

MATAS, (R.) *with the respect compliments*
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1888

REPORT

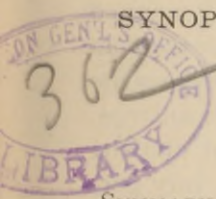
—OF A—

CASE OF THYROIDECTOMY FOR MALIGNANT DISEASE,

—WITH A—

SYNOPTICAL CONSIDERATION OF THE PRESENT STATUS OF THIS OPERATION.

By RUDOLPH MATAS, M. D.*



SUMMARY.—EXTIRPATION OF THE THYROID FOR SARCOMA OF THE GLAND; TRACHEOTOMY DURING THE OPERATION UNDER UNUSUAL ANATOMICAL DIFFICULTIES; RECOVERY. SUBSEQUENT INTRA-LARYNGEAL SPREAD OF THE DISEASE. SECONDARY PERMANENT LARYNGO-TRACHEOTOMY, WITH EXPOSURE OF THE GROWTH AND EXTRACTION OF FRAGMENTS; SURVIVAL TO PRESENT DATE, SIX MONTHS AFTER OPERATION. DESCRIPTION OF A READILY IMPROVISED APPARATUS FOR HEATING INHALED AIR AFTER TRACHEOTOMY. REPORT ON HISTOLOGICAL PECULIARITIES OF THIS TUMOR. COMMENTS ON THYROIDECTOMY FOR MALIGNANT DISEASE.

Observation.—James Lines, colored, laborer; æt. 65 years; native of Virginia; 40 years a resident of Louisiana, was admitted in Ward 2, Charity Hospital, Sept. 26, 1888. He gave no hereditary history of disease; no evidence of syphilis or tuberculosis. His habits have been always temperate. He stated that about six months before admission he had noticed a swelling in the neck, about the region of the thyroid, which steadily grew to its present dimensions. He suffered no pain or inconvenience from it until about three weeks before admission, when he began to experience some difficulty in breathing and swallowing. These symptoms became steadily worse, the dyspnœa and

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presented by the author.

hoarseness becoming quite urgent when he was excited or underwent exertion.

Upon examination an irregularly spherical tumor presents itself at the site of the thyroid, evidently originating in and forming a part of this body. Owing to the thinness and length of the neck, and the mobility of the skin, the outline and limits of the tumor can be readily mapped out. The tumor appears to be a little smaller than an ordinary Mandarin orange, and is more developed on the right than on the left side. Owing to this greater enlargement on the right side, the right sterno-mastoid and the corresponding carotid sheath, with contents, are very perceptibly displaced outwards, as is well shown in the accompanying illustration. It is also noticed that the tumor is very hard, of a fibromatous consistence, in some few places presenting a nodulated and almost cartilaginous thickness. It was also recognized plainly that the tumor had not become infiltrated and was completely encapsulated.

The growth was entirely painless, spontaneously and on pressure, at least in its anterior and lateral aspects. The tumor completely covered the anterior surface of the thyroid cartilage, crico-thyroid space, cricoid cartilage and the four or five upper rings of the trachea. During deglutition when the larynx was elevated, a space barely measuring one and a half inch (vertically) existed between the lower border of the tumor (in the median line) and the suprasternal notch; after swallowing, with the larynx depressed, this space was narrowed to about one inch or less. There were no enlarged lymphatics.

The questions that now presented themselves for consideration were: What was the diagnosis? What were the surgical indications furnished by the case?

In regard to the first question there was no doubt (1) that the tumor was solid and not cystic; (2) that it was of rapid growth (six months); and (3) that it had appeared late in life. The two last considerations eliminated ordinary hyperplastic goitre, inflammatory enlargements, and prac-



SARCOMA OF THYROID GLAND:
BEFORE EXTIRPATION.



SARCOMA OF THYROID GLAND:
AFTER EXTIRPATION.

tically all benign growths. The malignant growths were now left for differentiation. The diagnosis between the sarcomata and carcinomata was difficult and practically impossible to establish. The apparent absence of secondary lymphatic enlargements, the rapidity of the growth and its hardness suggested spindle-celled sarcoma; the age and the hardness also favored scirrhus. Anyway, it was decided that the tumor was of a malignant character—a diagnosis which entirely sufficed for clinical purposes; and we now directed our attention to the second question—*i. e.*, what was the indication?

The most urgent symptom complained of by the patient was dyspnœa, which was attributable to several factors: (1) the direct pressure backwards of the tumor upon the trachea, giving rise to the “*scabbard*”-like flattening of this tube, or the angular stenosis produced by the lateral displacement from the more enlarged right lobe; (2) the pressure exercised upon the pneumogastrics or recurrent laryngeals, giving rise to spastic glottic obstruction; (3) infiltrations with perforation of the cartilaginous framework of the larynx, with inflammatory and neoplastic obstructive formations.

It was plainly apparent that the obstructed respiration would soon call for relief, and that *low* tracheotomy, at least, would be required to avert immediate death from suffocation. But this was only a palliative measure at best, and the prospects of a radical extirpation of the growth had to be considered. The distinct encapsulation of the tumor, the apparent absence of secondary glandular invasion, the general good condition of the patient, and the comparatively small size of the growth encouraged the hope of cure by thyroidectomy. But the known fatality of thyroidectomy, especially for malignant disease, with its secondary physiological, as well as immediate operative dangers, led the writer to decide upon the performance, first, of the simultaneous ligature of the four thyroid arteries, as has been so successfully applied to benign

goitres by Billroth (see his recent paper in Wiener Klinische Wochenschrift, No. 1, April 5, 1888*), the operative interference being limited to this procedure only, if the tumor was found too dangerously adherent to surrounding parts and especially if marked evidence of neoplastic invasion of the larynx was ascertained; but, if the contrary favorable condition existed, it was decided that the ligation of the four vessels should be followed by the complete extirpation of the neoplastic gland.

Operation.—Oct. 11, the patient was taken to the amphitheatre, where, after the usual antiseptic preparation of the field of operation, he was placed on the table in the usual tracheotomy position; Messrs. Scherck (chloroform), Sabatier (interne of the service), and Borde, resident student, acting as chief assistants. From the start the patient's dyspnoea and stridulous breathing appeared to be much aggravated by the excitement of the impending ordeal. He inhaled the chloroform willingly, however, which, after a few inhalations, appeared to calm him. Shortly after he again presented ugly symptoms, viz.: very rapid pulse, increased stridor and great dyspnoea. This decided the writer to begin at once, before the anæsthesia was complete, by clearing the trachea above the sternum in readiness for immediate tracheotomy. This proved to be a wise course, for had it not been adopted as the initial

*The ligation of the thyroid arteries, originally recommended especially for vascular goitre, but more often applied in ordinary parenchymatous goitre, was first practiced by W. Blizard, though the idea originated with Ch. Lange (Dissert de Strumis et Scrofulis, Wittenberg, 1807) and Jones (1807). Blizard's patient, after a temporary improvement, succumbed to hospital gangrene. The first successful result was that obtained by Walther in 1814; since this time the operation has been practiced a great many times and by many surgeons, among whom we could mention Coates, Earle (Arch. de Med., 1827, t. xiii), Green, Larrey (ten times), Langenbeck (Archives de Med., 1820, t. xxix, p. 118), Chelius (Arch. de Med., 1835, t. xx, p. 230), Porta (Gaz. Med. de Paris, 1852). So often in fact that Le Fort (Med. Opérateur) has been able to collect (before Billroth's recent communication) a list of thirty-one cases, *vide* Krishaber (Dict. Encyclop. des Sciences Med., 1883). The revival of this operation, which for various technical and other difficulties had been abandoned, is attributed by Billroth to A. Wolfier. In this paper Prof. Billroth considers the ligation of thyroid arteries as undoubtedly a most valuable addition to the surgical treatment of ordinary goitres, and he asserts that this method would be an incalculable boon if it were equally efficacious in carcinomas and sarcomas of the thyroid gland. "But we have been sufficiently taught," he adds, "by the formerly more frequently employed ligatures of the lingual arteries in unextirpable carcinomas of the tongue that this so much desired result will not be attained; rapid disintegration of the carcinomatous neoplasms, but no harmless wasting takes place. Nevertheless we ought not to be disheartened and deterred from submitting to further trial this rational mode of treatment with any available modification, although the only attempt of this for this purpose completely failed." (Junker's Abst., Lond. Med. Recorder, June 20 1888).

step of the operation it is more than certain that the patient would have succumbed in a hasty attempt at its performance when the symptoms became still more urgent, for the reasons that will be detailed in a moment. A long incision was therefore made in the median line, extending from the anterior projecting angle of the thyroid cartilage to a point below the upper border of the sternum. After dividing the platysma and deep fascia, the edges of the sternothyroids were recognized and retracted, the anterior surface of the right lobe of the thyroid was exposed, and by following its capsule, which was not adherent to the surrounding parts, its lower border was reached, and the inferior thyroid veins and loose connective tissue separated with the handle of the scalpel. It was now observed that the trachea, which was exposed with considerable difficulty, had been pushed greatly to the left of the median line, and bent backwards towards the vertebral column by the rapidly growing and more enlarged right thyroid lobe. The right border of the trachea below the tumor was certainly one and one-half inch to the left of the median line. There existed between the lower border of the tumor and the supra-sternal margin barely one inch of space; the trachea itself sinking backwards at least one and one-quarter inches towards the vertebral column when it reached the level of the sternum.

Furthermore, the lower half of this small pre-tracheal space was much encroached upon by the crossing over the trachea and above the level of the sternum of a large pulsating vessel, as large as the common carotid. This vessel was believed by the writer to be either a right carotid, originating anomalously from the arch of the aorta, or an unusually high innominate. Anyway, owing to the presence of this large vessel, the only available space left for the introduction of the cannula in case of tracheotomy was only a small half inch of the anterior tracheal surface, left free between the lower border of the thyroid tumor and the upper border of the large artery, which was pulsating

most threateningly exactly at the place where the knife would have been introduced in a hasty attempt to reach the windpipe.

The available part of the trachea was, however, thoroughly denuded, and all was made ready for any emergency that might arise. The dissection was then continued upwards towards the upper ends of the right lobe, with the view of ligating the superior thyroid artery. The muscles and other structures had been detached from the anterior surface of the growth, and the whole lobe had been almost completely exposed, when for some reason, perhaps increased compression of the trachea from manipulation, or from reflex laryngismus, the patient suddenly began to gasp for breath, the veins in the wound became turgid, the lips cyanotic, the pulse weak, irregular, almost imperceptible at the wrist; in short, the patient was about to die from apnœa. There was no time for delay. The trachea was immediately opened below the tumor, and a large cannula was inserted into the windpipe. The relief was instantaneous. The cyanosis and turgescence of the veins disappeared, and the patient at once dropped into an easy and calm attitude, which markedly contrasted with his previous agitation and anxiety. The chloroform had been completely stopped on the appearance of the threatening symptoms, and we now decided to complete the operation without the anæsthetic. The restored tranquility of the patient was most assuring, and instead of simply ligating the four thyroids, as the writer had originally intended, we now decided to extirpate the whole diseased organ, especially since we were confirmed in our belief that the tumor had not perforated its capsule, or become adherent by infiltration into the surrounding parts. It was discovered that in order to continue the operation the tracheal cannula had to be introduced, owing to the great depth of the trachea, entirely into the wound; so deeply in fact, that the shield of the tube had to lie within the wound, resting directly upon the trachea and partly upon

the anomalous arterial trunk already mentioned. This gave rise to temporary trouble, owing to the fear that blood might get into the trachea through the tube; but the comparative bloodlessness of the remaining stages of the operation ultimately obviated this danger.

We now continued to separate carefully the muscles from the tumor. The sterno-mastoid and vascular sheath were retracted, and both extremities of the right thyroid lobe exposed. The superior thyroid artery was now seen penetrating at the usual point, and ligated at a short distance from the gland. The inferior thyroid was readily discovered as it crossed the longus colli and vertebral column, and also ligated at some distance from the gland. The left thyroid lobe, much smaller, was now cleared in the same manner, and its nutrient vessels (left superior and inferior thyroid arteries) also ligated. The tumor in its entirety, with the larynx and trachea, lay quite bare and isolated before us. By pulling gently on the tumor the finger could be easily swept back of the trachea and larynx to the pre-vertebral space. The examination revealed no apparently enlarged lymphatics or posterior involvement of the pharynx or œsophagus.

The great danger that was now apprehended was the possibility of the tumor proving to be a direct outgrowth from the larynx, and the possible necessity of removing the attached laryngeal portion. Fortunately this fear was not realized. The wire of an ecraseur was guided through the base of the tumor at a point corresponding to the original isthmus of the gland and the growth split in two halves. The tissue was exceedingly hard and offered considerable resistance to the wire; it was also completely exsanguinated. Each half was then quickly peeled off from the alæ of the thyroid cartilage and trachea, which showed nowhere evidence of malignant perforation or infiltration. There were some adhesions of the tumor with the right half of the thyroid cartilage, but the disease did not appear to penetrate at all into the fibro-cartilaginous framework

of the larynx and trachea as anticipated; it was evidently limited by the external surface of these organs.

A small fragment representing the lower third of the left thyroid lobe was left *in situ* without removal, as it appeared to be perfectly healthy. The inferior thyroid of that side was ligated, however, so that as far as its nutrition was concerned it was practically as functionless as if it had been extirpated. The faint hope that it might have some influence in averting the cachexia strumipriva, in case of recovery, led us, with doubtful propriety, to prefer leaving it without removal.

After the removal of the growth the parts were well irrigated with 2½ per cent. carbolic solution, and two long drainage tubes were inserted deeply into the wound, one on each side of the trachea and pharynx as far back as the retro-pharyngeal space.

With the removal of the growth the larynx and trachea returned almost to their normal position, though the latter continued to be directed backward and far from the sternum, so much so that difficulty was experienced in adjusting the large cannula employed, as it was too short for so deep a wound.

After the operation, which lasted one hour and twenty minutes, the patient was considerably prostrated, though much less than would have been expected considering the severity of the ordeal he had undergone. After the wound had been closed with silver sutures and sublimated silk, the patient sat up by himself for the dressing, and was sent to the ward in a chair. His pulse rapidly improved, though it practically ceased to give us any cause for uneasiness from the moment the trachea had been opened.

In order to avoid the risks of pneumonia consequent upon the admission of cold air into the lung through the tracheal cannula, it was desirable to secure its uniform warmth prior to its admission to the trachea. A sponge frequently pressed in warm water and fixed over the cannula has been heretofore the method generally resorted to

by the writer to attain this end, but this method is not well suited for hospital practice, where nurses are overtaxed with work, and where the devotion and personal feeling towards patient is not always to be relied on so much as among interested relatives, who will continuously and assiduously watch the cooling of the sponge and warm it again the moment it is cold and dry. To meet this indication, and, at my suggestion, Messrs. Sabatier and Borde, internes of the hospital, exercised their ingenuity and contrived a rubber coil for warming the inhaled air by submerging the tube in a warm water bath, kept at a tolerably constant temperature by a device shown in the annexed figures. The contrivance devised by these gentlemen consisted simply in a long (two yards), red rubber, non-perforated drainage tube, about 20 or 28 mm. in circumference. One end was attached to the cannulated trocar that is used as a guide in introducing the cannula, and the other was coiled in a metallic can filled with water, which was kept warm by immersion in a water bath heated by a spirit lamp. A sand bath was subsequently substituted by myself, though a water bath will do well, provided a thermometer is appended to the can to indicate the temperature, though this instrument ought to be appended to all receptacles that may in future be constructed for this purpose. Since describing the contrivance, at an informal meeting of the New Orleans Medical and Surgical Association, my friend, Dr. J. Farrar Patton, has suggested a most valuable improvement to the apparatus, which, by this addition, is made very serviceable in all cases in which the natural aperture of the larynx is closed, and the patient has to breathe entirely through the cannula and not, as in our patient's case, who, shortly after the tracheotomy, could breathe with tolerable comfort (at short intervals), when the cannula was stopped up. Dr. Patton's improvement consists in the addition of two valves of rubber, attached over two openings made in the tube, which at this point should be solid (a short perforated glass drainage

tube would do) and placed at a short distance from the tracheal attachment of the tube. By this arrangement, the rubber valves will be pushed outward by each expiration, giving ready exit to the expired air, while, during inspiration they will be closed by atmospheric pressure, and will not interfere with the inward movement of the warm air passing through the coiled tube.

Various other contrivances have been suggested to meet the indication in question, but it appears to the writer that in many cases of tracheotomy, especially in adults, and even in children, much benefit may be derived by the use of this apparatus, which can be readily improvised, needs little watching and can be kept clean without great difficulty.

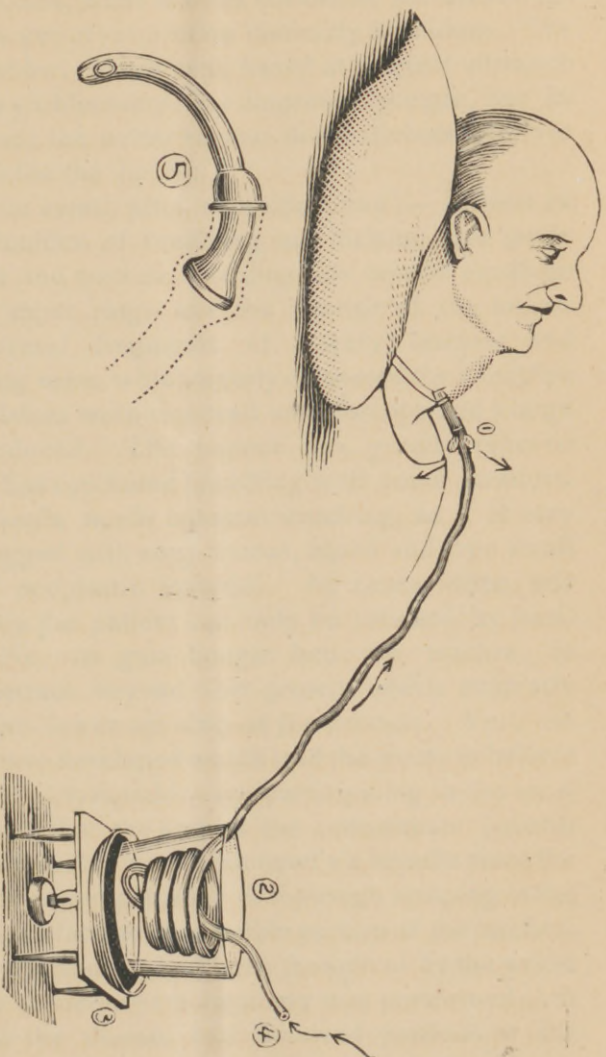
Returning now to the patient, we will state that on the day succeeding the operation his temperature was 101° F.; pulse, 90; the patient breathing easily through both mouth and tracheal tube, which day and night was kept attached to the cannula. The patient spoke distinctly when the cannula was closed.

Oct. 16.—The sutures were removed, as union had taken place along the whole of the incision, excepting at the points where the cannula and drainage tubes projected.

Oct. 17 (seventh day after operation).—As the patient's temperature continues normal and he breathes comfortably through the mouth, with tracheal cannula completely closed, the warm-air coil is discontinued and the cannula plugged. As a matter of precaution the cannula is allowed to remain *in situ*, though the patient breathes entirely through the natural passages.

Oct 18 (eighth day).—The patient sits up out of bed in a chair, the sutures are removed, the drainage tubes also, and the patient is considered as practically out of danger.

Oct. 20.—Since this date the patient has been up, and has been quite comfortable. The parts about the wound have consolidated firmly, excepting only the point where



WARM AIR COIL FOR TRACHEOTOMY.

1. Rubber valves fitted over openings in glass tube to allow expired air to escape.
2. Coil of gas rubber tubing immersed in can of warm water.
3. Porcelain capsule filled with sand (sand bath) on stand heated by alcohol lamp.
4. Free end of coil to admit inspired air.

[The rubber tube is attached to the cannulated trocar (see diag. 5) by the tracheotomy cannula and can be readily removed whenever the cannula needs cleaning.]

5. Trocar for cannula with rubber tube adjusted.

the cannula is situated, owing to the fact that the tracheotomy tube has not been removed until recently.

The voice, however, though distinct, is not normal and is of a low pitch, and, what is more noticeable the breathing, though easy, is yet in inspiration distinctly stridulous. The respiratory stridor, which was heard at a great distance prior to the thyroidectomy, has improved greatly, but its persistence leads the writer to fear that mischief may yet be brewing within the larynx.

Nov. 27 (one month after thyroidectomy).—In view of returning difficulties of breathing an incision was made into the larynx and trachea, dividing the cricoid cartilage and the three upper rings, and the interior of the larynx explored. Several fragments of a very vascular and granular looking mass, which nearly obturated the windpipe at level of incision, were removed with forceps and a large cannula introduced. The patient was greatly relieved thereby, and has continued breathing with some comfort, though the canula needs constant watching, as it is very frequently plugged with ropy mucus, blood and even small fragments of neoplastic material. At times when this plugging occurs the patient can only be relieved by passing a large No. 10 gum bougie into the trachea, in order to penetrate beyond the growth which evidently exists below the lower opening of the cannula. Very recently, signs have developed which lead the writer to believe that the bronchial lymphatics are participating in the morbid process, and that the end of the unfortunate patient, whose life has thus far been prolonged six months since the operation, is fast approaching. A thorough scraping of the intra-laryngeal surface and accessible portion of the trachea, and even a laryngectomy, had been thought of by the writer at the time the secondary tracheotomy was performed; but the belief that the disease had involved portions of the trachea deeper than a tampon canula could reach and protect dismissed this suggestion as impracticable and injudicious.

The tumor shortly after its removal was examined and pronounced a large cellular sarcoma of the thyroid gland.* Since that time a section was photographed for me by Dr. Gray, the able microscopist of the Army Medical Museum, Washington, D. C., who stated his opinion that it was an alveolar sarcoma. I examined the slide for the first time since its return, and could not fail to recognize the excellent reasons for differing with the original diagnosis. The perplexing histological peculiarities of this tumor are remarkable, however, and they are well stated by Dr. Henry Dickson Bruns, the present pathologist of the hospital, to whom the slides were submitted, and whose conclusions, after very careful and repeated examinations of both the extra and intra-laryngeal growths, harmonize with those of Dr. Gray. I append Dr. Bruns' report with pleasure, feeling that in the present very incomplete state of our knowledge regarding the histological peculiarities of thyroid sarcomata, that contributions of this character will prove especially valuable.

REPORT OF DR. BRUNS.

Thyroid Tumor.

It is with no little difficulty that the true nature of this growth is to be determined, the difficulty arising from the size, appearances and grouping of certain large cells, which are disseminated through some portions. In a section the main portion is seen to consist of connective tissue, at many places dense, adult in appearance; at others fine, light, resembling myxomatous tissue. There are many lymphatic spaces and a fair supply of vessels. Many of these latter are evidently old and well developed; others very young and thin-walled. Here and there the eye is caught by the peculiar large cells with distinct, large nuclei, surrounded by a goodly proportion of "formed material," referred to above. These cells are most abundant in the

* The first examination was made in the Pathological Department of the Charity Hospital, but doubtless owing to the illness of Dr. Schmidt, the now lamented pathologist, the examination of the section was not as thorough as it would otherwise have been.

delicate areas of the connective tissue, though sometimes met with in the denser portion. They are as a rule gathered into clumps of from three to four, or less frequently five to six or more, and around these clumps the connective tissue seems to form quite definite alveolar walls. These appearances closely resemble carcinoma with small alveoli, and it is only by close study that the following points are made out, which I believe indicate the true nature of the growth and its mesoblastic origin.

In the first place, nowhere in the sections can any trace or remnant of the original gland substance be discovered.

In the second, many isolated cells precisely like those gathered into clumps are to be found in the neighborhood of the latter. These cells are closely embraced by the connective tissue. In some instances the young connective tissue cell with its plump nucleus lying so closely in contact with the large cell as to give it the appearance of having a second crescentic nucleus situated at its periphery.

Thirdly, though many of these large cells, especially the isolated ones, whose form can be most clearly made out, are spherical or but slightly polygonal, many of them appear to be of a stout spindle-shape, while others have long, fine processes—one or more—which I cannot conceive as having been produced by mutual cell compression. Moreover many of these fine processes seem to come into intimate connection with the fine fibrillæ of the alveolar wall.

Lastly, the closest observation of certain alveoli, from which some of the cells have fallen, show them to be interpenetrated by most delicate fibrils running out from the alveolar walls. Of course all the connective tissue is rather embryonic in type. It is moderately infiltrated within different cells, and the nuclei of its spindle cells and fibres are larger than in the mature tissue. These structural peculiarities, made out only after long and attentive study, drive me to conclude that the growth is a *large celled alveolar sarcoma*, originating from the connective tissue of the gland; but, as I said before, it is a most puzzling tumor—

the hand is the hand of Esau, but the voice is the voice of Jacob. The structure is that of alveolar sarcoma, but the cells closely resemble carcinoma.

Tumor from Larynx.

As was the case with the thyroid tumor, I began the examination of this growth with a firm conviction of its being carcinomatous. This has only broken down after prolonged study has convinced me that it manifests the same peculiarities as the thyroid tumor, although its alveolation is yet more carcinomatous. Still I believe it to be less definite and regular than that of cancer; connective tissue fibrillæ seem at certain points to run between the cells contained in the alveoli, and the cells themselves are sometimes spindle shaped, bipolar or stellate.

HENRY DICKSON BRUNS.

REMARKS.

In a recent contribution to the subject of thyroidectomy an able writer* has stated that "this operation, amongst English-speaking communities, is infrequent enough to still offer many points of interest." This statement is certainly well borne out by our experience in this community, which, notwithstanding its very large cosmopolitan composition, rarely offers an example of thyroid disease of a character sufficiently serious to call for operative interference. It is certain that disease of the thyroid in general is comparatively rare, especially in New Orleans, if we are to judge by the evidence furnished by our Charity Hospital reports, which very faithfully reflect the pathological tendencies of our population, and which show that during the whole decade ending in 1887 there has been only one solitary admission into the institution for goitrous disease. The significance of this statement may be estimated when we state that according to the last report (1887) a total of 5999 inmates were treated during the year of the report, and that in addition to this there were 12,085 visit-

* T. F. Chavasse on Thyroidectomy, *Annals of Surgery*, vol. 51, 1887.

ing patients. The diagnoses of these last cases are not given in the reports, and it is therefore quite possible that some cases of thyroid disease may have presented themselves at the clinics, though it is almost certain also that, if they have existed, they have not been of a very serious or malignant character, as it is more than likely that they would have sought admission into the hospital. It may be therefore stated that out of a total 75,697 indoor patients treated in the Charity Hospital in the decade ending 1887, only one case of thyroid disease, excluding the present case, in 1888 has been reported. Furthermore, the operation of thyroidectomy is not mentioned in any of these reports, and it is almost certain this is the first instance of its performance in our institution, if not in our city.

The operation itself, though one of the most formidable in surgery, does not present any extraordinarily novel features, especially since its technique has been so thoroughly perfected by the great continental masters, who are so frequently called to perform it; but there are some peculiarities and considerations involved in the surgical treatment of cancerous or malignant goitres, which are still rightfully the subject of discussion, and which lead me to record this case, and which I hope will justify a critical, if imperfect presentation of the question.

Cancer or malignant disease of the thyroid, called also since Walther *Neue Heilart des Kropfes*, page 13 (quoted by Krishaber,*) scirrhus or cancerous goitre, is a rarer disease than the ancients believed, who frequently regarded as such any enlargements of this body which simply suggested to the naked eye the idea of malignant growth. Recent observations, based on histological investigations, have, however, positively determined the fact of the existence of malignant growths in this body and a sufficient number of cases have accumulated to allow of a definite description of the affection.

*Duchambres's Dictionnaire des Sciences Medicales, 1883.

From the histological standpoint, Lucke (*Cancroid der Schilddrüse mit schr. a. Ruten Verlauf Archiv. f. Klin. Chir.*, 1867, vol. ix, page 88), recognized three varieties of cancer of the thyroid, scirrhus, encephaloid and epithelioma. Cornil and Ranvier (*Pathological Histology*, Am. edition, 1880) admit encephaloid, but they consider it as very rare, and they believe that the majority of primitive thyroid cancers is constituted by epitheliomatous formations. They do not even mention sarcoma of this gland. Rose (*Archiv., f. Klin. Chirurg.*, vol. xxiii, band 1, 1879), in a collection of twenty-four observations of cancer which he reports, records three cases of sarcoma. This, I believe, is the first mention made of the existence of sarcoma of this body, and allows us to conclude that up to present date malignant disease of the thyroid may manifest itself in diverse forms, which, in the order of frequency appear to be: Epithelioma, encephaloid, scirrhus and sarcoma. Notwithstanding these histological differences we must admit with Butlin (*The Operative Surgery of Malignant Disease*, 1887) that all these types of malignant disease are all one to the clinician, and that so far as the operative treatment is concerned there is no essential difference between them. In all there is a probability that the lymphatic glands will be affected and that the disease will be disseminated in other parts of the body. Therefore all of them may be properly embraced under the more general and unifying designation of malignant disease, or the more common, if unscientific, name of cancer.

Cancer of the thyroid may be *primary* or *secondary*, and the relative frequency of these two conditions has not been yet definitely determined, observers disagreeing on this point, this divergence of opinion being due very often to the fact that the pharynx, œsophagus and larynx are involved simultaneously with the thyroid, and it being very difficult to state positively where the disease originated primarily. In the case here reported it is almost positive that the disease began *primarily* in the thyroid, and sec

ondarily involved the larynx. In some cases the disease is manifestly secondary, as in the case of a patient reported by Virchow (Tumors, vol. iii, page 244), who had been operated upon two years previously for cancer of the testicle. Stromeyer (Handbuch der Chirurgie, vol. ii, page 395), Lebert, Linke, Virchow and others have observed that cancer of the thyroid body attacks goitrous subjects by preference, a tendency which accounts for the greater frequency of the disease in countries where goitre is epidemic (Krishaber).

With the exception of a certain number of recorded instances of congenital sarcomatous disease of the thyroid, cancer of this organ is a disease of adult age, and occurs more frequently after forty years of age than in earlier life. According to Butlin it attacks men rather more frequently than women, probably in about the proportion of five to four; a very singular circumstance, as this writer observes, when the far greater liability of women to simple enlargement of the gland is remembered, and the further circumstance that certainly many of the cancerous affections have been noticed in glands which have during some years been the seat of simple enlargement. The history is not at all uncommon that the patient had suffered from goitre for years; that the goitre had very slowly increased, or been actually quiescent; that suddenly rapid growth had taken place, and the case terminated fatally in the course of a few weeks or months. The disease often produces general and almost uniform enlargement of the whole gland, and resembles in this respect the cancerous affections of the liver and the testis; but it may form a distinct and clearly defined tumor, which may be situated in the isthmus or in either lobe. In other cases the gland may be the seat of a great number of cancerous nodules, disseminated and separated by zones of healthy tissue, which may, however, finally become involved secondarily in the infiltration. According to Houel infiltrated cancer is more commonly found in primary neoplasm, and the

multiple, disseminated nodules in the secondary neoplastic affections of the gland.

The great peculiarity of cancerous disease of this gland is that, once the process of infiltration begins, the gland either in part or as a whole, *rapidly* enlarges. The surface of the tumor may be uniformly enlarged or tuberoso. It may remain for a considerable time, even after attaining very considerable dimensions, entirely encapsulated. Coincident with the enlargement the neighboring organs are pushed away, compressed or welded into the mass of the tumor. The effects of pressure on the air and food passages are soon felt, and then the real distress of the patient begins.

According to Rose (*loc. cit.*) dysphagia is a more frequent and earlier symptom in malignant enlargements of the thyroid than in the benign growth. This symptom is especially noticeable in cases of backward enlargement. Infinitely more troublesome and dangerous is the dyspnoea which soon follows the compression of the trachea and larynx and which is only comparable to the distress produced by non-malignant "suffocating" goitre. Cancerous enlargement of the thyroid may produce stenosis of the trachea, as in benign goitre, either by direct compression or by displacement, or by both conditions combined. Bonnet (*An. Academie des Sciences*, 1855) ascribed the obstructive deformities of the larynx to flattening of the trachea by compression from before backwards, by monolateral or by bilateral compression and stenosis, by deviation or angular deformities, as in our case. The deformities, by compression first mentioned, frequently give rise to the "scabbard" or sword-sheath trachea, first described by Demme (*Medizin. Zeitschrift, Wurzburg*, 1861, vol. ii), and since by Rose, Kocher and other later authors. This difficulty alone may call for operative interference, even before perforation of the thyroid capsule has taken place, as in the present instance. With the further progress of the disease, the skin over the tumor becomes red, adherent and in-

flamed, and at this stage it is difficult, if not impossible, to differentiate it from the inflamed goitre. "Soft spots may be observed ; a puncture results in the escape of a thick semi-fluid material, and is frequently followed by a fungous protrusion of the tumor." The ulcerative period now begins, and the trachea, larynx or œsophagus may be perforated, and fragments of the tumor expelled by the natural passages (Lebert, Path. Anat., p. 202). The trachea may be still further compressed by the growing mass, and its walls infiltrated in such an extensive manner that tracheotomy with an ordinary tube may be practically impossible, and special tubes or even catheters may become necessary in order to pass the strictured portion. The neighboring vessels and nerves of the neck become welded to the growing mass. The internal jugular may become obliterated, or, on the contrary, perforated by a penetration into its lumen of neoplastic granulations. The carotids generally resist longer, but Lebert records a case in which this vessel was perforated with fatal results. The pneumogastriks and the recurrent laryngeals may become involved, and finally become totally destroyed and incorporated into the infiltrating mass. The nerve lesion readily explains the respiratory disorders and alteration of the voice, which, independently of other causes, frequently attract attention.

Secondary generalization of cancer of the thyroid is almost the rule, the lungs and mediastinal spaces suffering most frequently, the pharynx, œsophagus, larynx and cervical lymphatics are more frequently involved by continuity. The bones of the cranium and pelvis, the brain, the kidneys and the heart itself have been the seat of secondary deposits.

In regard to the natural duration of the disease I will quote Butlin, who has obtained his data from the latest and best sources. He says : "It is very difficult to form a correct estimate of the natural duration of the disease, not on account of the frequent interruptions caused by operations, but because of the many instances in which malignant dis-

ease has been engrafted on simple enlargement of the thyroid. Edmund Rose calculates it at from six to eight months, the extremes being nine weeks and a year and a half. If this estimate is correct—and there seems to be fair reason to accept it—malignant disease of the thyroid is among the most malignant of all cancerous diseases; for even in cases which have been fatal from suffocation within six months of the apparent commencement of the disease, secondary affection of many parts of the body has been found, while other cases have been fatal in a shorter period by reason of these secondary tumors. The causes of death are various: some of the patients die of suffocation, some of suppuration and gangrene, some of exhaustion and the production of cancerous cachexy.”

Diagnosis.—The early diagnosis of cancerous disease of the thyroid is one of the most unsatisfactory problems connected always with these sad and difficult cases. It is stated that it can be usually recognized by its rapid development, the lancinating pains which it causes and which radiate to the head, the early adhesion to the skin, the secondary enlargement of the lymphatics, and the distressing respiratory difficulties which precociously present themselves. There is no doubt that when that stage is reached in which these conditions exist that the diagnosis is easily made, but we must then say of the diagnosis, *cui bono?* The diagnosis at this stage is then of no value to us or to the patient; it is, from the operative standpoint, a superfluous luxury, or at best a conclusion, which will bid the prudent surgeon limit himself purely to the work of palliation, and not rashly undertake a useless if not fatal operation. As Butlin again observes, after a study of the collected cases of his disease, there are two circumstances which are particularly worthy of notice—the large number of instances in which secondary affection was discovered at the autopsy, even when death occurred within a few days after the operation, and the frequency with which it was found impossible to entirely remove the tumor. These circumstances are the more ex-

traordinary, as he remarks, and the more significant, in respect to the question of extirpation, when it is taken into account that many of the cases were selected because they appeared to be far better fitted for the operation than most cases of malignant disease of the thyroid gland.

“It must be apparent to every surgeon who considers these matters that the attempt at radical cure was delayed until too late in the course of the disease, and this impression will be confirmed when we come to consider the further history of the cases in which recovery from the operation took place. Then follows the question: Why, knowing the necessity for early operation, was the operation deferred until the primary disease had become adherent to and involved vital structures, and until secondary disease of the lymphatic glands, the lungs and other parts of the body was present? Braun has laid down very clearly and emphatically the conditions which are favorable to an attempt to remove malignant disease of the thyroid. The tumor should be movable and completely encapsulated, its lower limit should be above the sternum, the pulsation of the common carotid artery should be perceptible on its external surface, and there should be no affection of the glands or metastases. But he adds—and in this lies the whole gist of the matter—tumors of the thyroid in which the circumstances are so favorable are scarcely to be recognized as malignant new growths.”

The difficulty of diagnosis is indeed the great obstacle to the prospect of successful extirpation of cancerous disease of the thyroid. * * * So exceedingly difficult is the diagnosis of malignant disease of the thyroid in an early stage, at a time when removal might not unreasonably be expected to be successful, that Braun says: “It appears to me that the time will never come when we will be able to diagnosticate the early stages of malignant struma.” The study of the present case will only tend to confirm this gloomy expectation. In this instance all the favorable conditions desirable for an operation were

present, and the malignant nature of the tumor was diagnosed before the operation (six months after its appearance and the moment he presented himself at the clinic), and still secondary involvement of the larynx followed quickly after operation, or very likely existed already, though slightly at the time, and the operation has only proved to be of a palliative character. I would, therefore, add that, in addition to the requirements specified by Braun, that a very careful laryngoscopic examination should be made, in order to prove that the respiratory difficulties are not all due to pure displacement or pressure distortion, and that the larynx is not involved in the neoplastic process. And, furthermore, even when there is no apparent involvement of any other organ than the thyroid itself—i. e., even if we operate in the earlier stage of the disease, when the conditions of the tumor are clinically identical with those of benign or simple hypertrophic goitre—we cannot even then feel in the least assured as to the non-recurrence of the growth. In other words, it is the conviction of the writer that by the time the growth has become simply perceptible to either the patient or the surgeon, it has already become disseminated beyond the thyroid tissue and is not eradicable even by the immediate and total extirpation of this body. This may appear to be an ultra-pessimistic opinion, but the history of my case and the unusually favorable encapsulation of the tumor practically reducing it to the conditions of a benign growth, coupled with the unfavorable experience of every other observer, and the histological peculiarities of the thyroid, tend to convince me that the operation of thyroidectomy for malignant disease is to be relegated to the category of the purely palliative measures which may prolong life for even a comparatively long time, but will fail to cure radically any true case of cancerous disease of this body.

Technique of the Operation.—Notwithstanding the discouraging opinion which I have formed in regard to the radical value of thyroidectomy in the class of cases under

consideration, I believe that it has a field of useful application which, no matter how restricted, still justifies and necessitates the perfection of all the technical details in its performance, in order that its ever-present dangers and difficulties may be reduced to their minimal proportions.

Firmly believing that all malignant growths of the thyroid which have invaded in any marked manner the surrounding tissues and organs, especially the larynx, pharynx, œsophagus and carotid sheath and its contents, and the lymphatics, are beyond redemption, and should be severely let alone, except only to relieve immediate distress of the respiratory functions by low tracheotomy, I would limit the performance of extirpation solely to those cases in which the isolation of the morbid tissue is obtainable and the operative conditions are identical with those for benign strumectomy. By adhering to this rule the essential difference between thyroidectomy for malignant disease and thyroidectomy for benign growth is eliminated, and the conditions are simplified; for, by the adoption of this principle, the surgeon is limited to the task—serious enough—of removing only thyroid tissue. If the surgeon will persist in the attempt to extirpate an infiltrated cancer he must be prepared not only to follow enlarged glands in dangerous mediastinal depths, excise portions of the carotid artery and internal jugular vein, resect the pneumogastric and perhaps the sympathetic, and remove partially if not wholly the larynx, pharynx and œsophagus, and several other comparatively unimportant organs, as the sternomastoid and other muscles. This may all be done, and has been done, but though illustrative of the daring, or, better, the recklessness of some modern surgeons, is not calculated to prolong the life of the patient or to impress the outside world with the safety of modern surgery. Certainly the operations are brilliant, but the statistics are lugubriously sombre and dark.

Discarding, therefore, all cases in which the extra-thyroidal structures are involved we will limit ourselves to a

few points connected with pure thyroidectomy, a systematic description of which is here unnecessary, since it is now a part of all surgical texts. Simple and straightforward as this operation might appear it must not be forgotten that the peculiarities of the growth, its size, etc., involve differences which vary in remarkable extremes. From the cases, as in the present, where the four nutrient arteries were readily secured, and all the hemorrhage was prevented by the use of four or five artery forceps, to the formidable operation described by Senn, as he saw it performed by Kocher of Berne (letter to *Journal of American Medical Association*, page 380, vol. ix, 1887), in which 60 or 70 artery forceps were needed, and the patient nearly collapsed from hemorrhage, or in the case related by McCormac (*British Med. Journal*, 1884, II, 229), in which no fewer than 100 ligatures were applied, there is quite a leap. Even in cases in which the conditions are apparently most favorable there may be room for a large supply of worry, as in a patient operated by Billroth (*Clinical Surgery*, 168, New Sydenham Society, 1881, quoted by Butlin), in whom a tumor, no larger than a hen's egg, was the cause of considerable anxiety to this eminent and most skilful surgeon.*

The accidents and special operative complications which are peculiar to thyroidectomy may be summed up in—(a) excessive hemorrhage; (b) suffocation; (c) entrance of air in veins; (d) accidental wounding of the œsophagus; (e) lesions of important nerves, especially the recurrent laryngeal and sympathetic, pneumogastric, even the hypoglossal, which was cut on one occasion by Maas, and was followed by subsequent lateral paralysis of the tongue.

As regards the first danger (hemorrhages) there is no doubt that primary ligature of the four leading thyroid trunks is the most positive method of securing the patient against it. But this "preventive ligature" (of Michel,

*I extirpated the tumor and found the operation one of the most difficult which I have ever performed. There was great difficulty in separating the tumor from the trachea and the deeper parts. The hemorrhage was very severe, and attacks of suffocation occurred, and she seemed several times during the operation on the point of death from asphyxia.

Heron, Watson, etc.) is not easily accomplished in very large tumors; in which case the tumor can best be removed by splitting it in two, as in the present case, by transfixing the isthmus with an armed needle and dividing it with a wire ecraseur, then peeling it off the larynx and trachea without involving the thyroid tissue proper. In extirpation for malignant goitre, in the smaller operable cases described above, the preliminary ligature should be, it appears to me, always feasible. If there are bleeding vessels, however, the artery forceps should avoid too much loss of blood.

In connection with the ligature of the inferior thyroids great caution should be observed not to ligate too liberally *en masse*, as the recurrent laryngeal will be almost certainly involved. The artery should be ligated at some distance from the thyroid, and as near as possible to the common carotid, as Kocher, Maas and Rotter have taught.

In ligating the inferior thyroids the excessive brittleness and thinness of these arteries, recently pointed out by Billroth (*Wiener Klinische Wochens.*, No. 1, April 5, 1888), should not be forgotten. It happened to him in three instances that this artery gave way, once when raising and isolating it with the grooved director, once when introducing the aneurysm needle, and on another occasion whilst tying the artery. In one of these instances he was obliged to divide the scalenus, behind which the artery had retracted, in order to clamp it.

A danger of equal if not greater importance is that of suffocation during the operation. This danger has been typically illustrated in my case, and the method of neutralizing it has been also satisfactorily illustrated by the tracheotomy which was performed. It has also been demonstrated that tracheotomy, when hastily performed under these circumstances, in which there is great displacement and distortion of the trachea, is fraught with great danger, and is in itself a formidable operation, especially if, as in our case, there are anomalous arterial trunks at the root

of the neck and intersecting the field of operation. The question, therefore, arises: should preliminary tracheotomy be regularly performed as a preventative? Rose has advocated its performance always for various reasons. But Kocher has met these reasons with valid arguments, and has furthermore urged that the tracheotomy wound renders the wound septic, and increases the post-operative dangers by the additional risk of septic broncho-pneumonia. Statistics are certainly against the indiscriminate and general application of Rose's method. Thus we find that out of Kocher's 43 last thyroidectomies (in 1883) 39 were performed without tracheotomy, and 39 recovered; 4 with tracheotomy, and 3 died. Billroth's 54 last cases (collected by Wœlfler) were divided into 45 without tracheotomy and 43 recoveries; 5 with tracheotomy and 3 deaths. It is certainly plain that tracheotomy must not be resorted to indiscriminately, but it is also equally plain that it is the patient's only salvation when suffocation is imminent. Furthermore, it appears to me in the light of my very limited experience, that in order to avoid the danger incurred in the hasty performance of this operation, that it should be the rule to begin the thyroidectomy for malignant disease *always* by exposing and denuding the trachea, preparatory to any emergency that might arise. Certainly prudence would counsel this course.

The entrance of air into veins with the characteristic sucking or whistling sound has been the cause of immediate death on the operating table. In a case of Wœlfler's, other patients reported by Schininger (of Freiburg), Kroenlein, Borel, succumbed in two or three days after the operation, and it is questionable whether they died solely of entrance of air into the circulation. A patient of Billroth's recovered after thrombosis of the internal jugular and the subclavian (A. Broca).

Wounds of the œsophagus are very rare, and the cases reported in which this complication occurred (four cases by Baum) were almost all inflicted during thyroidectomy for malignant disease.

We have already referred to the lesions of nerves which are liable to complicate this operation; but outside of the recurrent laryngeal no other nerves should incur the risk of injury in operations on the thyroid, for non-infiltrated malignant goitre. Reverdin, Kappeler and Bruns have noticed pupillary disturbances; and in consequence of wounds of sympathetic, Lücke, Maurer and Fisher have had to resect the pneumogastric, but this has only occurred in cases of thyroidectomy for malignant struma. We have referred to Maas, case of resection of the hypoglossal, followed by unilateral paralysis of the tongue.

The alterations undergone by the recurrent nerves after this operation are frequent, and have received various interpretations. There is no doubt that this nerve is divided occasionally in ligating or separating the inferior extremities of the thyroid lobes. In a total of 322 thyroidectomies collected by Liebrecht there were nine cases of certain section of the recurrents and four doubtful. A sharp paroxysm of cough notified Wagner that the recurrent had been irritated while operating on a case. An artery forceps had caught the nerve, and cough instantly ceased when the forceps was removed. Hamilton induced dangerous signs of suffocation while ligating *en masse* the inferior extremity of a thyroid lobe, and the threatened apnoea was immediately averted by untying the ligatures. Wælfler insists, when the section of the nerve is complete, on the *paralysis* of the epiglottis. This cartilage is deviated, as sumes an oblique position, and only imperfectly discharges its obturating function; hence, septic pneumonia from viscid deglutition (*Schluck Pneumonia* of the Germans). When the section is bilateral the aphonia is complete, a new and very grave phenomenon is added to the operation. It is an intense dyspnoea which caused the speedy death of two patients of Kappeler, and others of Maas and Richelot. According to Jankowski this complication necessitated tracheotomy in three cases. In addition to the laryngeal disturbances produced by mechanical irritation or division

of the recurrences, other peculiar phenomena, hoarseness, etc., have been attributed to the chemical irritation of these nerves by the antiseptic solution employed in irrigating the wound. J. L. Reverdin has especially called attention to this aspect of the subject, and his views, with those of others, will be found admirably summarized in A. Broca's recent and masterly article, "Thyroidectomie in the *Dict. Encycloped. des Sciences Medicales*," 1887, to which the reader is referred, and from which I have gathered many of the important facts previously presented.

As the immediate surgical complications of thyroidectomy we would simply specify septic infection, suppurative mediastinitis, septic pneumonia, and even secondary hemorrhage.*

* Nothing has been said of the special accidents which are peculiar sequela to the operation of thyroidectomy. The immediate complications above mentioned are more or less common to all operation wounds, the topography of the operative field causing the only differences. But there are other accidents which appear to be linked in a very specific manner with the suppression of the thyroid gland, and which other operations in the neck do not appear to cause. These phenomena may supervene almost immediately after the operation, viz.: cerebral disturbances (acute mania and tetany), and tardily as the cachexia strumipriva of Kocher (myxœdema, Ord, pachydermic cachexia, Charcot). The study of all these complications is highly interesting and instructive, but to consider them as they deserve would be out of place in the present communication. I cannot repress a few remarks, however, in regard to the relations of myxœdema with thyroidectomy for malignant goitre, as this complication has exercised such a revolutionizing influence on our physiological notions respecting the thyroid, and on the surgical treatment of its affections since its discovery by F. L. Reverdin in 1882, and by Kocher almost simultaneously.

The accumulated observations which have gathered since Reverdin's discovery tend only to confirm the belief that the thyroid is an active organ, discharging very important functions, and that its total suppression is liable to be followed by a general cachexia and mucoid deposits in the subcutaneous tissues, etc. The general tendency is at present to accept Horsley's theory that the thyroid is the organ chiefly interested in mucin metabolism. F. L. Reverdin (vide Guitera's Summary of the Diseases of the Thyroid Gland in Sajous' Annual for 1888) gives a late summary of the results obtained by different surgeons. Of ninety-five thyroidectomies recorded thirty were followed by surgical myxœdema. Trombetta of Messina, who has gone over the literature of the subject, finds a percentage of 27. On the other hand, no cases are reported from the Vienna clinic, and Bottini has operated on fifty-two cases without having a single case of surgical myxœdema. Still, and without attempting to explain these discrepancies, it suffices that a well established percentage of cases of thyroidectomy are followed by this very grave and fatal cachexia to cause surgeons to prefer always partial to total extirpation, when dealing with benign diseases of this gland, and this is no doubt the present tendency, especially since the technique has been so thoroughly perfected by Socin of Basle, the Reverdins, Hahn, etc.

These partial extirpations are as a rule free from the danger of myxœdema, as the remaining portion is adequate to discharge the functions of the whole organ. It can hardly be doubted that other lymphoid organs in the body (Thymus' amygdalæ, Peyers' patches, etc.), as Hale White's, Stogowitsch's, Fuhr's observations tend to prove, are capable of compensating for the loss of the thyroid; still the time needed for the establishment of this functional equilibrium has not been determined. Four months between the extirpation of the two lobes (Stokes of Dublin), and nine months in one of Kocher's cases, were not sufficient to prevent the appearance of the disease. The risk of myxœdema is therefore more to be dreaded after thyroidectomy for malignant disease than in the partial operation for benign growths, since in malignant goitre, if any radical operation is attempted, it must practically necessitate the complete removal of the whole gland. Furthermore, if the operation is performed at all, it is only justifiable in the early stages and it is plain that the economy will not have time to accustom itself to the gradual histological substitution of the thyroid tissue, and will, of necessity, be more liable to resent the removal of this organ.

Finally, we must now enter into a most important practical consideration: What are the immediate and permanent operative results of thyroidectomy for malignant disease? Nothing is more conclusive as to relative merits of the two operations—thyroidectomy for benign and the same operation for malignant disease of the gland. Nothing emphasizes more vividly the disastrous perils of the one and the comparative security of the other; nothing demonstrates better the inherent malignity of thyroid cancer and the comparative innocence of simple goitrous enlargement than the comparative statistics of the operation of extirpation for both affections—*i. e.*, the statistics illustrating the immediate operative results.

In regard to thyroidectomy for simple benign goitre we find that in 322 operations compiled by Liebrecht there was a general mortality of 7.92 per cent., and the results are still more satisfactory if we examine more recent collections. In 1883 Kocher led the van with 101 cases, with a mortality of 12.8 per cent. The 43 last operations performed, in the course of seventeen months, were accompanied by a net mortality of 9 per cent., and of 5.1 per cent. if only 39 pure benign goitres are considered. In 1885 the same surgeon again tells us that his last 70 cases were all operated *without* a single death! In 1882, 1883, Bottini performed 10 thyroidectomies, of which 8 were total extirpations, and without a death. (A. Broca, *loc. cit.*)

Now note the contrast in the immediate results of thyroidectomy for malignant disease. I will condense from the latest and most complete data gathered by Butlin in his excellent work already quoted (*op. cit.*, page 203). Very excellent information on this subject is afforded by three papers in three volumes of Langenbeck's Archives, xxiii (1879); xxviii (1883,) and xxxi (1885.)

The first is by Dr. Edmund Rose, the second by Dr. H. Braun, the third by Dr. J. Rotter. They may be regarded as supplementing each other, so far as the diagnosis and

treatment of cancerous disease of the thyroid is concerned. The total number of instances of removal of the disease in the third paper is fifty, of which thirty-four had been collected by Braun and sixteen by Rotter. *Thirty* of the fifty patients died of the effects of the operation, a mortality therefore of *sixty per cent.*(!) The fatal issue took place in the first twenty-four hours after the operation in eight cases; in from two to four days in ten cases; in from four to nine days in five cases; in from one to eight weeks in five cases. In two instances the exact period of death is not mentioned. The causes of death in many of the cases, not single, but multiple. For instance, dyspnœa, collapse, and the presence of secondary diseases—pneumonia, mediastinitis, and enlargement of the bronchial glands, whether cancerous or not—combined to produce death. The immediate deaths took place almost wholly from the severity of the operation, and those which occurred within two to four days after the operation were attributable to mediastinitis and septic poisoning. In two or three cases severe secondary hemorrhage occurred and proved fatal.

So much then for the immediate results of thyroidectomy for malignant disease. Now what is the showing in regard to the ultimate, final or radical cure of the disease after the operative ordeal? Again continuing with the same authority we find that "in the twenty cases which remain after deducting thirty fatal cases from the fifty which were treated by operation, there were two in which the operation was not completed and which really should be left out of account, except in so far as the fact should be mentioned that it was found necessary to abandon the operation in a certain number of instances. In three cases the further history was not known, and in one case the further observation only extended to a period of two months after the operation. In ten cases there was recurrence, which was either fatal or rapidly promised to be so. Only in four instances was a favorable result obtained. One of these was a patient treated by Bircher, who was known to be alive and

well eleven months after the operation. The second was operated on by Bruns. Some enlarged glands were removed a year after the first operation, and two and a quarter years later the patient died of inflammation of the lungs. The third case is of Maas, and was reported to be quite well nearly four years after the operation; and the fourth patient, also under the care of Maas, died at the end of twelve months of some affection of the lungs of uncertain nature.

In my own case the patient has thus far survived six months after the operation, but secondary tracheotomy was required one month after, owing to secondary involvement of the larynx; and it is not probable that the patient will survive many weeks longer, as the disease shows a manifest tendency to encroach deeper down into the trachea and bronchial glands.

Though these fifty cases compiled by the Germans do not represent the complete list of thyroidectomies for malignant disease, still it will be admitted that they quite adequately represent the status of the operative treatment of the disease under consideration. Furthermore, as Butlin observes, at least four-fifths of the cases in Braun's and Rotter's lists were treated within the last ten years—within the period, therefore, of modern antiseptic surgery. The statistics of operations for the removal of innocent tumors of the thyroid have improved steadily with improved surgery, but the same statement cannot be made with regard to the extirpation of cancerous tumors of the thyroid. Braun particularly draws attention to this, showing that the dreaded inflammations of the tissues of the neck and mediastinum only exceptionally occur, and that the real difference lies in the local relations of the malignant tumors, in the frequent affection of the cervical, mediastinal and bronchial glands, in the metastasis in different internal organs, and in the great difficulty in the diagnosis of malignant thyroid tumors generally.

The state of evidence in regard to this subject could not

be more fairly stated, and the final judgment could not be better expressed than in Butlin's language above quoted. It harmonizes with and endorses the position assumed and the conclusions adopted by the writer, who believes, as previously stated, that malignant disease should never be surgically interfered with unless the disease presents the limitations of strictly benign goitre—*i. e.*, that when positive signs of extra-glandular involvement are discovered that all operative measures should be of a purely *palliative* character; viz.: tracheotomy, section of the isthmus, ligation of the thyroid arteries (of very doubtful benefit), etc. Again, that even when the disease appears externally to be strictly encapsulated that a very thorough exploration by all means at our command should be made for the discovery of incipient secondary involvement of the neighboring organs; more especially the larynx, the involvement of which may be disguised by the mechanical disturbance of its functions, consequent upon extrinsic pressure, etc. And, lastly, that in all doubtful cases, a partial thyroidectomy be proposed to the patient with a view of settling the true nature of the growth by a careful histological examination of the excised portion; such treatment being as a rule curative of the goitre if benign, and permitting of an early and more complete extirpation by a final operation if malignant, though it is the writer's belief also that even a thyroidectomy for cancer under the most favorable operative circumstances will prove to be merely a palliative operation, as the very fact of its recognition as a simple enlargement will be coincident with at least its extra-glandular lymphatic dissemination.