors as being characteristic of the disease are secondary. This may be the result of handling and injuring the gland during operation or the result of treatment with Roentgen rays, electricity, injections, etc. We also find it regularly after ligation of arteries in previous operations.

What are we accomplishing by our operations on the thyroid gland in exophthalmic goiter? Only exceptionally a limited and well circumscribed part of the gland is diseased and can be entirely removed. It happens when the disease develops in a subject with nodular goiter and may also account for the prompter cure of these cases by operation.

Nearly always the changes are diffuse, though in areas, and it is not possible to take away all diseased tissue without depriving the patient of the thyroid function altogether. This is, in my opinion, not permissible. What we can do is to reduce the diseased tissue or its increased vascularization and thereby reduce the assimilation. It has proved that the nearer to the normal we reduce the gland, or its blood supply, the prompter the cure will be. I think it is the best proof against a perverted secretion of the thyroid gland in exophthalmic goiter, that even when we leave behind so-called diseased gland tissue, but under normal blood supply, the improvement after the operation is immediate and goes on to entire cure. We must admit, therefore, that the so-called diseased part of the gland can assimilate normally and, more than that, it can become normal itself or rather adapted to further claims.

The fact that increased vascularization is indispensable for the development of the disease also proves that what reduces vascularization prevents its development. We easily understand, therefore, that in nodular, and especially colloid goiter, with mechanically reduced vascularization owing to the great accumulation of colloid, the disease does not easily develop, whereas it does readily in normal and slightly hypertrophic glands. Based on these facts, the operation has been carried out in 254 cases and the results are as follows:

There is not a single case of ours in which the patient has not been much benefited by the thyroid operation. We have cured by our operation the patients in 83 per cent. of all our cases. There are 73 per cent. of the patients with the so-called primary disease healed; 92 per cent. of the patients having the disease combined with ordinary goiter, and 100 per cent. of the patients with vascular goiters. Some of the observations date back 15 and 17 years since the time of observation, without recurrence of the disease, provided that the operation was carried so far that vascular symptoms of the thyroid disappeared completely. In cases of this type the patients are all completely cured, so that no symptom of exophthalmic goiter remains. But the time required for recovery has varied greatly, it being especially long before the heart and eyes became normal again. I wish especially to say that our chances of cure do not so much depend on the degree and the extent of histologic changes as on the duration and the secondary changes in the case.

We have had cases in which the excised gland showed excessive epithelial proliferation in all parts and in which the patient presented all the symptoms in the highest degree, and yet the cure has been just as complete and rapid as in patients showing much colloid matter and less severe symptoms. The difference between the two lies in the fact that the former, as a rule, not only develop very rapidly but also progress rapidly. Hence an operation must be undertaken early before organic changes take place, and also before the thyroid tissue has undergone induration—that is to say, before the excessive proliferation of cells has mechanically reduced the capillary supply and a part of the functional tissue, and also before infiltration and desquamation have destroyed a part of the functional tissue. These latter changes are the cause of symptoms of hypothyroidism.

Secondary organic changes of this nature were present in 4.8 per cent. of our cases. The patients were all very much benefited by the operation, but some heart trouble, the impossibility of much exertion and more or less exophthalmos remained. These patients might present slight symptoms of hypothyroidism, but I must say that, owing to the great care my father takes in this matter, it has been the exception to see these symptoms appear after operation.

Ten patients (4.4 per cent.) were benefited by thyroid operation, but not as much as could have been expected; some of these had symptoms of other diseases and they seemed to present a special form of the disease. But space is too limited to discuss this question. Eight patients (3 per cent.) are still under observation, the time since the operation being too short to give any definite opinion concerning them. In another group of eight cases (3 per cent.) the patients could be cured by the thyroid operation, but, being so much improved, do not wish it.

This brings us to the question, how operate? The most important condition is *nihil nocere*, and that is why I have spoken, in the first place, of the danger of operation. We have seen that careful preliminary observation of the case makes a carefully conducted operation a possibility for almost every patient. The method has to be chosen for every case. We give the preference to repeated operations with the patient under close observation and with the help of medical treatment. More than two arteries should never be ligated in one session, because of the above-mentioned changes in the gland. To remove more than half of the gland at one sitting is dangerous, and it is difficult to say whether this is ever wanted. We find it rarely necessary to resect a part of the remaining gland after excision of one side.

The question, When are we to operate? depends not alone on the physician, but also quite as much on the patient. Often the surgeon thinks it the doctor's fault

that he is consulted so late, and does not imagine what an unsettled and sick mind the patient has. It is necessary to advise people to see the doctor in the early stages of the disease. Nervousness, irritability, weakness, emaciation, sleeplessness are the early symptoms and are not sufficiently dwelt on. These patients are often regarded as cases of neurasthenia. If such patients were carefully examined by medical men, especially after exertion and before or during menstruation, characteristic, although slight, symptoms could often be made out; such as tachycardia, ocular symptoms, tremor, blood changes, and especially vascular symptoms of the gland.

On these latter symptoms treatment should be decided. Distinct vascular symptoms should at once induce surgical treatment. If they are wanting, the medical treatment, with the patient under close observation, may cure, but if it does not, or if relapses come on, vascular symptoms will develop before long and be at once noticed by the doctor and induce surgical treatment. In such cases ligation of two arteries or excision of half of the gland will cure definitely in a very short time. If the doctor sees the patient only when the disease is at its worst, then we do not advise an immediate operation. Even ligation of one artery may be dangerous then, because of the increase of the discharge of toxic material from the gland and because in these cases the organism has not yet developed its own antitoxic reaction, the lymphocytosis. In these cases medical treatment is needed and cytotoxic serum here seems to act well. If the reaction of the organism is present, operative treatment must take place.

In cases of longer duration, great benefit can be derived by operation, but here one has to be even more careful, as we have to deal with organic changes in the heart and there is the fear of hypothyroidism. I wish to mention one fact, that in all cases of long duration, whether in the so-called primary cases or in the cases combined with ordinary goiter, always the same symptoms are evident—dilatation of the heart, excitable pulse, and exophthalmos. As to the latter symptom, which is mostly caused by the dilatation of blood vessels in the orbit, the fact that the eyeball does not go back, even when it can be pushed back easily, does not in all cases come from development of fat or connective tissue, as is generally admitted, but also from the fact that the muscles of the eyeball have been distended so much and so long that they can not contract well, if at all. It is possible that electric treatment might be of benefit.

We come now to the conclusion that operation on the thyroid gland gives the possibility of an entire cure of the disease. Whether we admit a primary irritation of the sympathetic nerve, and, therefore, an increased metabolism of the gland, or a primary increase of thyroid material and from it an irritation of the sympathetic system, or both, it amounts to the same thing so far as the thyroid operation is concerned. By reducing the hypertrophic thyroid tissue or reducing its blood supply, we reduce the possibility of too extensive reaction to the primary cause and also enable the gland to adapt itself to counteract new outbreaks of primary causes which a nervous subject can easily show.

DISCUSSION

ON PAPERS OF DRS. BEEBE,* MAC CALLUM,* BARKER, PREBLE AND KOCHER IN THE SYMPOSIUM ON GOITER.

DR. W. S. HALSTED, Baltimore, expressed his belief in the efficacy of the serum discovered by Drs. Beebe and Rogers in some cases. He saw a series of cases in which the exhibition of the serum had been followed by relief, almost complete, of the symptoms of exophthalmic goiter. The result of the surgical treatment of exophthalmic goiter in the Johns Hopkins Clinic has been surprisingly successful. Of some ninety cases of this affection operated on by Dr. Halsted during the past fifteen years only two patients have died, and both of these in the current year. Of the two fatal cases, one weighed only 60 lbs. at the time of operation, and was losing at the rate of 3 lbs. a week while under observation. The other patient died very suddenly four days after operation, during apparent convalescence.

Speaking of the danger of surgical tetany, which, until the epoch-making discovery of Gley in 1891, was incomprehensible, Dr. Halsted said that it seems hardly credible that the loss of bodies so tiny as the parathyroids should be followed by results so disastrous. With our knowledge of the function of the parathyroid glandules comes not only the recognition of the necessity for their preservation, but more frequent occasion for operations which imperil the vitality of these bodies. Seven cases of operative tetany within the past two years in the practice of a certain great surgeon probably exceed in number all that have occurred in his practice during the quarter century preceding. The ligation of two thyroid arteries has in several instances been followed by tetany. From simultaneous ligation of the four thyroid arteries in exophthalmic goiter the danger of tetany is so great as to contraindicate this procedure. In performing unilateral thyroid lobectomy, Dr. Halsted maintained that one should not sacrifice either of the parathyroid glandules of the operated side, for tetany may follow the excision of one lobe, and indication for the removal of the other lobe may subsequently arise. The cases of tetany occurring in the practice of experienced operators are, he thought, less often due to the actual removal of the parathyroids than to interference with their circulation. For the preservation of these little glands knowledge of their blood supply as well as of their location is essential. Their situation is, in general, along the posterior border of the thyroid lobe, commonly in the course of an anastomotic channel connecting the superior and inferior arteries. They may be found at any point from the top to the bottom of the thyroid gland, along its posterior border and posterointernal surface, and at least one is quite constantly found near the entrance into the thyroid gland of one of the branches of the inferior thyroid artery.

R. M. Evans has demonstrated that each parathyroid glandule has its own little artery, given off usually from a branch of the inferior thyroid or from the channel connecting the superior and inferior thyroid arteries; and directly or indirectly always from the last named arteries. Somewhere in the middle two-fifths of the posterior border of the thyroid gland these parathyroid glandules are ordinarily found, the superior one being rarely as high as the superior pole, and the inferior one frequently below the inferior pole of the thyroid gland.

Not infrequently it is very difficult, indeed, to avoid cutting off the blood supply of these glandules in the course of operation, for the parathyroid artery may be given off from its parent stem just as the latter is entering the thyroid gland. In such cases there is not room for the point of even the finest artery forceps or the parent stem distal to the point of origin, of the parathyroid artery. Twice Dr. Halsted found it quite impossible, for the reason just given, to save a parathyroid glandule; and on several occasions, in the course of operation he has transplanted into the thyroid gland a parathyroid body whose circulation was threatened or cut off. In dogs he has many times transplanted parthyroid glandules, into thyroid gland and spleen, occasionally as many as seven or eight of these little epithelial bodies into one spleen. After eight months of experimentation he has been unable to obtain functional proof of the success of a transplantation, although six weeks after the transplantation into the thyroid gland there was anatomic evidence of the success of the experiment. Hence he feels that at present one can not rely on transplantation of the parathyroid glandules. The main reliance in case of

* The papers of Drs. Beebe and MacCallum were published October 5.

tetany is the injection, hypodermically, of the proteids of these bodies as prepared by Dr. S. P. Beebe.

Dr. Halsted stated that the procedure in the course of thyroid lobectomy which seems to him best to guarantee the safety of the parathyroid glands, is ligation of the branches of the thyroid arteries as far peripherally as possible, beyond the point of origin of the parathyroid arteries. The slicing of the thyroid lobe distal to the parathyroid bearing area, he said, is not to be countenanced in severe cases. This procedure, which may be resorted to in many cases of colloid and nonhypertrophic goiter, is in the exophthalmic form reserved by Dr. Halsted for operations on the second lobe, and for the special occasions when the blood supply of the parathyroid is such that ligation of the little radicle beyond the origin of the parathyroid artery, is impracticable.

DR. FRANK BILLINGS, Chicago, said that one must bear in mind that while there are patients who suffer with the typical symptoms, there are others who may be nervous, may have tachycardia, tremor, flashes of heat and cold, myasthenia with early exhaustion on either mental or physical effort who would ordinarily be classed as neurasthenics, but with the appearance of slight goiter could be classed under exophthalmic goiter. It is sometimes difficult to see where neurasthenia ends and exophthalmic goiter begins. It is, therefore, important to have the patient under observation for a considerable period of time in those cases when the diagnosis can not be readily made. There are two classes of patients: One the so-called secondary, where simple sturma has existed for an indefinite period, sometimes for years, and where for some cause there may be developed exophthalmic goiter. In the second class there has been no pre-existing knowledge of goiter and the symptoms of exophthalmic goiter develop suddenly. The morbid anatomy of the classic goiter of exophthalmic goiter is said to be that of the hypertrophic thyroid gland. Associated with this there is an increase in the secretion of the gland and hyperthyroidea results. It is known that in certain localities simple struma exist in larger numbers than in other places, and certain localities also give a larger number of exophthalmic goiters. Dr. Billings stated that there are three or four counties just north of the center in Illinois, from which a larger unmber of cases of simple goiter and exophthalmic goiter come than from other regions in the state. In one small village in Michigan eight cases of simple goiter occurred and two developed exophthalmic goiter. Dr. Billings urged that physicians individualize in the treatment. Last year he reported sixty-five cases of exophthalmic goiter before the Chicago Medical Society. Of this number three patients had been operated on, with one death during the operation. The other patients had been treated medically and three terminated fatally. The three fatal cases were acute manifestations of the disease and ran a rapid and very acute course. Of the remaining patients, all improved very materially on a rest treatment. No specific medication was given, but the rest treatment was given with an attempt to individualize as to the time to produce results. Ordinarily, he said, the rest treatment as prescribed by most physicians is not thoroughly given. The patient must have physical as well as mental rest. In one instance it may be the continuous recumbent posture; in another the recumbent posture must be changed for the sitting posture or even moderate walks taken to keep the patient in the proper mental state. In all cases the environment must be restful. The food should be nourishing and should be pushed to the full digestive and assimilative power of the individual. The icebag used intermittently over the precordia and over the goiter, galvanism through the goiter and in the direction of the pneumogastric nerve, cold salt glows and massage are important incidents in the management. Medication is of less importance, but for certain individuals small doses of opium are helpful. The hydrobromate of quinin, 5 grains, three or four times a day, is often helpful because of its effect on the vasomotor apparatus. If a rest treatment thoroughly carried out results in a decided improvement, one would be justified in continuing it. If it is not helpful to the individual or if the individual's financial conditions or relation to the family are such that it is impossible to take a rest treatment, then, Dr. Billings said, surgery is indicated. Although less objectionable than formerly, if a member of his family suffered from the disease, Dr. Billings would prefer at first to try the rest treatment rather than to at once submit to surgery. In his experience with the few patients he has seen operated on, entire recovery has not occurred, as it does not occur in those managed medically. Such patients continue to show moderate cardiovascular disturbances and more or less tremor and other evidences of neurosis.

DR. WILLIAM J. MAYO, Rochester, Minn., said that three types of these cases are seen clinically. First, the vascular type; second, the type that is due to a hypertrophy of the thyroid tissue, and third, those cases of hyperthyroidism developing in patients with pre-existing goiters. There is a fourth or pseudo-type in which there is not a true exophthalmic goiter or hyperthyroidism, but where a tumor, such as an adenoma, develops in the gland inside of the capsule and produces pressure on the gland. In other words, the tension within the capsule of the gland causes a greater amount of secretion to be absorbed. Such cases, he said, do not require removal of the thyroid, but simply removal of the tumor. Dr. Mayo considered one point brought out by Drs. Halsted and MacCallum exceedingly important in this connection, and that is, that there is practically no difference between the glandular overwork that comes from experimental removal of part of the normal thyroid gland and cases of hyperthyroidism. In other words, that there is practically no difference between a gland which has been hypertrophied as the result of necessity produced by operative removal experimentally, and those cases in which this takes place not as a result of such a necessity. These cases, then, can be shown both clinically and microscopically so plainly that there can be no question regarding their existence. Another point brought out by Dr. Barker he thought also important, and that is that some of these patients do not, apparently, have goiter. That was his opinion for a while, but he now finds that in every case, whether the goiter is apparent or not, there is enlargement of the thyroid, and that those cases with pre-existing goiter, where proper areas are cut and examined, the typical changes, macroscopic and microscopic, can be shown. As to the relief of these patients, Dr. Mayo said they can be cured by operation. A failure to cure, as a rule, is due to failure to remove enough of the gland. In regard to the question of tetany, Dr. C. H. Mayo found in a large number of cases but one case of tetany and that was exceedingly mild and soon disappeared. Dr. Mayo said that if the posterior capsule of the thyroid is carefully preserved, and the tumor removed from above, it is impossible to cut into the parathyroid glands.

Finally, in regard to the question of operative mortality, Dr. C. H. Mayo reported 176 cases of hyperthyroidism operated on with nine deaths. There were four deaths in the first sixteen cases operated on; three in the next thirty cases, and three in the remaining cases. There was but one death in the last 75 operations. The earlier operations were done with a considerable loss of blood. They were cases in which the medical treatment had failed. They were operated on at a bad time, and the result was a high mortality. With careful preparation this is largely disappearing, and Dr. Mayo believes that one can now look on hyperthyroidism as a surgically curable disease; not in all cases, but in those turned over to the surgeon by the medical man not too late when they feel that these cases have been subjected for a reasonable length of time to medical treatment without relief. Such cases can be looked on as being susceptible to a cure by surgical means.

X-Rays Plus Static Electricity in Treatment of Lupus.—F. Winkler of Vienna reports excellent results from the use of soft Roentgen tubes in treatment of lupus until the lupous patches become necrotic, after which he substitutes static electricity, under which the lesion rapidly heals. He cites in the *Monatshefte f. prakt. Derm.* for September 1 a case in which different technics were used on different patches on the same individual. The patch treated by the Roentgen ray plus static electricity not only healed over more promptly than the other patches, but has been free from recurrence since, while the other patches have shown a tendency to recurrence.