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THE OPERATIVE STORY OF GOITRE

THE AUTHOR'S OPERATION

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The extirpation of the thyroid gland for goitre typifies, perhaps better than any operation, the supreme triumph of the surgeon's art. A feat which today can be accomplished by any really competent operator without danger of mishap and which was conceived more than one thousand years ago might appear an unlikely competitor for a place in surgery so exalted.

There are operations today more delicate and, perhaps, more difficult, but they have followed naturally and easily in the paths made clear for them. But is there any operative problem propounded so long ago and attacked by so many which has cost so much thought and endeavor and so many lives before its ultimate solution was achieved? And further, is there any problem in surgery having required for its solution such intrepid throbbing and prolonged striving of the world's greatest surgeons which has yielded results so bountiful and so adequate?

For thousands of years, probably, goitre has been a familiar malady. An unsightly and frequently fatal disease, it was accepted as an inoperable affliction or dispensation of Providence in communities where it prevailed, and paraded the streets exciting the curiosity of the populace in towns where it was unusual. The sufferers sought relief from suffocation, difficulty in swallowing, failure of the heart and from a distressing disfigurement. Thus this conspicuous tumor of the neck was a perpetual challenge to the physician, and to the surgeon a stigma as well.

My interest in the thyroid gland may be traced to the time, 40 years ago, when Wölfler was writing his classic monograph on *Die Entwicklung und Bau des Kropfes*.⁷⁰ Anton Wölfler, first assistant of Billroth and later professor of surgery in Prague, occasionally came to the laboratory in which I was working in Vienna in 1879 and 1880 to study my sections of the salmon, with reference to the development

and structure of the thyroid gland in the fish. I do not recall, however, having seen an operation for goitre in the clinic of Billroth, which I attended quite regularly.

From 1880 to 1886, the period of my surgical activities in New York, I neither saw nor heard of an operation for goitre, except that in one instance I assisted Dr. Henry B. Sands to extirpate a small tumor from the right lobe of the thyroid gland. The patient, a male, was operated upon in the sitting posture, with a rubber bag to catch the blood tied about his neck. We had only two artery forceps, all, probably, that the hospital afforded, and these were of the mouse-tooth or bulldog variety (Liston's).

In the autumn of 1887, at the suggestion of Dr. Welch, I began experiments on extirpation and transplantation of the thyroid gland in dogs, which resulted in the discovery, among other things, of the striking histologic changes which signify hyperplasia and hyperactivity of this gland and which apparently are identical with those usually found in Graves' disease. The knowledge thus acquired enabled us early to interpret the microscopic picture of the gland of exophthalmic goitre. The remarkable discoveries by Gley (1891-2)¹⁴¹ and Vassale and Generali (1896)¹⁴² of the vital importance of the parathyroid glandules stimulated afresh my interest in the surgery of the thyroid gland and suggested experiments in transplantation of the tiny epithelial bodies (Epithelkörperchen). From these experiments there resulted the general law that homografts of these glandules will not live, and that for the successful transplantation of autografts a considerable deficiency must be created. We made the startling and hardly believable observation that the life of a dog may be maintained by a particle of parathyroid tissue only one-quarter of a millimeter in diameter and extinguished by tetany on its removal.

In 1907 Mr. Herbert M. Evans kindly made at my request arterial injections of the parathyroid glandules, and from his and Dr. W. G. MacCallum's careful anatomical studies and my own surgical and experimental observations there resulted an operative procedure in our clinic which I have described on several occasions (1907,¹⁴³ 1911,¹⁴⁴ 1912¹⁴⁵), but perhaps too fragmentarily to attract attention. Inasmuch as we have been unable during the past 12 years to make any essential improvements in our operation, it occurred to me that it might now be well to describe it in greater detail and to give in outline the history of the development of the operation for goitre.

So far as possible I have let the story narrate itself in the words of the principal actors, those chiefly responsible for the operative progress. Surgical performances which seem not to have influenced the development of the operation have been in greater part merely recorded.

I wish to express my thanks and deep indebtedness to Colonel McCulloch and Dr. Fielding Garrison for their great courtesy and assistance. They have granted me very unusual privileges in the use of the Surgeon General's Library, without which and the *Index Medicus* it would not have been possible to conduct the investigation.

To my accomplished secretaries, Miss Stokes and Miss Hough, I can hardly emphasize sufficiently the extent of my obligations for their assiduous and intelligent support. And in the beautifully executed illustrations from the pencil of Max Broedel I have found constant pleasure and a stimulus.

Statistics on the subject of operations, performed the world over, for goitre have from time to time been compiled. The latest collection is Süskind's, who in 1877,¹⁴⁶ reporting 28 operations by Victor von Bruns of Tübingen, was able most favorably to compare his master's work with that of all others and justly to boast of the contributions which German-speaking nations had made to the list of operations for goitre as contrasted with those from the rest of the globe. He makes no mention of a very similar, but less fervidly patriotic paper by Bruburger¹⁴⁷ which antedated his own by about one year. The fundamental historical papers are a tract by Hedennus (Leipzig, 1822),¹⁴⁸ an admirable treatise by Mandt (1832)¹⁴⁹ of Greifswald, and a voluminous chapter by Günther (1864),¹⁵⁰ professor of surgery in Leipzig, in the fifth volume of his *Lehre von den blutigen Operationen am menschlichen Körper*.

HISTORICAL PAPERS

MANDT. *Der Kropf; Geschichte u. Exstirpation desselben*, Rust's Magazin f. d. gesamte Heilkunde, Berlin, 1832, vol. 37, pp. 390, 412, 413.

"The early story of goitre is voluminous, but very tangled. Traces of attempts to distinguish varieties are found with the ancients; later, however, and especially in the Middle Ages, scrofula and other diseases of the glands were confounded with it and synonymously treated. This error was continued until late in the eighteenth century.

"Only in recent, indeed very recent, times have the doctrines on the subject of goitre been put in order by the works of Kortum,¹⁵¹ Wichman,¹⁵² Webers (Monograph on Scrofula), Maas,¹⁵³ von Walther,¹⁵⁴

Hausleutner,¹⁸⁸ Mühlbach,¹⁸⁹ Hedenus,¹⁹⁰ especially Johannes Müller and others.

"I think it probable that Abul Casem Khalaf Ebn Abbas, usually named Albucasis, undertook about the year 330 * a genuine extirpation of goitre. He lived in Bagdad, was a bold and, one may say, venture some operator, and could the better hazard the operation because of the following experience: A 'homo ignarus' had attempted a similar operation, and the patient having nearly bled to death from an injured artery Albucasis knew very well how to control the hemorrhage by ligature and the hot iron."

G. B. GÜNTHER. In the fifth volume of that scholarly, voluminous, altogether remarkable and today almost unknown work, Günther's *Lehre von den blutigen Operationen am menschlichen Körper*, Leipzig, 1864, 5. Abtheilung, p. 369, the author records in chronological order abstracts of the first 41 cutting operations performed for the removal in whole or in part of "Struma lymphatica," the common form of goitre, covering the period from Celsus to 1861.

"We have used chiefly the treatise by Mandt in Greifswald, Rust's Magazin, vol. 37, p. 411, and that by Hedenus,† *Tractatus de gland. thyreoid.*, Lipsiæ, 1832, and, at the same time, corrected some errors which appear in these articles.

"According to Schreger, Celsus had already undertaken the extirpation of goitre. But it is clear from the text that in the chapter which Celsus entitles 'De Struma,' lib. vii, cap. 13, the author, in the use of this term, has not in mind a disease of the thyroid gland, but rather a swelling of the lymph glands. Of goitre proper he speaks in lib. vii, cap. 13, under the title 'De Cervicis Vitis.' Here he describes, unmistakably, cystic goitre, and says, after discussing the use of caustics, 'sed scalpellum curatio brevior est.'

"It is doubtful if the operation mentioned by Galenus, 'De Locis Affectis,' (lib. i, cap. 6) comes under this head. See Hedenus, *Tractatus de gland. thyreoid.*, Lipsiæ, 1832, p. 288.

* Gurlt (Geschichte d. Chirurgie, vol. i, p. 620) states: "The year of his (Albucasis') birth is unknown. Nevertheless, it is safe to say that he lived in the second half of the tenth century, since it is stated that he was the body physician of Caliph el-Hakim III (961-976). According to the latest investigations of Ledere (Gaz. hebdomadaire de médecine et de chirurgie, 1874, pp. 537, 569) the statements of the Arab chroniclers that he died in the 404th year of the Hejira, or 1013 of the Christian era, can be accepted as correct (in spite of the assertion of Mich. Casiri, 1766, who says that Albucasis died almost 100 years later, i. e., in the 500th year of the Hejira or 1106-7 A. D.). And if it is true, according to the account of Leo Africanus, that he lived to the age of 101 years, then he must have been born in the year 912 A. D." (W. S. H.)

† Hedenus, Augustus Guilhelm, not to be confounded with J. A. W. Hedenus whose operation for goitre is described later in this paper.

"According to Mandt in Rust's Magazin, vol. 37, p. 413; and Iangenbeck, Chirurgie, v, p. 306 (note), Albucasis is listed among those who performed this operation about the year 330. In the local library I have not been able to find any passages bearing on this.

"Paulus Aegineta, who lived 400 years later, evidently refers, like Celsus, to tumors of the lymphatic glands when he speaks of amputating strumas. Guy de Chauliac (1363) advocated the extirpation of goitre instead of treatment by 'sympathetical' means.

"Extirpation is next mentioned by Johannes de Vigo (1501 to 1512).

"Mandt, in Rust's Magazin, vol. 34, p. 414, states that Amatus Lusitanus about the year 1550 relates that an 'audax homo' excised small goitres, and thereby exposed the trachea. I therefore consulted the 1557 edition of the works of this author and found only two passages which could be construed as bearing on the extirpation of goitres. One is found in Centur. III, Curatio 56, p. 416, and is entitled 'De Strumis'; the other, in Centur. IV, Curatio 58, p. 597, and is entitled 'De Strumis Dictis Scrofulosis.' But one soon becomes convinced that by the former he means scrofulous abscesses, and by the latter swollen lymph glands.

"It is doubtful whether the accounts of Fabricius ab Aquapendente (1613) and of Marchetti (1664) relate to an extirpated goitre or to swollen glands.

"Joh. Jessen speaks also of an operation on a bronchocele, but he certainly alludes to a swollen gland. Dionis, in his *Cours d'opérations de chirurgie*, 4th edition, 1740, p. 639, after describing struma lymphatica, gives explicit directions for operation. After reading his description of the operation, one doubts whether the author really performed it or only witnessed it.

"According to the account of Mandt, there is an observation by Muralt which makes it seem very probable that an extirpation was accomplished. The communications of Wepfer (1727) and Wisemann probably relate only to the excision of lymphatic glands. I cannot find anything in Muralt and Wepfer bearing on this operation.

"On the contrary, Forstner, Fulvius Gherli (1710), Petit, Roonhuyzen, Hoin, and Conrad Ludwig Walther seem to have excised true goitres. Mandt credits also Joseph Warner. In the translation of the fourth edition, 1787, pp. 83 and 84, I have found only two cases which could possibly be considered under this heading. After reading the full description of these cases I am convinced that they were not goitres.

"Laurentius Heister, 1752, seems to have performed the operation several times, for he says in the second edition of his large *Chirurgie*, vol. ii, p. 659, that he has never found it necessary to use the red-hot iron on account of bleeding. He also describes, in detail, the operative procedure.

"Theden, *Neue Bemerkungen und Erfahrungen, etc.*, new edition, 1776, vol. ii, p. 108, tells of an operation performed by an unnamed physician, with happy result. Mandt speaks of this as a successful case; but it appears that he did not read it in the original, or he could not have alluded to it as an extirpation of an ordinary goitre, for it was clearly a cystic goitre out of which a piece was cut. Desault erroneously credits Theden with an extirpation on account of this operation. It also appears that the case of Kallschmid in Jena should not be counted among the extirpations. Theden says of this case that Kallschmid had operated on a similar tumor of the gland, but that the carotid artery ran through it, that this artery was cut in two and that the patient died on the operating table.

"In the *Dissertation* of Zartmann, p. 5, it is stated that Schmucker removed a portion of a goitre. This statement is incorrect. In the second volume of his miscellaneous writings, from which Zartmann quotes, the 23d Observation is entitled: 'Complete Cure of an Enormous Goitre by Dr. Sellin, Military Surgeon' (the case, therefore, does not belong to Schmucker). The operative procedure was in no respect an extirpation; it consisted in the opening and stretching wide of abscesses, caused by severe inflammation of the goitre, whereby, to be sure, the entire enlarged thyroid gland, which contained many bony fragments, by degrees came away.

"Richter in Göttingen did not venture to undertake the operation. Boyer declared himself against it, and Fodéré claims to have carried it out only in cases of scirrhus degeneration.

"According to Froiriep in Notizen, vol. vi, p. 336, the operation was practised in India.

"In the Dictionnaire des sciences médicales, vol. xviii, p. 555, several instances of extirpation of goitre are mentioned, but they certainly are not all vouched for, and indeed in part are improbable. We quote the following from this treatise:

"Fodéré asserts that this operation has been performed even by ignoramuses. It is known that intoxicated patients have cut out very large goitres without disaster; in other cases, they have accidentally been cut away without harm by the stroke of a sabre or a knife. Further, Paradis relates, 'It is narrated in a chronicle of Savoyen that a barber successfully removed a disfiguring goitre from his wife.' Fodéré tells of a courageous surgeon in Marseilles, Giraudy, who successfully removed two goitres."

Chronological List of All the Operations which Actually or in All

Likelihood have been Performed

"1. In the year 1596 an empiric attempted to remove a goitre in the case of a 10-year-old girl. She died under the operation, and the surgeon was imprisoned. Fabrici, Hildanus, vol. ii, p. 399; Fabrici, Hildanus, Opera, p. 216, Obs. 35; Langenbeck, Chirurgie, Bd. v, p. 306, footnote.

"2. Johann Heinrich Freitag in Zürich, about 1694; *Epistola de glandula thyreoidea, partim ossae, partim meliceridis formam referentis extirpatione*, Lipsiae, 1778; Weiz, *Neue Aussage aus Dissertationen für Wundärzte*, Bd. iv, p. 66; Langenbeck, Chirurgie, Bd. v p. 304.

"In a girl of 18 years Freitag extirpated, with success, probably half the thyroid gland. The tumor was almost the size of a goose's egg and could easily be dislodged up to the sternocleido-muscle. A deeply situated vessel, thought to be the right thyroid artery, was ligated. Langenbeck doubts that it was the thyroid gland. The fact that it was so easily movable is suspicious.

"3 and 4. (About 1770.) Benjamin Gooch, S. Cooper, Dictionary, vol. i, p. 301; Bell, System of Surgery, vol. v, p. 525; Richter Chir. Bibliothek, Bd. ii, Stück IV, p. 128; Langenbeck, Chirurgie Bd. v, p. 305, footnote; Dictionnaire des sciences médicales, t. xviii p. 555.

"In one case (3) such a severe hemorrhage occurred that the surgeon was obliged to stop in the middle of the operation. He was unable to control the hemorrhage by any means. The patient died eight days later. Gooch assisted at this operation.

"In the other case (4), after several fruitless attempts at ligation of the arteries, the severe hemorrhage was controlled by compressor day and night during eight days by persons alternating with each other at the task. Gooch should have performed this operation, but he declined. It was performed by another skilled surgeon.

"5. Adolph Friedrich Vogel, in his inaugural dissertation (*Observationes quaedam chirurgicae*), Kiel, 1771, reports this operation, but he does not say who performed it. If he had performed it himself he would certainly have said so. Peculiarities in the procedure were the circular incision employed in removing the tumor, and the ligation of the arteries leading into the thyroid gland by a common ligature. I have compared the *Observat. quaedam chirurg.*, Killian, 1771, quoted by Mandt, but have not been able to find this case.

"6. Desault excised successfully the greater part (so it is said in the text) of an enlarged thyroid gland in the year 1791.* Desault, Chir. Wahrnehmungen, 1794, Bd. v, p. 3. This is probably the case attributed to a Girault by Bernstein (*Handbuch der Chirurgie*, Leipzig, 1800, Bd. iv, p. 604). There are many errors in Bernstein.

"7. Another operation which Desault performed on a woman is described in the Dictionnaire des sciences médicales, t. xviii, p. 356. After beginning the operation the hemorrhage was so severe that he abandoned the attempt and contented himself with tying up the piece of gland which had been cut. The patient died subsequently of convulsions.

"8. In the time of Desault. Related by Parey in Strasburg. Rullier, Dict. des sci. méd., t. xviii, p. 504; Rust's Chirurgie, Bd. xv, p. 504.

* A complete report of this case is given under the chapter on France.

"In the case of Marquis A., Desault advised operation; Pary and Louis advised against it. The surgeon who had proposed the operation performed it with the assistance of two people whom he came across accidentally. The patient died from hemorrhage on the operating table.

"9. About 1800. Kergel, military surgeon of Saxony. Successful operation. He had to ligate 11 arteries. Bernstein Handbuch d. Chir., Leipzig, 1800, Bd. iv, p. 405; *ibid.*, 5. Aufl., 1818, Bd. i, p. 752; Langenbeck, Chirurgie, Bd. v, p. 305.

"10-15. J. A. W. Hedenus in Dresden (about 1800). Six times with good results.* Journ. von Walther und Graefe, Bd. ii, p. 236.

"16. Bonnet, surgeon in Clermont-Ferrand. Year unknown. Brun, *Dissertation inaugurale sur le goitre*, 1815, p. 16; Dict. des sci. méd., t. xviii, p. 564; Rust's Handb. d. Chir., Bd. xv, p. 504. The patient died from hemorrhage.

"17. Ohle, Prof. der Chir. Academie in Dresden. Successful. Hedenus, *Tractatus de gland. thyreoid.*, 1822, p. 291.

"18. Weiss in Dresden, successful. Hedenus, *l. c.*

"19. Dupuytren,† Jan. 1, 1808. Pelletan, Clin. Chirurg., vol. i, p. 215. Death after 35 hours. Seventh Obs., Paris, 1810; Dict. des sci. méd., t. xviii, p. 557; Rust's Handb. der Chir., Bd. xv, p. 504. Related in greater detail; Dupuytren, Clinique chirurgicale, t. i, p. 215, Obs. 7, Paris, 1810. Adelaïde Michon, *et.* 28. Jäger, Walther und Radius, Bd. vi, p. 548, give this case and case No. 33 of this article as one and the same, while the reference here given by Pelletan and the reference in case 33 taken from Froiery's Notizen is regarded as one and the same story. The two cases, to be sure, have many points in common, but the two operations were certainly performed in two entirely different periods.

"20. Langenbeck in Göttingen (year unknown). Langenbeck, Chirurgie, Bd. v, p. 303.

"Since Langenbeck in the very full chapter on 'Struma,' declares himself, on the whole, more against than in favor of the operation, and also gives only very general rules for the same, one would doubt that he had himself operated if he had not said explicitly in Ann. 3: 'At the extirpation which I accomplished I found not the least difficulty in ligating the arteries.' I have not been able to find out anything about the result.

"21. 1820, Graefe in Berlin, Jan. 19. Hedenus, *Tractatus de gland. thyreoidae*, Lipsiae, 1822, p. 276; Journ. von Walther und Graefe, Bd. ii, p. 388. He had some time previously ligated the thyroid artery and removed only the greater part of the gland. Fifty-three arteries were ligated. The result was good.

* Paper of Hedenus is abstracted in chapter on Germany.

† For abstract see chapter on France.

"22, 23. Graefe. Hedenus states (*l. c.*, p. 292) that besides the above-mentioned case, Graefe has twice performed the operation successfully.

"24. Eichenberg, a Swiss, extirpated the gland without excessive bleeding. It is, however, doubtful whether this was the thyroid gland, although he asserts that after the operation the larynx and the trachea were exposed. Ephemerid. med. physic. germ. acad. Naturcurios., Dec. ii, Ann. v, p. 453; Langenbeck, Chirurgie, Bd. v, p. 304.

"25. Klein* in Stuttgart, Journ. von Graefe und Walther, Bd. i, p. 120, undertook the operation in a boy of 15 years (1815). The patient died directly after the operation.

"26. Klein. On p. 130 he tells of a second operation, but it is doubtful if he extirpated the thyroid gland. He had only three arteries to ligate. The patient lost his voice during the operation, and developed great difficulty in swallowing. These symptoms disappeared very slowly after the ligatures came away.

"27. Klein. The third operation was performed on a man aged 26 years (p. 133). A very severe hemorrhage occurred, but the patient recovered, nevertheless.

"28. Hermann Schmidt in Paderborn. Zartmann, *Dissertation* p. 26.

"29. Roux. Took out half the gland. Death. *Ibid.*

"30. About 1829, Green, at St. Thomas's Hospital. Extirpation of the right lobe in Maria Gale, *et.* 24, on May 22. Death June 6. The Lancet, No. 302; Froiery's Notizen, Bd. xxv, p. 95.

"31. May 21, 1829. Walther. Removed half the gland. Patient Catherine Rath, *et.* 28. Recovery. Chir. Handwörterbuch von Walther, Jäg. u. Rad., Bd. ii, p. 542; Zartmann, *Dissertation*, p. 26.

"32. Aug. 11, 1829. Walther. Removed half the gland. Patient Elsie Hartung, *et.* 34. Recovery. Chir. Handwörterbuch von Walther, Jäg. u. Rad., Bd. ii, p. 542; Zartmann, *Dissertation*, p. 22.

"33. About 1831. Nov. 22. Dupuytren. Froiery's Notizen, B. xxix, p. 141. Girl of 12 years. Death the next day at 3 a. m.

"34. About 1832. Mandt in Greifswald. Patient Charlot Schneider, *et.* 34. Recovery. Rust's Magazin, Bd. xxxvii, p. 387.

"35. About 1834. Professor Franke in Leipzig, with the assistance of Professor Bock. Verbal report.

"36.† March 26, 1835. Roux. Operated on Girard Gourvain, a 22. Forty-seven ligatures were applied. The operation lasted 12 hours. Arch. génér., 1836; Schmidt's Jahrb., Bd. xi, p. 58. Detail with full autopsy account; Oppenheim, Zeitschrift ii, p. 519. Shc account. Death after two days.

* For full account see chapter on Germany.

† Abstracted in chapter on France. Interesting because the patient was ensected while dying from result of hemorrhage at the operation. Ve section was not infrequently practised on exsanguinated patients.

"37. 1844-1846. Reported by Madelung in Gotha. Probable Recovery. Aerztlicher Verein in Gotha, 1844-46; Schmidt's Jahrb., Bd. lvi, p. 279.

"38. Bruns in Tübingen. Deutsche Klinik, 1859, p. 145, Fall 3. Gurlt, Jahresbericht von 1859, p. 186. Successful.

"39, 40. About 1861. Züricher Krankenhans. Struma lymphatica twice successfully extirpated. Deutsche Klinik, 1861, p. 167.

"41. N. Pirogoff. Rapport médical d'un voyage en Caucase et St. Petersburg, 1849; Schmidt's Jahrbücher, Bd. lxxvii, p. 117. In a girl of 17, with the administration of ether. The middle lobe was the size of a goose's egg and pressed on the trachea. Thirty arteries were ligated. Operation lasted half an hour. Result not stated.

"42. R. V. A. Schmidt tells of the extirpation of a goitre in a horse with the ecraseur. Cure. Reported by Falke in Jena. Schmidt's Jahrb. Bd. cix, p. 346."

Thus the story is carried by Günther to 1861. He collected 41 cases, but overlooked 65 (France, 17; Italy, 13; Great Britain, 12; United States, 8; Germany, 15), operated upon prior to this date, which are abstracted in our tables. Many of these cases were, however, published in journals to which Günther hardly could have had access; and some were merely ligations of thyroid arteries which Günther did not attempt to collate. Most important, perhaps, of the omitted cases are Nathan R. Smith's (1835)²²³ and E. S. Cooper's (1860).²²⁴ The operations prior to 1861 were chiefly resections of portions of the gland or enucleations of more or less circumscribed nodules or ligations of one or two thyroid arteries. There were, however, several remarkable lobectomies which will be considered later under the geographic headings.

Operations Prior to 1861 Not Tabulated by Günther

FRANCE

Nélaton: Bull. soc. anat. de Paris, s. 3, i, 100.

Blandin: Ferrus, Dict. de méd. ou répertoire gén. des sci. méd., Paris, 1836, 2^e éd., xiv, 181.

Voisin: Gaz. méd. de Paris, 1836, s. 2, iv, 372.

Bach: Hirtz, Gaz. méd. de Paris, 1841, s. 2, ix, 9.

Rigal, R.: Bull. gén. de therap., méd. et chir., Paris, 1841, xxi, 224. Ballard: Arch. gén. de méd., Paris, 1846, s. 4, xi, 222.

Roux: Petit, Bull. soc. anat. de Paris, 1848, xxiii, 205.

Bégin: Bull. de l'acad. nat. de méd., Paris, 1849-50, xv, 1110.

Roux: *Ibid.*, p. 1106.

Sédlitot: 3 cases, *ibid.*, p. 1132.

Cabaret: Gaz. méd. de Paris, 1850, s. 3, v, 710 (communiqué par Dr. Velpeau).

Alquié: Annales cliniques de Montpellier, 1854, ii, 222. Also reported by Barbin, Thèse de Montp., 1854, p. 26.

Dunglas: Gaz. méd. de Paris, 1856, s. 3, xi, 129.

Chassaignac: Foucart, La France méd. et pharm., Paris, 1860, vii, 284

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Porta, L.: Delle malattie e delle operazioni delle ghiandola tiroidea Milano, 1849. Articolo II, Cura chirurgica, p. 135.

Ibid., p. 135.

Ibid., p. 136.

Ibid., p. 139.

Ibid., p. 149.

Ibid., p. 150.

Ibid., p. 151.

Ibid., p. 152.

Ibid., p. 153.

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Brodie: Lancet, Lond., 1832, ii, 314 and 479.

Liston, R.: Wilson, W. J. E., Brit. Ann. Med., Pharm., etc., 1833, i, 11.

Lancet, Lond., (1839-40), 1840, ii, 31.

Lancet, Lond., 1841, i, 691.

Lectures on the operations of surgery, with numerous additions by Thos. D. Mütter, Phila., 1846, 320.

Ibid., p. 321.

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Harris, C. (1807): Gross, S. D., A system of surgery, Phila., 1882, 6th ed., ii, 354.

Mott, V.: "Early in his professional life." *Ibid.*

Jameson, H. G.: Amer. Med. Recorder, Phila., 1822, v, 116.

Smith, N. R.: North Amer. Arch. Med. and Surg. Sci., Balto., 1835, ii, 309.

Hoyt, O.: Bost. Med. and Surg. Jour., 1847, xxxv, 297.

Olis, G. A.: Virginia Med. and Surg. Jour., Richmond, 1845, ii, 115.

Toland, H. H.: Pacific Med. and Surg. Jour., San Francisco, 1838, i, 53.

Cooper, E. S.: Cine. Lancet and Observer, 1860, iii, 15.

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Schnu: Wien. med. Wochenschr., 1859, ix, 641, 657 (three cases); *ibid.*, 1860, x, 145.

Klein: Dissert., Tübingen, 1860, 30.

Meek: Med. Corresp.-Bl. d. württemb. ärztl. Vereins, 1861 (four cases).

At this juncture we may, opportunely, quote the views, current at the time (the middle of the nineteenth century), of a few of the world's leading surgeons on the subject of operating for goitre.

The Operative Story of Goitre

ROBERT LISTON.* *Lectures on the operations of surgery, and diseases and accidents requiring operations.* With numerous additions by Thomas D. Mütter, Philadelphia, 1846, p. 318.

"It has been proposed, again, to cut these tumors out, and son surgeons have ventured upon that, but the result has not been at a satisfactory. You could not cut the thyroid gland out of the living body in its sound condition without risking the death of the patient from hemorrhage; and when that body has become hypertrophied an immense extent, and all the veins and arteries are enormous enlarged, you can easily understand what dangers may arise from an attempt of the kind. Look at the foregoing sketch, and think of the dangers that must encompass you on all sides, and you will pause before undertaking such a task as the extirpation of the thyroid body. It is a proceeding by no means to be thought of."

JOHANN FRIEDRICH DIEFFENBACH.† *Die Operation des Kropfes Die Operative Chirurgie.* Leipzig, 1848, vol. ii, pp. 331 and 340.

"The operation for goitre is one of the most thankless, most perilous undertakings, which, if not altogether prohibited, should at least be restricted to certain varieties of the malady."

* Robert Liston (1794-1847) was a pupil of Sir William Blizard (in 1816 who was the first to ligate the superior thyroid artery (publication 1811); he taught anatomy with Syme, his younger rival; was a member of the Council of the Royal College of Surgeons, F. R. C. S., 1841.

Obituary notice, London Times, Dec. 20, 1847 (Dictionary of National Biography): "Liston's claim to remembrance is based upon the marvelous dexterity with which he used the surgeon's knife, and upon the profound knowledge of anatomy which enabled him to operate successfully in cases from which other surgeons shrank. Lying at a time immediately antecedent to the introduction of anesthetics, he appears to have attained to a dexterity in the use of cutting instruments which had probably never been equalled, and which is unlikely to be surpassed. When chloroform was unknown it was of the utmost importance that surgical operations should be performed as rapidly as possible. Of Liston it is told that, when he amputated, the gleam of his knife was followed so instantaneously the sound of sawing as to make the two actions appear almost simultaneously and yet he perfected the method of amputating by flaps."

† "Die Operation des Kropfes ist eine der undankbarsten, lebensgefährlichsten, und wenn auch nicht ganz aus der operativen Chirurgie verbannt, doch nur auf gewisse Kropfformen zu beschränken.

"Wenn wir nun alles, was wir aus den Werken der Schriftsteller über die Operation grosser, gleichmässig harter, oder selbst scirröser Kröpfe wissen, nochmals überblicken, so müssen wir mit Schauern an die tollkühnen Unternehmungen denken."

"If, now, we again review all that we know from the writings of authors concerning operations upon large, uniformly hard or indeed scirrhus goitres, we can only regard with tremendous aversion these foolhardy performances."

SAMUEL D. GROSS. *A system of surgery*. Philadelphia, 1866, 4th ed., vol. ii, p. 394.

"When the tumor resists our curative efforts, and endangers suffocation, it has been proposed to afford relief by extirpation; but the question arises, is such a procedure proper or justifiable? In a word, can the thyroid gland, when in a state of enlargement, be removed with a reasonable hope of saving the patient? Experience emphatically answers, no. This conclusion is not invalidated by the fact that the operation has, in a few instances, been successfully performed. By no means. It only proves that an undertaking may occasionally be accomplished under circumstances apparently the most desperate. What has once been effected may be effected again. But no sensible man will, on slight considerations, attempt to extirpate a goitrous thyroid gland. If a surgeon should be so adventurous or foolhardy as to undertake the enterprise, I shall not envy him his feelings while engaged in the performance of it, or after he has completed it, should he be so fortunate as to do this. Every step he takes will be envied with difficulty, every stroke of his knife will be followed by a torrent of blood, and lucky will it be for him if his victim live long enough to enable him to finish his horrid butchery. Should the patient survive the immediate effects of the operation, if thus it may be called, death will be almost certain to overtake him from secondary hemorrhage, or from inflammation of the cervical vessels, esophagus and respiratory organs. When the tumor is large, the wound is of frightful extent, involving all the most important and delicate structures of the neck, and rendering it altogether improbable, from the constant motion of the windpipe and esophagus, that much of it will unite by first intention. Thus, whether we view this operation in relation to the difficulties which must necessarily attend its execution, or with reference to the severity of the subsequent inflammation, it is equally deserving of rebuke and condemnation. No honest and sensible surgeon, it seems to me, would ever engage in it."

JOHN E. KRICHSEN. *The science and art of surgery*. American edition. Philadelphia, 1873, vol. ii, p. 367.

"I have more than once been tempted to remove large, pendulous, pedunculated bronchocèles, but close examination has satisfied me in all cases that the pedicle of the tumor was so vascular, containing large arterial and venous branches, and so intimately connected with the sheath of the carotid, stretching under the sternomastoid, which was expanded over it, that no operation could be safely undertaken.

In the event of its being thought desirable to operate, the better plan would be, after exposing the tumor by a straight incision, to enucleate it as much as possible with the handle of the scalpel, ligaturing carefully all the vessels divided as they were cut."

THE BILLROTH. *Geschwülste der Schilddrüse*. Chirurgische Klinik, Zürich, 1860-67. Berlin, 1869, p. 179.

Billroth, in 1869, having performed 20 extirpation operations for goitre with eight deaths, writes:

"To him who has had little practice in these operations it can easily happen that he removes the entire half of the gland instead of merely the tumor, whereby the operation becomes very complicated and more dangerous. The extirpation of the entire gland is not so exceedingly difficult and can be accomplished without great bleeding; but whether human beings can survive it has not yet been determined."

The deaths following Billroth's operations were due to infection, only one patient dying of "collapse" (hemorrhage?).

The views of other surgeons will appear later in the pages devoted to their contributions.

BRUBERGER. *Ueber die Exstirpation des Kropfes, nebst einem geheilen Fall von Totaderstirpation einer grossen, mit breiter Basis aufsitzenden Struma hyperplastica und stichischen Bemerkungen*. D. militärärztl. Zeitschr., Berlin, 1876, Jahrg. 5, p. 447.

In 17 pages Bruberger condenses the story of the surgical treatment of goitre from 1785 to 1876. The important work of Günther he undoubtedly overlooked, as no mention is made of it. For the extirpations from 1785 to 1845 he accepts Brière's collation from Schmidt's Jahrbücher (*l. c.*). From 1845 to 1876 the study is original and possibly furnished to Siskind material for his monograph of the following year.

A very creditable and successful case of Küster's, which Bruberger publishes in detail, gave the incentive for his work. A "total extirpation" in a difficult case was performed by Küster in the Augusta Hospital, Berlin, on May 4, 1875. In January and May of the following year the patient was examined by Bruberger, who found him in perfect health and with voice unaffected. In the strict sense of the term this operation of Küster's was probably not a total extirpation, for I note that the broad base or pedicle of each lobe was perforated in several places and tied off in masses. Had no thyroid tissue been left to the patient it is more than likely that such a procedure would have

caught the recurrent nerve and probably have cut off the circulation of the parathyroid glands. As there was neither tetany nor cachexia strumipriva nor laryngeal paralysis, it is probable that the patient (male, *æt.* 18) was not entirely deprived of his thyroid gland.

Bruberger tabulated 124 cases. In 82 it could not be determined that anything more than the "goitre" had been excised; of these patients, 28 died and 54 recovered.

"In 17 cases," he writes, "the entire degenerated gland was certainly removed; of these only two died. In 25 cases it is expressly stated by the authors that only degenerated portions were removed; of these, five died.

"The mortality from goitre-extirpations, according to the published reports, amounts to 29 per cent."

In Bruberger's table the 17 total extirpations are assigned as follows: Lücke, 2; Greene, 3; Watson, 6; Kocher, 2; Hopmann, 1; Michel, 1; Dupuytren, 1; Roux, 1.

By reference to the notes which we have made of these cases from the original sources I am convinced there is no evidence that the entire thyroid gland was removed in any one of them except Kocher's. Sick's²⁰⁰ case is regarded by Bruberger as a partial extirpation. This is probably an error, for from Sick's description of the operation it seems quite certain that the entire gland was removed; furthermore, the patient developed symptoms of thyroid privation—the *first recorded case of status thyreoprivus*.

It would indeed be strange if 17 complete extirpations had been accomplished by the comparatively rough methods of the earlier, relatively inexperienced, surgeons without resultant tetany or cachexia strumipriva or injury to the recurrent nerve, when later operators with vastly greater experience and better technical equipment had such disastrous sequelæ from their total excisions. Thus Kocher, in 1883,²⁰⁰ states that of 18 patients, out of 34 with total excision who returned for examination, only two were free from the symptoms of cachexia strumipriva. In three of Milknicz's total excisions (1886)²⁰⁰ of the thyroid gland, tetany occurred; and in one of the cases of tetany, cachexia strumipriva developed later.

In 1883 Weiss²⁰⁰ reported eight cases of tetany from Billroth's clinic; he does not, however, give the number of Billroth's total lobectomies at that time. But the previous year Wölfler²⁰⁰ reported these as 22, with two post-operative deaths.

Notwithstanding much speculation on the subject by various authors, it has not been made clear why Kocher's cases of cachexia strumipriva should have been so free from tetany, nor why Billroth's total extirpations should have been so frequently followed by tetany and should have so seldom manifested symptoms of thyroid deprivation. I have pondered this question for many years and conclude that the explanation probably lies in the operative methods of the two illustrious surgeons. Kocher, neat and precise, operating in a relatively bloodless manner, scrupulously removed the entire thyroid gland, doing little damage outside of its capsule. Billroth, operating more rapidly and, as I recall his manner (1879 and 1880), with less regard for the tissues and less concern for hemorrhage, might easily have removed the parathyroids or at least have interfered with their blood supply, and have left fragments of the thyroid. Surprising, however, is the fact that the function of the parathyroids was so seldom interfered with by Kocher, notwithstanding his careful procedure; for these little bodies were entirely disregarded by surgeons until years after the discoveries of Gley (1891)²⁰⁰ and Vassale and Generali (1896).²⁰⁰

Bruberger writes: "Besides Lücke, who, quite beyond question, ranks first as authority in the province of the surgical treatment of goitre, and who as early as 1870 declared himself in favor of excision, there are several surgeons who, very recently, have rendered conspicuous service in matters pertaining to the technique of goitre-extirpation. These are the American Greene, the Englishman Watson, our German fellow-countryman Kocher and the Frenchman Michel. In the preceding pages, I have furnished proof that the surgical authorities of all countries have almost up to the present time contributed to the placing of a ban upon the excision of goitre; it is therefore permissible to point out, in connection with the above names, that the voices which now are asking that this adverse verdict be set aside are from Germany, England, France and America, and, accordingly, that the reintroduction of goitre-extirpation as an operation which is justifiable and deserving of a place of honor has international support.

"Watson practises the following original method, which he has had opportunity to test in six cases: He divides the soft parts by a long incision in the midline, passes the index finger round the upper and lateral edge of the struma and carries a threaded aneurism-needle beneath the gland from the middle of the upper to the middle of the lateral edge. When this thread is tied, about one-fourth of the vessels leading into the gland are shut off. In the same way the needle is passed three times beneath the remaining quarters of the gland, and after all the threads are tied, the tumor is severed from its connections by means of curved scissors.

"Greene divides his procedure, which he has practised in three cases, into four operative acts: (1) Exposure of the struma by a long, straight incision, avoiding any wounding of the tumor or of its fascia; (2) division of the fascia of the tumor on the director; (3) retraction of the fascia and enucleation of the tumor with the fingers and the handle of the scalpel—disregarding the bleeding; the operator advances quickly to the base in order to compress the thyroid arteries; (4) transfixion and double ligation of the pedicle.

"Kocher, who has already reported 13 cases of goitre-extirpation—among them two cases of cure by total extirpation—practised in four cases the enucleation described by him."

Thus, with generous courtesy, Bruberger divides the honors of the early triumphs in the surgery of the thyroid gland almost equally between Germany, England, France and America, mentioning after Lücke, the name of one surgeon for each country—Kocher for Switzerland, Watson (Edinburgh) for England, Michel for France and Greene for America; and this, too, at a time when for Germany he might have mentioned, among many, the names of Hedenus, von Walther, von Bruns and Billroth, and probably could not from his knowledge have credited America with any one besides Greene, nor Great Britain with any one except Watson. The names of Desault, Dupuytren and Sédillot for France he should not have overlooked. Süskind, truer to the facts, waves ardently, a year later, the colors of his country.

ADOLF SÜSKIND. *Ueber die Exstirpation von Strumen*. Inaugural-Abhandlung, Tübingen, 1877.

Süskind continues the operative story introduced so comprehensively by the scholarly Günther and carried by him from the beginning of the Christian era to the middle of the nineteenth century. He makes no mention of Bruberger's paper of the preceding year.

The contrast between the adverse sentence visited by surgical authors with few exceptions upon extirpation strumae and the favorable results obtained by Victor von Bruns in the surgical clinic at Tübingen gave Süskind the incentive to submit to critical review the cases theretofore published. For the history of the earlier period he makes due acknowledgment to the work of Günther (*l. c.*), and to Michel (1873)²⁴ for his collection of cases operated upon in France. Quite justly he makes the claim that from the end of the eighteenth century to the date of his thesis (1877) the operative work upon the thyroid gland was performed chiefly by German surgeons. Notwithstanding this,

BRUBERGER'S STATISTICAL SUMMARY OF GOITRE-EXTIRPATIONS TO 1876

Operator	No. of cases	Cured	Died	Total extirpations of whole thyroid gland	Partial extirpations (whole gland not affected)	References
Operations, 1785-1845.....	29	18	11	....	....	Schmidt's Jahrbücher, collected by Brière.
Walther	2	2	..	....	....	Zartmann: De Strumae extirpat. Dissertation, Bonn.
Bruns.....	5	3	2	....	....	Werner: Chir. Behandl. d. Strumen. Dissert., Tübingen, 1853.
Emmert.....	3	2	1	....	3	Klein: Behandl. der Strumen. Dissert., Tübingen, 1860.
Billroth.....	20	12	8	....	....	Brière: Du traitement chirurgical des goitres parenchymateux. Lausanne, 1871. (Cases 10, 11, 12.)
Middeldorpf.....	1	1	..	....	....	Billroth: Chir. Erfahr., Zürich, 1860-67.
Schuh.....	4	4	..	....	....	Lebert: Krankh. d. Schilddrüse. Wien. med. Wochenschr., 1859, 60.
Lücke.....	9	8	1	2 (cured)	7 (1 death)	Lücke: Chir. Klinik in Bern, Brière, <i>l. c.</i> , Cases 1-9.
Greene.....	3	3	..	3	....	Amer. Journ. Med. Sci., Jan., 1871.
Watson.....	6	5	1	6 (1 death)	....	Edinb. Med. Journ., 1873, p. 252; Brit. Med. Journ., 1875, Sept. 25.
Kocher.....	13	11	2	2 (cured)	....	Methode d. Exstirpatio Strumae nebst Bericht über 13 Fälle. D. Zeitschr. f. Chir., Bd. iv.
Kappeler.....	5	5	..	....	....	Bericht aus dem Spital Münsterlingen, 1874.
Sick.....	1	1	..	....	1 (cured)	Württemberg. med. Correspondenzbl., 1867, No. 25.
Hofmockl.....	2	1	1	....	2 (1 death)	Wiener med. Presse, 1869, No. 2, 3, u. 4.
Blackman.....	1	1	..	....	1	Amer. Journ. Med. Sci., 1870, Jan.
Hopmann.....	1	1	..	1	..	D. Zeitschr. f. Chir., 1872, Bd. ii.
Holmes.....	1	..	1	....	1	Amer. Journ. Med. Sci., Jan., 1873.
Billroth.....	3	2	1	....	3 (1 death)	Chir. Klinik in Wien, 1869 u. 70, p. 130.
Michel.....	1	1	..	1	....	This and the following cases are taken from a paper by Michel in which the cases in French literature are assembled.
Desault.....	3	1	..	....	2 (1 death)	Gaz. hebdom., 1874, No. 44 et 45.
Dupuytren.....	2	0	2	1 (died)	1 (died)	
Roux.....	2	1	1	1 (cured)	1 (died)	
Sédillot.....	3	3	..	....	3	
Bégin.....	1	..	1	....	....
Cabaret.....	1	1	..	....	....
Blandin.....	1	1	..	....	....
Brun.....	1	..	1	....	....
Percy.....	1	..	1	....	....
	124	88	36	17 (2 deaths)	25 (6 deaths)	

the general verdict among them at the time of Siskind's publication was decidedly against these performances which in great measure had resulted disastrously.

Siskind writes:

"At the end of the eighteenth century when the operation was celebrating in Germany its first triumphs it was emphatically condemned in France* by all the members of the influential Academy of Surgeons of Paris except Desault,† who, according to Günther and Michel (*l. c.*), is the first French surgeon to whom is accredited the excision of a struma."

Siskind, evaluating operations upon the thyroid in terms of failure and success, writes:

"Günther in the above-cited work gives 37 cases of extirpation of solid strumas which, up to the middle of this century, he found recorded. Of these 37 cases 17, nearly one-half, ran a fatal course. Gurt in his monograph *Ueber die Cystengeschwülste des Halses* (Berlin, 1855) enumerates 10 cases of extirpation of cystic goitres, of which, as Klein has remarked in his dissertation, three should not be regarded as extirpations. There remain, accordingly, seven extirpations of cystic goitres, one with fatal result. The total number of extirpations up the year 1850 is 44; of these 18 ended fatally—mortality 40.9 per cent. Of the operations since this time (1850) there were performed

By Germans 97 extirpations with 20 deaths,
By Americans† 7 extirpations with 3 deaths,
By Englishmen 12 extirpations with 0 deaths,
By Frenchmen 2 extirpations with 0 deaths,
accordingly a mortality of 19.4 per cent.

"Of the various operators Bruns has extirpated the greatest number of strumas:

Bruns 28, with 6 deaths,
Billroth 20, with 8 deaths,
Kocher 13, with 2 deaths,
Kappeler 5, with 0 deaths,
Chelius 5, with 1 death,
Meeh 4, with 0 death.

* It was also condemned in Germany, by most surgeons, even three-quarters of a century later.

† Desault (*l. c.*) operated upon two cases—in one of them successfully (*vid.* Table I, France).

‡ Siskind's figures for England, France and America are far from complete. By reference to my tables it will be seen that up to 1877 there had been in America 30 operations with five deaths; in England 39, with nine deaths; and in France 30, with 10 deaths.

The Operative Story of Goitre

"Comparing the mortality figures of the extirpations made 1 and after the middle of this century, we find:

"1. That the mortality from the operation in the past 25 years decreased by one-half.

"2. That the extirpation of strumas is not only not more dangerous than other major surgical procedures, but indeed offers greater chance of success than many dangerous, but nevertheless approved operations such as high amputation of the thigh, resection of the hip-joint, ti-culation of entire limbs, ovariectomy.

"As far as I have been able to discover, the following are the cases of extirpation of goitre which have been published since the middle of this century:

"To begin with Werner recorded in 1853, in his dissertation ten under the presidency of Professor von Bruns (*Ueber die chirurgischen Behandlung von Strumen*), a successful case operated by Prof. Bruns, describing at the same time the customary procedure followed in the Tübingen surgical clinic, in which were employed possible precautions against hemorrhage in this operation.

"To this case are added the following, according to date of publication:

- "1859 3 cases by Schuh in Vienna (Wien. med. Wochenschr. 1859, pp. 641 and 657).
- "1860 1 case by Schuh (Wien. med. Wochenschrift, 1860, p. 3 cases by Bruns in Tübingen (dissertation by K. Beitrag zur chir. Behandlung der Strumen, 1860).
- "1861 1 case of extirpation, begun but not completed, is not counted. 4 cases by Meeh in Brackenheim (Med. Corr.-Bl. für tennb. ärztl. Ver., 1861, Nr. 29).
- "1862 1 case by Middelndorf in Breslau (cf. Lebert, Krankheitsgeschichte, p. 221).
- "1867 1 case by Sick in Stuttgart (Med. Corr.-Bl. für würt. ärztl. Ver., 1867, Nr. 25).
- 1 case by Gärtner in Stuttgart (Med. Corr.-Bl. für würt. ärztl. Ver., 1867, Nr. 40).
- "1868 20 cases by Billroth, at that time in Zürich (Billroth, Klinik in Zürich, 1860-67).
- "1871 9 cases by Lücke, at that time in Bern (cf. dissertation Brière: Du traitement des goitres parenchymateux en particulier de leur extirpation, Lausanne, 1871).
- 3 cases by Emmert in Bern (*ibid.*).
- 5 cases by Kappeler in Münsterlingen (Chir. Beobachtungen aus dem Thurgauischen Cantonsspital Münsterlingen, 1865-70).

* In Germany, Switzerland and Austria.

"1874 1 case by Hopmann in Cologne (Deutsche Zeitschrift für Chirurgie, Bd. ii).
5 cases by Chelius in Dresden (cf. Jahresbericht der Gesellschaft für Natur- und Heilkunde in Dresden, Oct., 1873, Mai, 1874).

"1875 13 cases by Kocher, at that time in Bern (cf. Deutsche Zeitschrift für Chirurgie, Bd. iv).
2 cases by Gärtner in Stuttgart (Med. Corr.-Bl. für württemb. ärztl. Ver., 1875, Nr. 29).

"1876 1 case by Gärtner in Stuttgart (Med. Corr.-Bl. für württemb. ärztl. Ver., 1876, Nr. 3).

"In addition to the 70 cases in the German literature published since the middle of this century, 23 other cases of goitre extirpations should be added. These patients were operated on by Professor von Bruns between 1861 and 1876 in the Tübingen surgical clinic. I propose to assemble these cases, together with the remaining cases of goitre extirpation made since the middle of this century (as far as I have been able to find accurate description in the literature available to me) in a tabulated review, and then to run over them for the results of the operation (mortality, dangers and indications), and describe in more detail the operative technique, especially that customarily employed at the Bruns clinic.

"In closing I shall add some especially instructive clinical histories from the Tübingen clinic.

"Upon the whole it appears that the good results obtained in late years by good operative methods only now entitle this operation to assume the place of honor in surgery which was earlier altogether forfeited on account of mishaps caused by imperfect technique.*"

I shall leave unconsidered the attempts, continued in some countries until after 1890, to reduce the size of goitres by the use of the setaceum, wick, hair seton, cannula, incision, through drainage; by the injection of iodine, tincture of chloride of iron, turpentine, etc.; by caustics and by the actual cautery; by subcutaneous and, indeed, extra-cutaneous ligature en masse of thyroid tumors or prominent goitrous nodules; by débridement, subcutane Zerreißung (Billroth), morcelllement, évidement (Kocher), etc.; and shall confine myself to the story of operations performed with the scalpel.

In our tables of operations performed in France, Italy, Great Britain and the United States up to 1883, the year when the operation may be considered to have become essentially perfected in Switzerland, Germany and Austria, there are included a number of the earlier and more

* Siskind had in mind merely the technique of operating, the art of controlling hemorrhage—not the antiseptic technique.

important ligations of arteries. Counting these, the score of each of the four great nations is about 50 (France, 53; Italy, 53; Great Britain, 49; United States, 45). Most of these operations were relatively minor ones—resections of conspicuous portions of the gland, enucleations of more or less circumscribed nodules or cysts or new growths, transfixion ligations and écrasement of pedicles, division of isthmus, etc. There were few lobectomies, either single or double, and few surgeons who had the experience of more than one case. By 1883 the operation performed by Desault in 1791 had not been improved upon in France, and in America. Nathan R. Smith, in 1835,²² Marshall in 1852²³ and Maury in 1871²⁴ had set fine examples which deserve to be brought to the attention of the medical profession of our country.

England made no operative contributions of importance, but Scotland could congratulate herself upon the work of Patrick Heron Watson (1874),²⁵ who was the only surgeon, except Bottini, of the four great nations, France, Italy, Great Britain and America, to perform more than three lobectomies and to devise a method regarded at the time as worthy of adoption. But Watson's method was crude as compared with the procedure of some surgeons of half a century earlier (Desault, Hedenus) or with the method of Victor von Bruns, practised by him in 1859 and thereafter.

Warren Greene erroneously thought himself and is quite universally believed to be the pioneer in this field in America. He was a courageous and probably dexterous operator, but his method, to be described later, was not commendable.

Given this outline, we may proceed to consider in greater detail the operative work set forth in our tables of the four countries, France, Italy, Great Britain and America.

FRANCE (TABLE I)

MICHEL. *De l'extirpation complète de la glande thyroïde dans les cas de goîtres suffocants, cystiques ou parenchymateux. (Opération suivie de succès.)* Gaz. heb. de méd. et de chir., Paris, 1873, s. 2, t. x, pp. 699 and 718.

Michel gives an inventory of the cases operated upon in France to the time of his publication (1873). His comments upon these cases and his references to the animated discussions participated in by Vel-

peau, Sédillot and others make interesting reading for the surgeon who cares to trace the story. He collected 14 operations and writes:

"We count in France up to this moment 14 operations—mine makes the 15th *—including in this list extirpations partial as well as complete. Desault, 2; Dupuytren, 2; Roux, 2; Sédillot, 3; Bégin, 1; Cabaret, 1; Michel, 1. Adding the case operated by Blandin, that seen by Brun and that seen by Percy, one obtains a total of 15. Of these 15 cases there were seven recoveries (Desault, 1; Roux, 1; Cabaret, 1; Sédillot, 3; Michel, 1) and eight deaths (Desault, 1; Roux, 1; Dupuytren, 2; Blandin, 1; Bégin, 1; Brun, 1; Rullier, 1). Among the fatalities two succumbed to hemorrhage at the hand of the surgeon (cited by Rullier and Brun); in three the loss of blood was so great that the surgeon was compelled to interrupt the operation (Desault, Dupuytren, Bégin); the sixth (Dupuytren) died 36 hours after the operation; the seventh (Roux) after 56 hours. I have been unable to find the cause of death in Blandin's case."

Michel's conclusions: "1. The total extirpation of the thyroid gland should retain its rank as an operative procedure; it enjoys in France an unmerited discredit."

"2. It is expressly indicated when the life of the patient is menaced, notwithstanding the employment of all the means at the disposal of science."

"3. Partial excision of the thyroid gland appears to be at least as grave as the complete extirpation."

Michel (Table I, No. 27), after having successfully performed an excision of both lobes and isthmus in a methodical but sanguinary manner, abandoned the cutting operation and substituted for it a timid procedure which thereafter bore his name. It consisted of isolation, puncture and cauterization—"dissection-cauterization"—(Table I, Nos. 28, 29, 30).

PIERRE-JOSEPH DESAULT. (No. 1.) *Observation sur l'extirpation d'une partie considérable de la glande thyroïde*. Reported by Giraud. Jour. de chirurgie, Paris, 1792, t. iii, p. 3.

Desault isolated and ligated the superior and inferior thyroid arteries before cutting them, and was, I am quite sure, the first † to dissect the firmly adherent gland from the trachea. Von Bruns, Lücke, Billroth, Kocher and surgeons of all countries up to about 1874 found it necessary to ligate the tumor en masse when it was firmly bound to the trachea; Kocher¹⁰⁰ states that when the tumor is bound

* We have added 12 cases to Michel's list; hence in our table Michel's first operation appears as the 27th instead of the 15th.

† Dupuytren was the second.

to the trachea over a considerable area by unstretchable adhesions "*ligation in parts being impossible*," one must have recourse to the ligature *in toto* and cut off the tumor with a knife, leaving a stump behind."

The tumor which Desault removed was probably an adenoma. When, in the course of its growth, it had become cystic, he incised it and treated it with caustics. As a consequence of the treatment and resultant infection the tumor, and, possibly, remains of the thyroid lobe also, had become indurated.

It is quite probable that the thyroid lobe had been absorbed more or less completely by the pressure of the adenoma. When this is the case the operation of hemistruumectomy is simplified and the danger of injury to the recurrent nerve is, I believe, lessened. With the atrophy of the thyroid tissue, due to the pressure exercised by the growing adenoma, a new capsule develops. This capsule may contain all that remains of the original thyroid lobe, although usually normal glandular tissue is found at the upper pole. Adenomata may be deeply buried in the thyroid, surrounded everywhere by normal or even occasionally, as in Graves' disease, by hyperplastic glandular tissue. The capsule of an adenoma may, therefore, consist solely of connective tissue or almost altogether of thyroid gland.

Many a surgeon, on enucleation of an adenoma, has believed, undoubtedly, that he had performed a lobectomy, inasmuch as no vestige of the thyroid gland remained at the conclusion of the operation. He may, however, merely have enucleated an adenoma from its transformed, transfigured capsule, and nevertheless have thought or found it necessary to ligate both thyroid arteries.

It is impossible to decide from Giraud's description of Desault's operation whether or not there were remnants of normal thyroid tissue in the part removed. In any event, the operation was a remarkable one for his time.

There are cases, but these are not common, in which no trace of the thyroid lobe remains to suggest that the adenoma had originally been embedded in glandular tissue. The tumor in these cases is delivered more easily at operation than a thyroid lobe would be, and is enclosed in an extrinsic capsule thicker than that which ordinarily envelops the gland. But the blood supply is quite different and less abundant.

* Italics mine (W. S. H.)

"In 1784, Jacqueline Hyons, then 20 years of age, experienced a very sharp pain in the anterior and middle part of her neck, following a violent movement of the head. Although this pain was but momentary, there remained afterwards slight restriction of movement; but three months later there appeared to the right of the trachea a small, hard, indolent tumor, without fever and without change in the color of the skin. Over it were felt lifting pulsations which showed that it was situated over a large artery; in fact, its base rested on the ordinary course of the common carotid.

"The patient, who was not at all incommoded by the tumor, paid no attention to it until June, 1788. At that time the tumor measured 1 inch in diameter, and thenceforth its progress became as rapid as it had previously been slow. Internal and external remedies had no effect upon the progress of the tumor; there was always manifest a fluctuation in the centre. On making an incision at this point there issued a yellowish serosity. Three months after this operation, which was absolutely fruitless, caustic was applied several times, also without result. At last the patient, having suffered in vain for a long time, presented herself at the Hôtel Dieu in Paris, on May 20, 1791.

"At this period the tumor was 2 inches in diameter; it was round, very hard, adherent to the right side and centre of the trachea, and pressed outwards the sterno-mastoid muscle. Besides being lifted up distinctly by each pulsation of the arteries, as has already been noted, it followed the movements of deglutition, and interfered a little with the passage of solid food.

"The patient, strongly desirous of being freed from this uncomfortable deformity, determined on the spot to undergo extirpation of the tumor, which was suggested to her as the sole expedient; but we did not conceal from her either the dangers, the length of the operation or the pain which were inseparable from the procedure. M. Desault performed this operation in the amphitheatre, after having for several days prepared this woman by general remedies.

"The patient was put on her back, inclined a little to the left side, the head and neck elevated more than the rest of the body. The surgeon made a longitudinal incision over the centre of the tumor extending it a finger's breadth above and a finger's breadth below it, in order to facilitate the carrying out of the operation. With this first incision he penetrated to the gland, dividing the skin, the cutaneous muscle and some fibres of the sterno-hyoid and thyroid muscles. Then, while an assistant drew to the left the internal border of the incision, in order to immobilize the tumor, he separated it from the sterno-mastoid muscle. In cutting the cellular tissue surrounding these parts he divided two small arteries, which he immediately ligated while they were lifted up by means of a dissecting forceps. Then, after having disengaged the external side of the tumor, the internal side was likewise freed by drawing the tumor outwards with a hook in order to facilitate its separation from the anterior part and from the side of the

trachea. In the course of this dissection the branches of the thyroid arteries were successively ligated as they were cut. Then the assistant who held the hook drew the gland inward and forward, and at the same time the operator completed its dissection exteriorly, above and below. This phase of the dissection was most minute and difficult. It was necessary to sponge continually the small quantity of blood which still oozed and prevented one from recognizing clearly the tissues. This it was which made it necessary to cut only a little at a time and to identify with the finger, before each cut of the bistouri, the part which was about to be incised. Dissecting with these precautions, the superior and inferior thyroid arteries were exposed without wounding them, and were ligated with the aid of a blunt-curved needle. These arteries were divided transversely and it was found possible to detach the tumor from the trachea, to which it was firmly adherent.

"The wound resulting from this operation was almost 3 inches deep; it was bounded exteriorly by the sterno-mastoid muscle, within by the trachea and the esophagus, and behind by the common carotid artery and the eighth pair of nerves, which appeared at the bottom of the wound.

"After having washed this wound with tepid water and having absorbed all the blood which it contained, it was filled with coarse lint powdered with colophony. Square compresses held in place by loosely applied bandages formed the rest of the dressing.

"The tumor after its excision was about 5 inches in circumference. However, it did not differ at all from other scirrhous glands, unless one notes the fact that it contained a cartilaginous nucleus.

"The patient had borne the long, difficult and painful operation with uncommon fortitude. She passed the rest of the day quietly, suffering only the pains usually present in large wounds. The following night she complained of slight feeling of heat in the neck and of slight difficulty in swallowing. She was a little relieved the next day by soaking the dressing with a decoction of mallow. For a drink weak *eau de chiendent* seasoned with oximel was prescribed.

"The difficulty in swallowing greatly increased on the third day, although the fever was very moderate. At this period the compresses and the external lint were renewed for the first time, and the dressing was soaked as on the previous day.

"The fever ceased after the fourth day and the swallowing became less difficult. Suppuration had already begun: the following day it had detached all the lint so that the dressing could be entirely renewed. The wound was in good condition and it was dressed only with soft lint and compresses soaked in the emollient decoction. This was continued every day.

"Nothing of note happened in the course of the treatment. The wound followed the ordinary course of wounds. It had cicatrized at the end of a month, and the patient left the hospital perfectly recovered on the 34th day after the operation."

Desault's second case (No. 3), evidently much more difficult (no details given) than the first, ended disastrously. The dissection had hardly begun when blood flowed with such appalling violence that the operator was "obliged to give up the pursuit of his object." He trans-fixed the incised portion of the goitre with many threads, but the patient died in spasms.

GUILLAUME DUPUYTREN. (No. 4.) *L'excision de la thyroïde*. Related by Rullier in Dict. d. sci. méd., Paris, 1817, t. xviii, p. 557.

There are many dramatic, tragic and a few even brutal performances linked in the story of operations for goitre. One of the most pathetic cases is Dupuytren's first—reluctantly, conscientiously and courageously undertaken; cautiously, deliberately and admirably performed. Rullier draws the picture in stirring lines:

"Patient, female, *æt.* 28, was of a choleric and vivacious temperament; a worker in the fields, who had always enjoyed flourishing health.

"Eight years ago, following an attack of the itch which had been driven in by cold, the patient noticed a small tumor the size of a hazelnut on the anterior and middle part of her neck. From that time the tumor constantly increased in size, but its growth, slow and gradual at first, became very rapid in the course of the seventh year. Then it made enormous progress, and covered the whole front of the neck. Like the thyroid gland, of which it was only an expansion, the tumor presented three distinct lobes, one middle and two lateral; but the first alone became offensive. It fell in front of the sternum, presenting a tumor about 4 inches in diameter.

"At this period a surgeon of Paris, at the solicitation of this young woman, determined to excise the middle lobe. He succeeded in this after making a transverse incision of the teguments. No hemorrhage or other accident occurred, and the wound which resulted from this operation was healed at the end of a month.

"Meanwhile, about six months after this operation, the two lateral portions of this goitre acquired an enormous volume, the centre itself increased rapidly, and the whole formed a tumor so extensive that respiration became difficult. This difficulty in breathing increased towards evening and when the patient lay on her back. There was also difficulty in swallowing if the food was not very well masticated. Added to this marked derangement of function was such great deformity that this woman, still young and endowed by nature with a pleasant face and good figure, was distressed to be only an object of aversion and disgust to those around her.

"It was under these circumstances that the patient presented herself at the public service of the Hôtel Dieu. She wanted to be freed from the tumor, and she declared that whatever the dangers and pain

to which she might be exposed, she was determined to submit to them. Nevertheless, in spite of her resolution, she received a negative answer, and was sent away by Drs. Pelletan and Dupuytren, who told her very positively that in their judgment she should not be operated upon. In spite of this she returned a few days later in the same state of mind but received the same answer; and all the dangers to which she would be exposed by operation were depicted to her in the most vivid colors. Besides, she was advised of appropriate measures to bring about the relief of the numerous symptoms of which she complained.

"However, nothing could convince this poor girl. She returned dissatisfied and desperate. Neither fear of the pain nor of the danger to which she was incessantly warned she would expose herself, nor the express refusals which she had already received had any influence upon her spirit, and she did not hesitate to present herself for the third time at the Hôtel Dieu. Such perseverance at last vanquished the reluctance to admit her, and she entered the hospital January 1, 1801.

"Without, then, any fixed plan as to what might be determined to do for her, the surgeons of the hospital submitted to serious and thorough consideration the question as to what might appear to attempt in behalf of this young woman.

"The picture which she presented at that time was as follows: Over the whole extent of the anterior and lateral regions of the neck there was a tumor extending vertically from the base of the inferior maxilla to the sternum and to the clavicles, and laterally, from the maxillary angle to the other. This tumor measured 7 inches long transversely, and a little more transversely; one saw, as is usual in the thyroid, two distinct lateral lobes, connected with each other by a middle lobe, which was less protuberant and shorter in the vertical measurement than either of the other two. In addition, all three were irregularly nodular and soft to the touch. Their mobility differed: the middle lobe was very adherent to the larynx and moved only with while the two lateral lobes, loosely attached to the neighboring parts, could easily be moved in all directions. The teguments played freely over the portions of the tumor covered by them.

"The jugular veins and their ramifications were greatly dilated; the superior thyroid arteries, beating forcibly, could be palpated a little above the mid-portion of the tumor. The pulsations of the common carotids were likewise readily felt, but it was necessary to seek for them behind and outside of the tumor, into which position they had been forced. The tumor itself had never become painful but it hindered respiration to a very appreciable degree, interfered with deglutition, and under many circumstances, notably during straining emotion, it became a cause of obstruction to the circulation of the brain; at such time the patient's face for some instants would be dazed and she would be sensible of dizziness and vertigo. Otherwise her functions were normal.

"Such was this affection, to which one could not give too serious attention; the progress which it had made for some time past, and was making each day, the imminent danger of suffocation to which it subjected the patient, did not admit of doubt that there would soon be a fatal issue. But when, on the other hand, one considered the location, the size and the relations of this tumor, one could not contemplate without well-founded fears the hazardous operation by which one might radically deliver the patient from this tumor. Nevertheless, the dangers overbalanced too much the advantages which one might expect from the operation, and it was determined to do nothing; but at that time a sombre despair took possession of the unhappy patient, her profession. Indeed, she refused food of any kind. The menstrual flow which took place at that time, was suppressed, and soon thereafter a condition of violent spasm, extreme suffocation and convulsive movements came to augment the torment and the horror of the situation.

"This paramount circumstance put an end to our indecision; the patient would certainly perish, and there was some hope that she might be saved by operation. Operation was promised her, and calm returned to her spirit.

"The good health, the vigor, the youth of this girl, her extreme desire to be operated upon, and, moreover, the great mobility of the tumor, the laxity of its connection with the teguments, and, in short, the knowledge of what had been accomplished with impunity for a part of the tumor gave M. Dupuytren ground for the hope which determined him at last to risk the hazards of this operation.

"Observe how the operation, at which we assisted, was performed in the presence of M. Pelletan, of many surgeons of Paris, and of an immense gathering of students.

"The teguments of the anterior and middle part of the neck were elevated in such a manner as to form of them a transverse fold of great size. This fold was incised perpendicularly from over its centre to its base; the incision was then enlarged by carrying it upwards to the symphysis of the chin, and below to the superior border of the sternum. The left edge of the incision was detached by breaking up the cellular adhesions which connected it with the corresponding portion of the tumor, then the dissection was continued on the same side by lifting up the teguments and separating them from the tumor. Thus was reached the left part of the tumor. One encountered along this course two sets of veins, one of which was adherent to the tumor, and the other of which was subcutaneous. The greater part of these veins was avoided, and as to those which one was obliged to divide, not one was cut until two ligatures had been thrown round it: one on the side towards the heart, and the other on the side towards the tumor. Meanwhile, having reached the left side and behind this part, four thyroid arteries were encountered, all of which appeared considerably dilated. They were easily recognized, and in ligating them the

same precautions were observed as in the case of the veins; that is to say, that after having previously exposed them, two ligatures were passed around each, and they were cut in the space between these two ligatures.

"Here, as throughout the operation, one was careful to place the ligature on the side corresponding to the brain, in order to avoid the application of the second ligature.* The same care was taken in dissection, so that almost never were the arteries opened before being ligated, and always in a manner equally secure, whatever their size.

"One thus succeeded in detaching the left lobe of the tumor, without other accident to the patient than the pain inevitable in a dissection too careful not to become at the same time a little long. Soon afterwards the right part of the tumor was encountered, and it was isolated from its surroundings with the same precautions and with equal success. During this stage of the operation we encountered no intimate adhesions which had to be destroyed; the fingers and the back of the bistouri sufficed almost always. It was easy also to avoid the internal jugular veins, the common carotid arteries and the pneumogastric nerves. Twenty times one perceived these parts, but they were always pushed away, and in this manner put, without trouble, out of danger.

"It was after this stage of the operation that M. Dupuytren the possibility of realizing the hope which he had conceived of removing the whole of the disease. In order to achieve this end the lateral lobes of the tumor, which had just been successively isolated were brought out again and through the skin incision; they were in place by elevating them and carrying them a little forward, in order to stretch, in this way, the middle part of the tumor which adhered intimately to the larynx and to the windpipe; one succeeded in this manner in the dissection of this part, but it was done only by carrying the instrument down to the very substance of the gland, extremely close, it is true, to the larynx and the trachea, so dense was the cellular tissue which established the connection of these parts. The larynx the trachea then appeared bare. The latter presented anteriorly very marked flattening, evidence of the prolonged compression to which it had been subjected by the tumor.

"The patient bore with astonishing courage this operation, which was long, and which called for, during a dissection made in the midst of parts which it was important to avoid, sustained and delicate attention as much on the part of the surgeon as of his aids. Never for an instant, however, did one feel fear of a hemorrhage, and the patient did not lose more than a few spoonfuls of blood; but she was several times threatened with syncope, and she was also nauseated at times.

* Italics mine (W. S. H.). It is interesting to find this early reference to the sensitiveness of arteries.

formed by the threads of the ligature was brought to the inferior angle of the wound.

"After the operation the face of the patient was very pale and profoundly altered; all of her vital forces were depressed; the pulse was frequent, small and concentrated; respiration was laborious and frequent, the skin quite uniformly cold; there was cardialgia and continued nausea. This unhappy woman, in a word, appeared to us to be dangerously stricken, and as if shocked by the blow itself of the operation.

"The most pressing indication to be met then appeared to be to raise again and to sustain the little strength left to the patient. Cor-dials were administered, but with great difficulty, because deglutition was much hampered, and one only lessened the dangers of suffocation, which appeared when the patient took a spoonful of liquid, by making her assume an almost vertical position.

"Nevertheless, from the same evening her unfavorable condition appeared to improve: to the prostration there succeeded a rather marked reaction, the pulse became frequent and high (*élevé*), the respiration deviated less from the normal state, color returned to the face, the skin was dry and warm, and some spoonfuls of liquid were administered without exciting nausea and vomiting. But the hopes raised by this improvement lasted a very short time, and from the fall of night the respiration became laborious, even stertorous, the pulse wretched, the skin without heat; in a word, the phenomena of the death-struggles commenced, and the patient expired the next day, 35 hours after the operation.

"Specially charged with the anatomic examination, this is what we observed in the tumor, the wound of the neck and in the remainder of the cadaver.

"The tumor which had formed the goitre was oblong, nodular, with a volume as great as that of the lungs of a young child. It presented two conoid lobes, excessively swollen. These lobes were joined together by a transverse mass, situated at their inferior and middle portion. A cellular mesh covered the whole surface of this tumor and was intimately adherent to it.

"This tumor was of a density which did not appear to be greater than that ordinarily seen in the thyroid; its weight, at the moment of extirpation, was 1202 gm., or about 2 pounds 8 ounces; its color was reddish, and its tissue was not different internally from that of the thyroid in its usual state: only the organization of this portion had become more evident by means of the considerable increase in nutrition which it had experienced. Here one perceived a multitude of small vesicular cysts, filled with a yellowish and viscous fluid; but besides, one saw here and there some points, whitish and callous, which appeared as if scirrhus. The superior and inferior thyroid arteries, as well as the thyroid veins, showed a diameter double their usual size. One may see the model in wax of this specimen in the anatomic museum of the Faculté de Médecine, where M. Dupuytren deposited it. . . ."

Dupuytren practised the method of ligating twice and cutting between ligatures. This method has been attributed by Sick and others to Victor von Bruns. Dupuytren, in ligating arteries, placed the first ligature on the cerebral side so that patients would not twice suffer pain I have often practised this method in local anesthesia, operations believing it to be original; but Dupuytren had the idea 100 years ago. Dupuytren removed the entire gland in bloodless manner—"only a few spoonfuls lost." Dupuytren like Desault accomplished the feat of dissecting the isthmus from the trachea, which more than one half a century later even the greatest German and Swiss surgeons did not believe possible.

Dupuytren waited 11 years before venturing upon a second operation (Table I, No. 6). The goitre in this case, to his disappointment, had broad, non-pedunculated base. Hemorrhage from many veins was controlled temporarily by finger pressure, but the patient was in syncope at the end of the operation. Thus, Dupuytren who had so calmly operated upon a relatively simple case was unable to contend with complicated one.

ROUX. (No. 9.) Reported by Rutz. *De l'extirpation d'un goître* Arch. gén. de méd., Paris, 1836, s. 2, t. x, p. 25.

A brief abstract of Roux's case (No. 9) is here given to tell of venesection performed just after an operation from which the patient had nearly bled to death on the table. Exsanguinated patients were venesected, sometimes repeatedly, to reduce the fever of sepsis.

The patient was a young peasant, *et. 22*, with a large goitre in the centre of the neck, presenting two definite lobes. It was irregularly round, with nodules. The symptoms from the goitre were moderate but severe.

Operation, March 26, 1835: First incision in the mid-line from the hyoid bone to the sternum; second incision through the middle of the tumor from right to left. The tumor was freed partly by incision partly by enucleation in three parts. The arteries were situated laterally, and could be for the most part ligated before being cut. Several veins were ligated. In all 40 to 47 ligatures were applied. The patient lost about "1½ pounds" of blood. The operation lasted hour and 10 minutes. At 3 o'clock the lips were colorless. *The patient was bled, 6 ounces of blood being removed.** Death at 6 o'clock.

OLLIER. (No. 35.) *Goître lésique ayant donné lieu à la trichine du goître acrophthalmique. Opération par les caustiques.* Guérison (

* Italics mine (W. S. H.).

tous les symptômes. Reported by A. Boursier. *L'intervention chirurgicale dans les tumeurs du corps thyroïde.* Thèse de Paris, 1880, Obs. ii, p. 172.

In 1877 Ollier cured by repeated incisions and cauterization a "cystic goitre," the size of a turkey's egg, which had caused pronounced symptoms of Graves' disease—pulse 160, exophthalmus, loss of flesh, etc. Two years later the patient's pulse was 80 and only a little exophthalmus remained. This case is not included in Buschan's collection (1894)* of 80 operations in Basedow cases.

PAUL-JULES TILLAUX. (Nos. 41, 47, 48.) *Sarcome du corps thyroïde ayant donné lieu à tous les symptômes du goître exophtalmique. Ablation de la tumeur par M. Tillaux. Guérison de tous les accidents.* Reported by Benard. *Contribution à l'étude du goître exophtalmique. Pathogénie. Traitement.* Thèse de Paris, 1882, Obs. ii, p. 36.

Tillaux operated upon two cases of hyperthyroidism (1880 and 1881). In both the toxic symptoms vanished.

In the second of these cases the tumor, believed on microscopic examination to be sarcoma, was circumscribed and confined to the left lobe; the right lobe and isthmus being "unaltered" were not removed. The clinical history, the operation and the thorough microscopic examination are admirably reported by Benard. This second case of Tillaux's is, I think, altogether the most interesting of the contributions of France to the surgery of the thyroid gland.

No. 47. Cazabonne, male, *æt.* 33, entered l'Hôpital Beaujean May 9, 1881. Four years previously he had noticed transitory disturbances of vision, with sometimes phenomena of cephalic congestion with headache and amblyopia. The patient also suffered with palpitation, especially after fast walking or mounting the stairs. He said that he had always had this symptom since childhood. One year previous to examination the patient noticed that his neck was enlarging. Iodine treatment had no effect. Two months after noticing the enlargement of his neck, the patient's eyes, which were naturally a little sunken, became prominent. As the exophthalmus increased the palpitation became exaggerated. Respiration also became more difficult. Attacks of suffocation occurred in the day as well as at night, and were accompanied by profuse perspiration of the head and upper part of the body. At the Beaujean, digitalis was administered. The palpitations diminished a little, but the voice became rough.

Examination, May 9, 1881: The largest part of the tumor is situated on the anterior lateral surface of the left side. There is a continuation on the right side, but much less voluminous, and appearing

The Operative Story of Goitre

to be clearly separated from the tumor by the right sternoma. The anterior and left portions are, on the contrary, blended, represent in their entirety a regularly rounded tumor. The border completely covers the sterno-clavicular articulations a little, the sternal notch. The upper border runs obliquely up and from right to left, passing 1 cm. below the Adam's apple; it extremity reaching the angle of the jaw, about 4 cm. higher than front on the midline. The left border reaches to the trapezius forms a rounded and rather thick swelling. On the right the tumor stops beneath the sterno-mastoid. This portion on the right is a soft, in contrast to the firmness of the rest of the tumor. Measurements: Vertically, 12 cm. in front, 14 cm. near the left border cm. transversely. For some years the neck measured 39 cm examination it measures 47 cm. in circumference.

The skin moves easily on the tumor. On the right side the pulsations of the carotid seem weak, as if the artery were at a distance; the left they are strong; and on palpation of the tumor there is a sensation of a veritable thrill, while it is at the same time elevated by the immediately underlying vessel. Pressure on the sterno-mastoid provokes a raucous cough with a pricking sense in the larynx. The thyroid cartilage is thrown nearly 3 cm. to the right of the midline. The tumor does not appear to be very adherent to the larynx, but does seem to be rather solidly fixed to the rounding muscles.

The surface of the tumor is rather regularly rounded without prominent indentations. The consistency is firm; below and in there is a zone where it is a little more soft, but there is no real fluctuation. One can see no movement of lifting up; palpation reveals no movement of expansion; one finds only near the left upper the pulsations of a superficial artery of rather large size. If the patient walks one perceives throbbing over the whole tumor, due to the generated pulsations of the left carotid, which, lying immediately beneath the tumor, lifts it up en masse. Auscultation reveals no true vibration in the tumor, but the throbbing of the carotids is perceptible its whole extent.

Symptoms: Attacks of suffocation, due partly to compression of the trachea and partly to compression of the recurrents; rough difficulty in swallowing. The two globes of the eyes are on the same plane and they reach the level of the orbital arcades. The patient estimates their projection in front at 1.5 cm. The eyelids close with an effort; the sclera are visible around the cornea. The patient continually a sense of tension in the eyes. There is diplopia looking at objects at a distance. Movements of the eyes are easily regular. Pupils normal.

On palpation the cardiac pulsations are rather strong, but there is no exaggerated thrill with the patient in repose; after walking pulsations become more frequent and the precordial impulse

stronger. Pulse 80; much quicker if the patient takes a few steps. Auscultation of the vessels of the neck shows continuous bruit with ptyoxysm. Appetite is good; no diarrhea.

The patient has become irritable, flies into temper over nothing, is almost always in a state of very pronounced nervous agitation. There are frequently choreiform movements in the limbs.

Diagnosis: Exophthalmic goitre, as plain as possible.

On the left temple, the dorsal region (left side), and on the upper external part of the left arm are three small swellings about the size of a hazelnut. The patient noticed them about eight months before examination.

It was decided to operate May 18, 1881, and the patient was prepared and administration of the chloroform had begun, when he was seized with very severe attacks of dyspnea, with harsh breathing and beginning cyanosis. On this account the operation was postponed and Dr. Tillaux decided to consult the Society of Surgery.

Bernard writes: "The question of anesthesia, decided in advance, so to speak, held small part in the discussion. It was decided not to use chloroform, but to have recourse simply to the administration of strong doses of chloral at the same time with subcutaneous injections of morphine.

"As to the expediency of surgical intervention, there was diversity of opinion.

"M. M. Verneuil, Trélat, Duplay advised against operation, as much because of the immediate danger of the operation as of the probable hypothesis, according to M. Duplay, that the goitre might be the effect instead of a cause.

"M. M. Labbé, Maurice, Perrin, Desprès, on the contrary, considering the condition of the patient who appeared doomed to certain and early death if left to himself, and being of the opinion that the surgeon should have the courage to undertake, at the risk of disagreeable eventualities, dangerous operations when they are the only chance offered to the patient, urged strongly M. Tillaux to persist in his first intention."

Operation, May 21, 1881: The operation was begun at 9.30 a. m., about one hour after administration of morphine and chloral. U-shaped incision, with the opening above. The two lateral incisions were parallel with the anterior border of the sterno-mastoids. The horizontal incision, over the inferior third of the tumor, joined the others in rounding very slightly and giving to the flap an almost rectangular form. The right branch corresponded exactly to the right border of the tumor; the transverse incision was made next (both with the bistouri); for the left incision scissors were used and the teguments were divided from below upward. Here the hemorrhage was almost insignificant and was easily controlled with forceps.

After dissecting the cutaneous flap with the fingers for 8 or 10 cm., he cut the sterno-hyoids and omo-hyoids at the transverse incision.

The Operative Story of Goitre

Now was seen the greater part of the tumor surrounded by the cap. The operator proposed to disengage first the inferior border of tumor by using on it from below upward a 'mouvement de bas and to end on each side by ligature of the thyroid vessels. With fingers bent he commenced the enucleation. But hardly had he the inferior border when the capsule tore and the pressure brought numerous fragments of a friable, granular mass, of grayish-white without any cohesion. This suddenly diminished the size of the tumor then as much with the fingers as with the spatula he set himself dissecting the remains of the capsule, having care to cut, at the time, between two ligatures all the frena of vascular appearance which he encountered.

New difficulties presented themselves when it was necessary to attack the left extremity of the capsule, which reached deeply behind and behind the sterno-mastoid. It was necessary above all to cut the common carotid and the jugular vein which adhered firmly to the capsule. An assistant retroverted the cul-de-sac of this capsule, which was then completely detached with the spatula from the vessels, rather firm adhesions to the upper part of the trachea were seized with a T-forceps and divided. Now the capsule adhered only to the glandular appearance, representing the isthmus of the thyroid right lobe of which did not seem to be altered.

This species of pedicle was cut after being ligated. Then the capsule of the tumor was complete, but below, behind the sternum there was a deep cul-de-sac filled with debris.

"Having removed this, one was able to estimate the depth of the cul-de-sac which ran towards the mediastinum; with each expiration was seen the trunk of the left innominate vein, which was of enormous size and filled up the whole space. Above, one saw the trachea then to the left and considerably flattened transversely. Its right lateral face was hidden by the corresponding lobe of the thyroid body and not been uncovered; the left face, on the contrary, running almost directly from in front backward, was completely denuded and started from the vasculo-nervous bundle by a rather large space which reached a prolongation of the tumor.

"At the bottom of this space the whole anterior surface of the esophagus was seen, which was immediately in connection with the tumor; but the recurrent nerve had not been exposed."

All this part of the operation was effected in half an hour; but a wound was the site of hemorrhage which was controlled by means of a large number of ligatures, taking one hour.

When hemostasis was complete the wound was sutured and a compress placed in the lower part of the wound. Lister dressing; the patient was carried to a specially prepared carbolized room.

"From the first cut of the knife to the end of the dressing a 'verisateur' enveloped the patient in carbolized vapors. The ligatures were of catgut. The Lister method was, in a word, scrupulously observed."

Post operation, May 22, 1881: Since yesterday the patient has not suffered. He breathes easily. Dressing changed. May 25, 1881: Cough tires patient. Deglutition and respiration easy. Tension of the eyes diminishes more and more, and the patient says that the skin of his lids seems too long. Exophthalmus still rather pronounced. Palpitations have ceased. Temperature between 39° and 40°. May 28, 1881: Diminution of exophthalmus is apparent to any one. The wound continues to be satisfactory. Sutures removed. Healing *p. p.* At this point the recovery was complicated by an attack of erysipelas. June 20: From this date recovery from erysipelas.

July 8, 1881: Patient discharged. Exophthalmus has completely disappeared, but the patient is extremely thin and weak. There is trouble in the lungs. "It is probable that this organ (lungs) is the seat of generalized cancer, from which the patient will soon succumb."

The patient died July 27, 1881.

Histological examination of the tumor: "It is easily determined that it belongs to the genus sarcoma but it presents diverse varieties of this kind of tumor.

"At certain points the tissue consists solely of fusiform cells, without appreciable intercellular substance, arranged in bundles which, grouped, present themselves as cut sometimes transversely, sometimes longitudinally (sarcome fasciculé).

"At other points true connective tissue fibres and trabeculae are seen between the cellular fasciculi (fibro-sarcome). Finally, one sees at these fibro-sarcomatous points a homogeneous, faintly tinted and, in places, slightly granular intercellular substance imbedding the cells of certain bundles.

"The fusiform cells remain in relation with each other by prolongations more or less numerous. In a word, veritable mucous tissue is formed, not at all an extraordinary fact in a fibro-sarcoma, this tumor belonging to the same class as the myxoma; *i. e.*, to the tumors derived from connective tissue.

"The vessels are not very numerous; for the most part they present a simple wall which, in the sarcomatous points, is not clearly distinct from the surrounding tissue.

"... fibro-sarcoma, having become 'sarcome fasciculé' at certain points, and presenting myxomatous transformation in other regions much less extensive."

How is this case to be interpreted? That the patient was suffering from hyperthyroidism and that after removal of the tumor all the toxic symptoms, including the exophthalmus disappeared, there seems to be no doubt. The tumor was a circumscribed one of the left lobe. The right lobe and isthmus were, according to Tillaux, macroscopically normal. Could the new growth have been a sarcoma, as Tillaux supposed, and as the careful histologic examination by an accomplished

pathologist seemed to indicate? Is it conceivable that a mesodermic tumor could, *per se*, be responsible for the syndrome of Graves' disease? Had the removal of the tumor not been followed by disappearance of the symptoms we might have surmised that the remaining right lobe and isthmus were hyperplastic and not, as Tillaux believed, normal. We are forced to the conclusion that the tumor must have been epithelial, either an adenoma or carcinoma, and not sarcomatous. adenoma may, we know, cause severe thyroid intoxication, and Tillaux's description of the macroscopic appearance of the material evinced, in the course of the operation, from within the capsule would not exclude this variety of tumor—nor, indeed, would the metastases to the temple, arm and lung necessarily exclude it. But a carcinoma of the thyroid might bear a closer resemblance, histologically, to sarcoma than would an adenoma.

Professor Koehler called my attention to the fact that Professor Langhans, his life-long friend in Bern, who, probably, studied malignant tumors of the thyroid more zealously than any one, had finally concluded that certain malignant tumors of this gland, which for many years he had considered sarcomata (indeed spindle-cell sarcomata), were undoubtedly carcinomata. If Langhans was for time so deceived, surely others may well have been. But it would altogether clarify the situation to assume that Tillaux's tumor was a carcinoma, for carcinomata of the thyroid have rarely been accompanied by the symptoms of hyperthyroidism, and then only in a very mild form. Adenomata, on the other hand, may produce the complete picture of Graves' disease, even in serious form. We may assure, therefore, that the degree of anaplasia in carcinoma is not on greater than in adenoma, but that in adenoma the cells function at least for a time, overactively. This has been convincingly shown by Goetsch ²², in his illuminating studies of the mitochondria in the cells of adenomata of the thyroid.

Is it not conceivable that the tumor, if an adenoma, may in part have become carcinomatous and thus have given rise to the metastases while sufficient hyperactive adenomatous tissue remained to cause the toxic symptoms; or that the whole tumor was of an unusual adenocarcinomatous variety capable of producing in pronounced form the picture of Graves' disease?

Tillaux operated upon a third case (No. 48). All of his patients recovered from the operation; although in each instance considerable

blood was lost and in none were the thyroid arteries tied as a preliminary step. In all he practised a rectangular U-shaped incision. The transverse or collar incision, for the popularization of which Kocher deserves credit, had already been employed by Boeckel (1880).³⁸ Oblique or vertical incisions, often with supplementary cuts, were employed by all the French surgeons up to 1880.

Of the 53 cases tabulated for France, in 15 the patients died (28.5 per cent); but, excluding the relatively minor operations, the fatalities for the 12 total excisions plus the four operations which had to be abandoned and two operations for cancer were 12—a mortality of 66.6 per cent. The cause of death was hemorrhage in seven cases, sepsis in three, hemorrhage and sepsis in one, asphyxia in one, shock in one, unknown in two. No operative procedure was devised in France up to 1883 which definitely advanced the art of operating for goitre. Her surgeons were still far from being able properly to deal with the blood vessels.

ITALY (TABLE II)

In reviewing the contributions of a nation to the solution of an important operative problem one naturally looks for the names of the eminent surgeons, and usually to find that they are well represented, particularly so before the days of high specialization in surgery. Inasmuch as for the excision of a goitre the first and great difficulty was the control of hemorrhage we might hope for greatest assistance from those who had particularly interested themselves in the ligation of arteries, in the surgery of the blood vessels. In the case of Italy we are not disappointed.

Those of us who are familiar with Luigi Porta's great classic on *Delle alterazioni patologiche delle arterie per la legatura e la torsione*, Milano, 1845, may have premised that in considering the various procedures which might be employed to bring about a reduction in the size of a goitre he would first test, as he did, the effect of ligation of the thyroid arteries. After ligating one superior thyroid artery in two cases without effect, he ligated, simultaneously, both of the superior arteries in his third case (Table II, Nos. 2, 3, 4) and noted appreciable, but only temporary, reduction in the size of the goitre. Now he concluded that in the future the inferior thyroid artery should be tied, marvelling that it had occurred to no one to do this. He writes: "Ligature of the arteries with the object of producing atrophy of tumors of the thyroid gland is a procedure really rational and destined

to succeed; but with this object in view one must ligate both the arteries of the same side, the superior and inferior of the side corresponding to the tumor. . . . which operation (the ligation of the inferior thyroid artery) is, without doubt, more hazardous and serious than the ligation of the superior thyroid artery, but the dangers are in such as to deter a skillful surgeon; although I have had the operative in mind, I have not attempted it because no patient suitable for the undertaking has been presented to me."

Porta soon had the opportunity to test the feasibility of his proposition.

In July, 1850, a girl, aged 17, entered the clinic. There was goitre on the left side of the neck, the size of a mandarin, which she had had from childhood, and which had grown rapidly during the two previous years.

The superior thyroid artery could be distinctly seen pulsating the summit of the circumscribed tumor, but there was no trace of the inferior artery. The right lobe was not altered. It was decided to ligate the superior and inferior thyroid arteries on the affected side. Operation, July 28, 1850: Longitudinal incision 4 finger-breadth in length between the sterno-mastoid and the sterno-thyroid muscle. As the ligation of the inferior thyroid artery was the most difficult part of the operation, it was decided to ligate this artery first. The incision was made through the inferior angle of the incision, dissecting with the index finger the cellular tissue towards the back and a little below the base of the tumor. The pulsations of the artery were clearly felt between the trunk of the common carotid and the trachea. Guided by the index finger placed on the thyroid artery, the operator succeeded in passing beneath it a curved Lawrence needle. The eye of the needle being brought out through the incision, an assistant threaded it with a little thread of red silk * which was thrown twice around the artery. Having accomplished this first ligation, the superior thyroid artery was carefully ligated without great difficulty; it ran obliquely from the external carotid to the summit of the tumor.

The operation lasted about three-quarters of an hour, most of the time being spent in ligating the inferior artery. Inasmuch as the author says, is difficult in any case, and since it was a new operation, which the author had got the idea from studies on the cadaver, "stayed his hand" and proceeded with great circumspection in cutting the parts and in the search for the vessel. In a footnote the author states that he lost a quarter of an hour in looking for the inferior thyroid artery behind the posterior-inferior part of the tumor, when

* Porta had a fondness for red silk, using it for ligating arteries in experiments on animals.

it would naturally be located. He finally lifted out the lower extremity of the lobe, and found the inferior thyroid beneath it to the left of the trachea, between this and the carotid. He thinks that in another attempt he would achieve his object with greater ease and promptness.

This is probably the first case of ligation of both the superior and inferior thyroid arteries. The operation, in Porta's opinion, proved two things: that the obliteration of the two arteries of the tumor may produce radical effect, and that the two arteries of the other side are not capable of maintaining the proper amount of blood.

Porta performed 11 operations for goitre; the first in 1835; the last in 1850. Five were merely ligations of one or two thyroid arteries; the remainder were small operations—incisions or enucleations of very small tumors. In one instance he ligated the internal carotid artery (No. 5), mistaking it for the inferior thyroid; the error was discovered at autopsy. He was the first to ligate the inferior thyroid artery (No. 13). The most important and the greatest number of operations for Italy were performed by Bottini, who like Porta occupied the chair of surgery in Pavia. Bottini operated upon 18 goitres; Porta, as I have said, upon 11. Thus in Pavia 29 of Italy's 53 operations for goitre were performed; indeed, the surgery of goitre in Italy up to 1883 may be said to have begun and ended and centred in Pavia. Most of Bottini's operations were of considerable magnitude, six of them being more or less complete excisions of the thyroid gland. His first operation, in 1868, was regarded, probably erroneously, as a total removal; his second operation, also believed to be a total one, was not performed until 10 years later; then, in five years, he operated 16 times.

The period from 1878 to 1883 was one of great activity in this field in Germany, Austria and Switzerland—for Billroth, for Koehér and indeed for most surgeons in all surgical fields and in all countries. For Listerism was being introduced—eagerly adopted in German-speaking lands, very tardily in England and the United States. It was not until about 1890, 23 years after Lister's first papers on the use of carbolic acid, and 14 years after his visit to America, that the value of antiseptic surgery was generally recognized in the United States. From 1876 to 1889 the contributions to antiseptic and aseptic technique were made chiefly by the German-speaking nations; since 1889 they have come quite exclusively from America. Bottini observed "strict antiseptic precautions" in 1879 or perhaps 1878 (*vid.* No. 20); for

France the first mention in my tables of a Lister dressing is made Monod, 1880 (No. 38); for Great Britain, by McLeod, in 1880 (No. 40) and by Purcell, in 1880 (No. 41). In the accounts of operations in America there is nothing to indicate that antiseptic precautions were taken in a single instance. It is remarkable that Bottini notwithstanding his great experience in operating upon goitres—experience greater than that of any surgeon of the four countries should not have hit upon the idea of ligating the thyroid arteries a measure preliminary to the extirpation of the gland. The preliminary ligation was made only once in our series for Italy—by Berrini (No. 39), who removed the whole gland "by the method of Billroth. The incisions, except in one instance, were longitudinal, or oblique so. Ruggi (No. 44) employed a semilunar flap—approximately collar incision.

Bottini's mortality was 16.6 per cent (3 in 18); for Italy it was 1 per cent (7 in 53). The fatalities were distributed as follows: Porta (No. 5); Bottini, 3 (Nos. 28, 50, 51); Colomiatto, 1 (No. 32); Fani, 1 (No. 34); Novarato, 1 (No. 37). There were no deaths from primary hemorrhage—one from secondary. Sepsis was the cause of death in three cases, and in a fourth was undoubtedly responsible for the fatal secondary hemorrhage. One patient died of pneumonia one from suffocation caused by an unrecovered and undiscovered tracheal lobule of the thyroid.

GREAT BRITAIN AND IRELAND (TABLE III)

BENJAMIN GOOCH. (Nos. 1 and 2.) *Of bronchocèles. Medical and chirurgicæ observations*, London, 1776, p. 134 (being an appendix to *A practical treatise on wounds and other chirurgicæ subjects*, 1767).

These first cases for England are essentially the first for the world if we may exclude cases 1 and 2 of Günther's abstracts. Gooch tested against operation in both cases. Bell¹ and Langenbeck² cautiously state that he either operated or intended to operate. Günther believes that he assisted at one of the operations. Gooch's account of these earliest operations (1776) is entertaining and worth repeating:

"I have had my opinion asked in a great number of tumors of the kind, and cannot recollect an instance of their endangering life, when enlarged to a very great size.

"It is said, that in some parts of this kingdom, there are persons who undertake to cure this disease; and some years ago I had a letter upon this subject from a surgeon of character at Coventry, written in a very modest and sensible manner, wherein he acquainted me he had sometimes succeeded. But, for my own part, I must ingenuously confess, the various methods I have tried to disperse these swellings, even in a recent state and moderate size, have been defeated; * and I never durst venture to attempt the cure by excision, on account of the vicinity of the large blood vessels.

"I was once indeed prevailed upon to be present at such an operation, where the tumor was of a very large size, and the patient's blood in a thin, deauperated state.

"Before I went the operation was resolved upon, in a numerous consultation, and all I could do was to shew my fears and apprehensions of what would probably attend it, declaring, that were it a patient of mine I would not attempt it.

"The surgeon was a good and intrepid operator; but before he had half finished the operation, there was such an effusion of blood, as obliged him to desist and turn his whole attention to restraining the hemorrhage, or, in the opinion of all present, the patient would have sunk and died under his hands. She died in less than a week and, I was informed, the blood was never totally stopt. The unhappy event naturally brought the reputation of all the surgeons concerned in question.

"I remember another case of this kind, in which my opinion was asked jointly with that of an excellent surgeon in the country, my particular friend,† and the operation was performed against our judgment by one of the ablest surgeons and most dexterous operators in London, which was very near ending in a fatal hemorrhage. The young lady's life was preserved only by having a succession of persons to keep constant pressure upon the bleeding vessels day and night for nearly a week with their fingers upon proper compresses, after the operator had been repeatedly disappointed in the use of the needle and ligature, etc., as his pupil assured me who attended this case.

"I may here add a third similar case, wherein I was consulted, in which the surgeon concerned discovered an earnest desire to attempt extirpation; but I as earnestly urged the arguments I have assigned, which dissuaded him from so dangerous an operation.

* "I have talked with many eminent hospital surgeons upon this subject, and they express themselves in the same manner, who have the best opportunities of improving our art, and making useful discoveries."

† "Mr. Cooper, late of Bungay in Suffolk."

"This disease is very frequent in Switzerland, and in the neighborhood of the Alps, which made Juvenal say, 'Quis tumidum guttur miratur in Alpibus,' *"

SIR WILLIAM BLIZARD. (No. 3, reported by Burns.) was the first to ligate a thyroid artery (1811) for the cure of goitre. Death from hemorrhage due to sepsis.

KEY and H. EARLE. (Nos. 5 and 6.) The ligations of Key and Earle are noteworthy because both patients had symptoms of the disease described 12 years later by Graves. Key's patient died on the second day, probably from hyperthyroidism.

GREEN (No. 7) is usually credited with the first excision of a goitre in Great Britain. He believed that he had removed the right lobe, but from his vague description of the operation one questions if he knew what he had done. The patient died about two weeks after operation, probably from infection.

ROBERT LINSTON. (Nos. 8, 10, 11, 12, 13, 14.) The dexterous Linston was evidently helpless when confronted with a goitre.

EDWARD HAMITTON (1865) (No. 17) was surprised to find how easily both lobes could be freed. He transected the "pedicle" (the part adherent to the trachea—the isthmus). There was great loss of blood, but the patient recovered.

ALFRED POLAND (No. 20) creditably enucleated (1870) an adenoma

TIMOTHY HOLMES. (No. 23.) A case in which a large bronchocele was removed, with fatal result. Amer. Jour. Med. Sci., Philadelphia, 1873, n. s. vol. lxxv, p. 17.

Timothy Holmes extirpated (1872) with care and skill a great cyst which hung below the patient's waist. His case is erroneously attributed by Siskind to America. Dr. Holmes writes:

"I have read with extreme interest the article on the removal of bronchocele published in the American Journal of the Medical Sciences for January, 1871, by Dr. Greene of Portland, Maine. It happens that I had been led to a conclusion similar to that of Dr. Greene as to the occasional justifiableness of such operations and had had occasion to perform the operation before meeting with his excellent paper. My case, although its issue was fatal, was one which to me

* "I have been told by gentlemen who have been in Switzerland, that this tumor in the throat, called 'goutière,' is far from being there looked upon as a personal deformity."

mind showed that such operations are not impracticable and that recovery may be reasonably anticipated in a certain proportion of them."

Woman, *æt.* 65. Enlarged thyroid for more than 40 years. The tumor gradually increasing in size, finally burst and discharged, her friends said, half a pailful. Suppuration of the enormous cyst followed. Greatly reduced in strength and when death seemed inevitable the patient consulted Dr. Holmes, who finally agreed to operate.

The tumor hung below the patient's waist. "On the right side the innominate artery could be felt extending as high as the lower edge of the tumor, and giving off its two branches; the subclavian lying over the pedicle for some distance" (*sic*).

Operation, June 19, 1872: "I did not adopt the plan of operation proposed by Dr. Greene, of endeavoring to enucleate the tumor without regard to the hemorrhage so produced. In fact, the enormous size of the mass rendered such a plan too dangerous, especially in her enfeebled state. The tumor was surrounded by appropriate incisions around its lower part; flaps were carefully dissected off it, sufficient to cover the vast surface which would be exposed; all large vessels that could be seen were divided between ligatures, and any that spirted were tied at once, and in this way we got down to the base of the tumor. Having dissected the soft parts away from the base of the large cyst to a sufficient extent, I encircled the pedicle with the chain of an *écraseur* so as to check the hemorrhage, while with an amputating knife I cut away the mass. This left behind a portion of the cyst. After the divided vessels had been secured, the *écraseur* was removed, and the remains of the cyst partly dissected off, and partly surrounded with ligatures. The operation lasted about an hour; the patient remained quiet under the influence of chloroform the whole time, and did not suffer at all from dyspnea, except when an attempt was made to pass the chain of the *écraseur* fairly below the tumor, instead of around its lower end. This attempt completely closed the trachea and stopped the breathing entirely. It was this intimate connection between the deep part of the cyst and the windpipe which obliged us to leave a part of the cyst wall behind; but I carried double ligatures round every accessible part of it—partly to command the hemorrhage, and partly to insure the separation of all the secreting surface. The patient lost very little blood, and her pulse was as good after the operation as before. She passed a comfortable night after the operation, and was able without difficulty to swallow milk and other liquids. Early next morning hemorrhage set in from the upper part of the wound, and before it could be stopped a considerable quantity of blood was lost; in the afternoon erysipelatous redness began to appear over the throat, the pulse became rapidly weaker, unconsciousness supervened, and she died on the following morning, having survived the operation about 39 hours. No post-mortem examination was made.

"The tumor, when removed, weighed a little over 7 pounds. It consisted almost entirely of the single large cyst, the walls of which were

of considerable thickness, containing here and there nodules of calcareous matter, and a few small secondary cysts."

JAMES SYME (No. 25, reported by Watson). James Syme, Scotland's famous surgeon, seems to have been almost as greatly embarrassed (1874) as Liston in the presence of the blood vessels of a goitrous

PATRICK HEMON WATSON. (Nos. 27, 28, 29, 30, 31, 32, 33, 34. *Excision of the thyroid gland.* Edinburgh Med. Jour., 1874, vol. xii. p. 252.

Watson's triumphs undoubtedly entitle him to the dominant position in the field of goitre surgery, not only for Great Britain, but also for France, Italy and America. Warren Greene excepted, he is the only surgeon of these countries who devised a special method of operation and practised it systematically and with success. His method served him well in the first seven cases, but in the eighth, having wounded "a large vein lying posteriorly in the groove between the trachea and esophagus," and being unable to control the hemorrhage, he accidentally opened the trachea in his haste to detach the tumor from it. The patient died from aspiration of blood. Watson's method almost guaranteed difficulties for the surgeon—difficulties which even those who approved of it would hardly have been able to cope with. He was not master of the art of dealing with blood vessels, and few could have been in those days when surgeons, handicapped by example and training and without suitable equipment, had not developed a delicate manner of operating. His first operation was in 1871. In 1877 he reported five cases, all successfully operated upon by him. He writes:

"The operation of excision of the thyroid gland has no claim novelly to render it attractive. It has been practised previously by different surgeons, notably by the late Mr. Liston, and the ill success which attended upon the attempts to extirpate this organ, when more requiring operative interference, has served to deter most writers of the present day from recommending its adoption. Before practising this operation, I had twice assisted at operations where a partial extirpation of the hypertrophied organ was adopted. In one case under the care of the late Mr. Syme, where in a cystic goitre, after tapping and injecting the cyst, aneurismal signs manifested themselves, I laid open the pulsating sac, and failing to arrest the hemorrhage, which poured out in a rapid stream, he seized first one side of the sponge-ligament and then the other, cutting away as much of the walls as could be exposed. In this case the hemorrhage proved unrestrainable, in spite

of stuffing the cavity with sponges and stitching the margins of the incision together over them, and the patient died in our hands. In the second case, Professor Spence extirpated a tumor of the isthmus of the thyroid with complete success, but with great bleeding attending upon the division of the vascular connexion. The hemorrhage which complicated both of these cases was certainly such as to make any one timid in adopting such a proceeding."

Watson describes the second operation in greater detail than the others.

Case 2: "In her case, I operated by a long linear incision, which sufficed to expose the upper and lower margins of the tumor. After dividing the skin and cellular tissue, and opening the fascia over the interval between the sterno-hyoid and thyroid muscles, carefully avoiding the fascial sheath of the thyroid gland, I carried my forefinger and thumb over the margin of the tumor at its upper and right-hand corner, and feeling that I had the vascular connexions of the tumor, with the right superior thyroid artery in my grasp, I introduced an aneurism-needle through the fascial sheath in the middle line, bringing it out again at the right side of the level of the equator of the tumor. A ligature was passed through the eye of the needle, and when the needle was withdrawn, the ligature was left in its track. This ligature was confided to an assistant, and held aside. The needle was again passed in the situation of its former emergence, guided by the finger, and then passed beneath the right inferior margin of the gland, so as to include all the right inferior thyroidal connexions. The ligature was similarly withdrawn along the track of the needle. The same process was repeated upon the left side, a ligature being carried beneath the left superior and inferior thyroidal connexions, together with their delicate investing fascia. These four ligatures were then separately tied, so as to secure the vessels included within their cellular sheath as near their origins as was possible; the further separation of the tumor was effected by curved scissors.* As the right superior thyroidal attachments were divided, the ligature came away in the hands of the assistant to whose care it had been confided. A gush of blood took place, but was at once stanchd with a sponge thrust into the wound."

In three of Watson's patients (Nos. 28, 29 and 31) exophthalmus was noticed. No mention is made of other eye signs or of lachrycardia, or other symptoms of Graves' disease. All of these were "cystic goitres," possibly adenomatous in origin and hence probably toxic. It is noted in one of them (No. 29) that "the anemia and exophthalmia which were present on admission markedly diminished after the operation." I recall no earlier mention of exophthalmus having been

* Dr. S. Cooper of San Francisco practised a similar method in 1861.

improved by thyroidectomy. It was, indeed, accidentally discovered by several (*i. e.*, Tillaux,²⁸⁸ Rehn,²⁸⁸ Mikulicz²⁸⁹) that Graves' disease could be cured by operation upon the thyroid.

In August, 1875, Watson²⁸⁵ read a paper on *Excision of the thyroid gland* before the surgical section of the British Medical Association in Edinburgh. This paper is almost a verbatim reproduction of an earlier communication in the Edinburgh Medical Journal, 1874²⁸⁶ mention this because Stuskind's "two successful operations performed at Chalmers's Hospital," given in his English list of 13, were undoubtedly Watson's, and counted twice; also because Watson in his paper recounts a fatal case, as follows:

"In this fatal case, the tumor, of a very large size, was adherent to the trachea. After preliminary application of ligatures and the division of the vascular attachments upon the right and left sides had been effected, on turning the tumor to one side, a large vein, lying posteriorly in a groove between the trachea and the esophagus, was unfortunately wounded. The pressure of the sponge applied to arrest its bleeding together with the drag upon the trachea when the tumor was turned one side, interrupting the respiration, led me to attempt to separate the attachments of the tumor from the trachea rapidly by means of the finger in a deep wound, from which bleeding was still going on. The thin soft posterior wall of the trachea thus turned outwards was unfortunately wounded; and, before relief could be afforded by opening the trachea and introducing a tracheotomy tube below the level of the tumor, so much blood had been sucked into the air-passages as to determine a fatal result in the course of the evening."

SPENCE, McLEOD WHITEHEAD. (Nos. 39, 40, 43.) Three operations upon by Watson's method. Spence modified the method by dividing the isthmus and removing the lobes separately. The first instance in Great Britain in which this procedure was practised. The patient, who quite possibly had Graves' disease, died within 24 hours.

The remainder of the operations tabulated for Great Britain are relatively minor ones, although for the day they were major operations in that they represented the best efforts of the best operators.

UNITED STATES AND CANADA (TABLE IV)

We have found reports of 45 operations for goitre in America 1883. There were five deaths, one of these (Maury, No. 21) occurred from pneumonia three weeks after operation and when the wound almost healed and the patient convalescent. Including this case

mortality, therefore, was only 11 per cent; excluding it, 9 per cent. There was only one death from hemorrhage (Cooper, No. 8) unless possibly another in the case of Valentine Mott (No. 2), which Gross reports in a single line. But the hemorrhage in two of Greene's cases was "fearful." In Nathan R. Smith's case sepsis was the cause of death; the huge pendulous tumor was ulcerated and sloughing at its dependent portion. Of the remaining two fatalities, one (Maury, No. 21) was, as just stated, due to pneumonia incurred three weeks after operation; the other (Hamilton, No. 26) followed a tracheotomy and was also probably due to pneumonia. One would naturally expect to find the greatest mortality in the cases of excision of both lobes; but in the 10 more or less complete thyroidectomies there was not a death. The cases of Nathan R. Smith (No. 4), E. S. Cooper (No. 8), Warren W. Greene (Nos. 13, 18, 19), E. L. Marshall (No. 14), F. F. Maury (Nos. 20 and 21) and C. E. Fenwick (No. 23) deserve especial consideration.

NATHAN R. SMITH. (No. 4) *Excision of the thyroid gland.* North American Arch. of Med. and Sur. Science, Baltimore, 1835, vol. ii, p. 309.

The patient, *ac.* about 40, was a Mrs. Wells of Prince George's County, Maryland. The thyroid enlargement was noticed about 1815; this is the only date given in the paper. The tumor "occupied the whole space between the os hyoides above, and the sternum below, and by its weight it had assumed something of a pendulous form, falling over the margin of the sternum. The general configuration of the tumor, in short, was that of a common goitre, and when the integuments were entire it presented the varicose veins usually conspicuous in that disease.

"Some months before the case fell under my observation, the skin covering its most prominent and dependent point had ulcerated, and all the means which had been employed to effect the cicatrization of the sore had failed. There had now issued from this breach of the integuments, a dark, fungous excrescence, represented in the drawing, and presenting a strong resemblance to the fungus hematomides. From this excrescence there issued a sanious and offensive discharge, and occasionally slight hemorrhage had occurred.

"On carefully examining the relations of the tumor (together with Professor Geddings, whose advice I requested) we became satisfied that it was one of the thyroid gland, the right lobe of the organ being chiefly concerned. We could distinctly feel and see the sterno-hyoid and sterno-thyroid muscles passing like tense ribbands vertically over the tumor. The margins of the sterno-mastoid muscles,

on each side, were raised and spread upon the sides of the tumor. More obscurely, the situations of the omo-hyoid muscles were ascertained.

"The superior thyroid artery of the right side was distinctly felt and seen, descending superficially, in a tortuous course, obliquely upon the lateral and anterior portion of the tumor. The left thyroid artery could be obscurely felt. On handling the tumor for the purpose of determining its deep attachments, we could readily cause it to gliding beneath the muscles of the neck and upon the trachea and larynx; but owing to its magnitude, it was impossible to determine the nature of all its relations with the deeply seated parts on which it rested. We satisfactorily ascertained, however, that the great vessels of the neck were not involved in, or adherent to, the tumor.

"On carefully weighing all the circumstances of the case, it was manifest that there was no rational ground for hope that any course of palliative treatment would arrest the progress of the disease, effect the cicatrization of the ulcer. The propriety of attempting complete extirpation of the tumor was now considered. We arrived at the conclusion that the operation would be attended with extreme difficulty and great peril to the patient, but, as a dernier resort, regarded it as justifiable in case the individual and her friend, being made acquainted with the circumstances of the case, should desire the attempt to be made. In a few hours I was informed that the patient had firmly resolved to place herself wholly in our hands and cheerfully to incur the hazard of any course we might see fit to pursue.

"On the _____ of _____ I performed the operation, with assistance of Professor Geddings, Dr. Whitridge, Dr. Thomas, Elk Ridge, and several medical pupils. I commenced the operation by making, in the integuments, an elliptical incision, the length of which corresponded with that of the neck. Its central and broad portion included the ulcerated and fungous portion of the tumor. I then commenced my dissection around the body of the tumor on the right side, it being my desire to expose and secure as quickly as possible the thyroid artery. This I soon effected, though in consequence of the exceedingly tortuous course, I wounded it and secured it at more than one point.

"I now proceeded to raise the border of the sterno-mastoid muscle and lay it back from the tumor. In doing this I encountered (1) a vessel which does not usually exist) the anterior jugular vein, the vein being somewhat withdrawn from its close proximity to the border of the sterno-mastoid muscle by the fascia involving it, which was tensely drawn over the anterior part of the tumor. As the muscle was retracted with some force, such tension of the parts was necessarily produced, as compressed the vein and emptied it of its blood. The wounding of the vessel, under these circumstances, was therefore scarcely to be avoided. Blood soon flowed freely from the wound

vessel, its flow being hurried by the strugeling, and deep, strong breathing of the patient. I was perfectly aware of the great danger of the inhalation of air into the vein, and the fatal consequences which might be expected to result from its reaching the heart in any considerable quantity. I, therefore, while making efforts to secure the vessel with the ligature, was careful to grasp the border of the sterno-mastoid muscle, including the lower portion of the vein, with the finger and thumb. The vessel was secured with the armed needle; but notwithstanding my utmost care, I twice distinctly heard the gurgitation of a small bubble of air, as it entered the vein, at the moment of a strong and deep inspiration of the patient. For a moment I desisted from the use of the knife, and looked in the face of my patient to observe the effects of the ingress of air into the veins. Happily the quantity was not sufficient to produce any obvious effect, and I proceeded with the operation.

"Having now passed through the strata of blood vessels which pertain to the muscles and to the border of the thyroid gland, I proceeded in my dissection with much greater facility. On the left side I effected it with much more ease than on the right; but here also, on the division of the thyroid veins, I distinctly heard the gurgitation of air. To guard against its repetition during the remainder of the operation, I was careful, whenever I divided any fascicles which might be supposed to contain veins, to grasp it firmly with the finger and thumb below the incision, and if blood flowed from the upper portion, to secure the lower with the ligature. I should have remarked that I found it necessary to divide the tendon of the omohyoid muscle on each side.

"As I progressed with the dissection of the tumor from the deep-seated parts, I found it necessary to proceed with extreme caution. The sheath of the great vessels on each side lay in immediate contact with the tumor and, indeed, was to some extent incorporated with it. I also found that the fascia covering the thyroid and cricoid cartilages was thickened and adherent to the tumor. Its separation from these connections was the most tedious and difficult part of the operation. The separation of the tumor from the parts immediately above the border of the sternum, where I was prepared to expect great difficulty and danger, was effected with infinitely more ease than I had anticipated. The vessels in this region appeared, by the traction of the tumor, to have been elongated, and to some extent obliterated. The thyroid artery, particularly on the right side, presented the appearance of a long, loose, hard cord, pulsated but feebly, and was secured without any difficulty, being drawn out with the tumor. On the left side I secured nothing but branches. The veins of this region were neither numerous nor large, they having no doubt been diminished by the pressure of the parts upon the sternum.

"At length I succeeded in effecting the complete removal of the tumor. There was now left a frightful chasm in the throat, the

The Operative Story of Goitre

larynx being dissected quite bare, especially on the right side, and trachea exposed as low as the border of the sternum. The great vessels on each side were also seen throbbing in their sheaths. The recurrent laryngeal nerve was distinctly seen on the right. The last portion from which I detached the tumor was a portion of the thick tissue covering the thyroid cartilage, and its attachment here was firm. When I had severed it, two or three minute arteries sprang out, one of which I immediately secured; but as the hemorrhage did not appear to cease, I did not take up the others.

"The operation was necessarily painful and protracted; its execution occupying an hour; the patient, however, endured her sufferings with wonderful fortitude, and at no time did there take place alarming sinking of the powers of life. Twice or thrice, at her desire, I had delayed a few minutes to allow her a moment of comparative repose, but neither then, nor after the operation, did there appear to have been inflicted any serious shock.

"In the morning, on visiting Mrs. Wells, I was alarmed at finding the dressings bathed in blood which was still flowing from the wound, and evidently of the arterial hue. I immediately cut stitches, opened the wound, and turned out a mass of coagulated blood, and found the bleeding to have occurred from a minute artery where the last attachment of the tumor had been cut away. I secured the vessel with the ligature, and as there was a disposition to hemorrhage from minute vessels, I applied to the part a small compress of dusted with alum powder.

"On the fifth day, however, there occurred a severe rigor, followed by fever, sonorous and embarrassed breathing, cough and irritation of the stomach. It passed off with a sweating stage, precisely like a paroxysm of intermittent fever. The wound, which had suppured kindly, now began to exhibit a flabby appearance, and to discharge an unhealthy secretion.

"It is not necessary that I should relate the subsequent progress of the case; suffice it to say, that the rigors recurred every day, notwithstanding our endeavors to parry them, and that the patient expired on the 13th day. The chills were evidently of malarious origin, my patient undoubtedly came to me predisposed to intermittent fever. To this, in part, I think I may with propriety ascribe the fatal result.

When we consider that the patients were unanesthetized and that surgeon until many years after Nathan R. Smith's day was without artery forceps, and had to rely chiefly on aneurism-needles, bled, and the pressure of fingers or sponges for the control of hemorrhage, we must concede that the most difficult task of the present-day surgeon is hardly more creditable than this operation by Smith in 1835. The control of hemorrhage has always been, as it is today, the chief concern of the operator. Now

surgeon is provided with literally hundreds of artery clamps and the patient being anesthetized there is no need for haste; the operator, unperturbed by the cries or struggles of the patient or the fear of hemorrhage, proceeds calmly and surely from one step of a well-perfected method to the next.

Nathan R. Smith had quite surely never seen an operation performed upon the thyroid gland, and it is not unlikely that he had never heard of such an operation, although he concludes his paper with the sentence, "Instances in which the operation has been successfully accomplished are no doubt fresh in the minds of the readers."

My admiration for Dr. Smith, Baltimore's "Emperor," has been greatly increased since reading his modest and lucid report of a case, the importance of which he could hardly have comprehended. I have seen no reference to this case in the literature except in the Index Catalogue of the Surgeon General's Library. It is surprising that Samuel D. Gross did not know of this chef d'œuvre of Nathan R. Smith.*

E. S. COOPER. (No. 8.) *Operation for the removal of bronchocele. Death of the patient.* *Cinc. Lancet and Obs.*, 1860, vol. iii, p. 15.

"Important surgical operations proving successful, should generally be reported to the medical world, but those terminating fatally should always have the widest range of publicity among the profession.

"In consequence of the great fatality attendant upon operations for the removal of bronchocele, the practice is now generally abandoned. The extent and importance of the tissues involved, when the tumor is large, rendering the operation dangerous in the highest degree, is sufficient reason why it should not generally be resorted to, except in extreme cases.

"There are those, however, where the disease is rapidly growing, and from the hardness of the enlargement and its pressure upon the windpipe suffocation must inevitably result at no distant day, in which an attempt at removal may be made. Such is the one I am about to relate.

"Case: Mrs. M., *æt.* 24 years, consulted me on the 3d of October, 1859, in consequence of an enlargement on the left side of the neck, extending from the clavicle to near the chin. It was twice the size of a man's fist, and had been over four years attaining that size, and during the preceding year increased very rapidly. It pressed heavily upon the trachea, which was considerably flattened. Pulsa-

* Both were professors at Jefferson Medical College—Smith, professor of anatomy from 1825 to 1827; Gross, professor of surgery 29 years later.

tion of the left carotid artery could be distinctly heard on applying the ear over it, while the sounds of expiration and inspiration could be as clearly heard over it as by applying the ear to the chest. The was distinct pulsation nearly all over the tumor. In the act swallowing, it arose and fell with the motion of the trachea, and was much more firmly fixed over the region of the trachea than over the outer part of the neck.

"I was convinced that I had made a true diagnosis before operation and that it was not aneurism, but bronchocele, though some of my medical friends thought it might be the former.

"I have been consulted in regard to many cases of bronchocele, but I never saw any one presenting so fearful a prospect for the use of the knife, and from the lights before me, conferred by the experience of others, I never would have decided upon removing this disease by the knife; and notwithstanding the certain prospect of a fatal termination of the case at an early day, I would have either sent the patient away hopeless, or pursued a temporizing course, as had been my custom in other cases, but for having decided to try the écarteur, by which I concluded I might succeed in removing it without the dangers fatal hemorrhage, so often attendant upon the use of the knife.

"For the purpose of applying the instrument, I made the cruciate incision over the tumor, and reflected the flaps of integument down its sides until I thought one-half of it was exposed, after which I passed needles armed with ligatures deeply into its substance in several different places, to be strongly drawn upon by my assistants, thinking thereby to force the chain round the tumor to its under side. It was soon ascertained, however, that the chain would slip forwards in spite of the ligatures. I therefore made a further dissection, so as to expose the entire anterior half for the purpose of inserting the ligatures as before.

"About this time the procedure was arrested by a collapse of the patient, apparently from the effects of the chloroform.

"The patient became pulseless, and for some seconds respiration appeared entirely suspended, but by the use of brandy and other stimulants, with electricity, she had reaction, when the écarteur was again applied; but the use of the instrument was still found to be impracticable, in consequence of the firm attachments of the tumor to the trachea, in consequence of which the chain would have broken down and carried part of it away, instead of separating it from the tumor. I therefore laid aside the écarteur, and took up the scalpel to dissect the tumor away from the trachea; but in effecting this I found necessary to ligate the primitive carotid artery a little above where the vessel crosses the lower part of the trachea.

"This I think was the most difficult dissection I ever did. The extreme low point on the neck at which I was compelled to ligate the vessel in order to place it out of the reach of being subsequent wounded, together with the density of the abnormal adhesions among

the different structures, rendering their separation with the scalpel exceedingly difficult, while the use of that instrument was hazardous in the extreme, were the causes of this dissection being so difficult.

"The carotid artery being tied, I concluded to extirpate the tumor by the knife, which was accomplished in 1 hour and 20 minutes from the time the operation was commenced, with the loss of a comparatively small amount of blood.

"The internal jugular vein was not wounded, but the anterior and external jugulars were both ligated above and below, as also the superior and inferior thyroid and some other enlarged veins. There were but four arteries besides the carotid and inferior thyroid ligated.

"The tumor being removed, the flaps of integument were brought together by sutures, and were formed sufficiently large to cover the exposed surface. Adhesive straps were put upon the wound, and a piece of lint wetted with an evaporating lotion placed over it, when the dressing was completed.

"The patient revived considerably, and appeared to be doing tolerably well for two hours, but perfect reaction did not take place, and she died in five hours from the time the operation was concluded.

"The great length of time occupied in this operation was owing to the care with which part of the dissections had to be made, the delay occasioned by the sinking of the patient at one time from the chloroform, and the time occupied in the efforts to use the écarteur."

E. S. COOPER. (No. 9.) *Cutting away of a bronchocoele without hemorrhage, with a case. Remarks.* Med. and Sur. Reporter, Philadelphia, 1862, vol. viii, p. 38.

"Operation, March 27, 1861: Mrs. P., *æt.* 27, applied to me with a small tumor situated at the isthmus of the thyroid body, of 10 months' standing. It was the size of a hen's egg, and moved up and down in the act of swallowing. It was unattended with pain and had increased in size but slowly. Its growth was, however, constantly perceptible to the patient, and caused her great mental anxiety.

"Being convinced that all methods in use among surgeons will fail to give that freedom from hemorrhage, at the same time certainly of success, with avoidance of suffering to patients, and of deformity after cicatrization, which the nature of the disease and surrounding tissues reasonably warrant, I have for some time been gradually departing from the usual practice.

"My first method was dissecting away the tissues covering the tumor, then passing ligatures through its lower as well as its upper parts so as to include the thyroid arteries.* After this, transfixing the enlargement at different points and in different directions by

* Thus he anticipated Patrick Watson, who, 13 years later, described the very similar method which he and his followers practised with marked success.

needles armed with ligatures of great strength, in case of large tumors using a sort of nevus needle made, on purpose, with a long, piercing extremity, sufficiently long to transfix readily a tumor 4 inches in diameter.

"Many double ligatures being thus passed through the tumor and their ends tied tightly together, it is at once reduced to one-fourth or one-sixth of its natural size. Sloughing occurs in these cases without secondary hemorrhage. But as cases operated upon in this way have been often published with their results, I shall not dwell upon it now, but proceed to my *second* method.

"This consists in exposing the tumor as before and transfixing it above and below, throwing ligatures around the substance as described before and cutting it away close to the ligatures. This was done in the case mentioned without more hemorrhage than results from the simplest operations. Should the wound bleed too much in any case, I would whip-stitch the entire cut surface.

"In this case every symptom was favorable from the commencement and on the 21st day after the operation the patient left for her home in the country, almost recovered, and with very little deformity from cicatrization, which was almost complete.

"Remarks: Although the method of treatment adopted in the above case is applicable to those of bronchocoele generally, still the surgeon will now and then meet with the vascular or *aneurysmatic* bronchocoele in which the excessive hemorrhage resulting from every stroke of the scalpel will be such that he is finally compelled to abandon the operation; but these cases are extremely rare, and the surgeon should not in any case be too much alarmed at a sudden gush of blood, as that will often occur in cases where the hemorrhage is perfectly controllable by occasionally whip-stitching the bleeding surface.

"I repeat here, substantially, remarks made in the publication of other similar cases elsewhere, which is done so that any who read this report, but may not have read the others, will understand it.

"Surgical writers often state that the method of ligating the thyroid arteries frequently results in secondary hemorrhage. This I have never seen in any case. Is it because of ligating the arteries in the midst of a mass of other tissue and at the same time strangulating every part of the tumor, as mentioned in the first method, removing the unnatural growth close to the ligature, as in the second thus causing a consolidation of the tissues around the arteries, the prevents the secondary hemorrhage as chronicled in the books?

"And at this point I am reminded of a question which has often arisen in my mind, as to whether the ordinary method of ligating blood vessels by isolating them completely first, is not based upon erroneous principles. Whether the necessity of drawing the ligature sufficiently tight to cut the inner coats of the artery, is not favorable to the production of secondary hemorrhage, by inducing the tissue to slough of the ligature; and whether it would not be better to

all cases to include such surrounding tissue as would admit of it, is also a question.

"Of course a nerve could not be included in the ligature; but muscle, fascia, cellular tissue, and even the veins might be included. The veins which have heretofore been supposed to be particularly disposed to phlebitis when wounded are found to be not more so than the arteries, unless the wound of the vein causes the arrest of the uncarbonized blood in its way back to the heart. But when that occurs, it becomes dangerous, because the accumulation of venous blood acts as a foreign substance and source of great irritation.

"I am now constantly in the habit of sewing up the ends of arteries, even of considerable size, in a mass of other tissue, when the vessel is either hard to isolate and tie, or in that exposed situation which would leave the ligature liable to be disturbed by the sponge or other cause during the subsequent steps of the operation.

"I do not believe that it is at all necessary to draw a ligature sufficiently tight, when applied to any artery, to cut the inner coat, as is supposed. Pressure, by which the hemorrhage will be arrested, would produce a change of action in the parts sufficient for the effusion of fibrin, by which the vessel would become filled.

"We have innumerable examples of pressure causing the effusion of coagulable lymph. Why should a ligature be drawn more tightly upon an artery than simply to arrest the hemorrhage? It appears to me that if there is any reason why this should be done, it is to keep the ligature from slipping, which may be readily effected by including some of the surrounding tissues. In natural amputations of the extremities, the arteries are hermetically sealed by the process of nature, and a firm clot is formed in the vessels without the aid of ligature. Who knows whether the inner coats of the arteries are cut by the ligatures even when drawn tightly? If not, it is very obvious that a very tight ligature would favor the too early division of the vessels without there being any just cause for the risk."

WILLIAM WARREN GREENE. (No. 13.) *Successful removal of a large bronchocele.* Med. Record, New York, 1866-67, vol. i, p. 441.

"It is well understood by the members of the profession that extirpation of an enlarged thyroid gland is one of the most fearful operations ever undertaken by the surgeon. While there is always great danger from shock, secondary hemorrhage, inflammation of the cervical vessels and of the esophagus and respiratory organs, the danger which overshadows all others, hanging like a thunderbolt over patient and operator, is terrible and uncontrollable hemorrhage.

"... such surgeons as the Coopers, the Bells, Ferguson, Velpeau and others have been obliged to abandon operation.

"I have quite carefully examined the literature of this subject, and so far as I can learn, *all* bronchoceles that were ever successfully re-

moved (and there are very few) were small. I am very confident that none were as large as that which I shall describe."*

Woman, *æt.* 45. The tumor had been growing for 26 years. Pressure symptoms were so great that attempts to swallow or talk caused "terrible spasms of dyspnea." She was unable to lie down. Suffered from headaches and giddiness and could not stoop without losing consciousness.

Operation, dates not given (Aug. (?), 1866 (?)): Vertical incision. "Fearful hemorrhage" from veins on exposing the tumor. "I now rapidly separated the areolar attachments, and in a few seconds was at the pedicle, which I found containing three large arteries whose pulsations were very distinct, and which were my guides for dividing the pedicle into three parts, which I also accomplished with the fingers. I immediately tied each third with a ligature composed of 18 strands of saddler's silk, *saturated* with wax and *loosely twisted*. As I drew the last cord all hemorrhage instantly ceased. The pedicle was carefully divided close to the goitre, and it removed. During the dissection I found at one point the tumor quite firmly adherent to the sheath of the vessels; and while separating it, a gush of venous blood indicated the rupture of a large vessel. The finger of an assistant controlled it until the ablation of the bronchocele, when examination proved the internal jugular to be wounded. This was tied with a ligature of three strands of silk loosely twisted; no other vessels needed interference. The entire operation occupied 22 minutes."

The patient was restored to perfect health. The weight of the tumor was one pound and nine ounces. The paper is illustrated with interesting woodcuts showing the patient before and after the operation.

WILLIAM WARREN GREENE. (Nos. 18 and 19.) *Three cases of bronchocele successfully removed.* Amer. Jour. Med. Sci., Philadelphia, 1871, n. s., vol. lxi, p. 80.

No. 18: Woman, *æt.* 40. Tumor, the size of a small orange, in the right lobe caused great difficulty in swallowing.

Operation, Oct. 25, 1869: The tumor was removed by enucleation. Simple operation except for adhesions to esophagus. Recovery.

No. 19: Woman, *æt.* 35. The tumor had been growing slowly for 20 years. Headache, vertigo, dysphagia and an alarming degree of dyspnea were complained of when she consulted Dr. Greene in August, 1869. "To the fingers, as to the eye, the tumor pulsed everywhere." At one point there was a distinct thrill and bruit. "So marked and peculiar was it that an eminent hospital surgeon of Buffalo had pronounced it an aneurism of the common carotid.† But it was certain

* Greene evidently knew nothing of the European literature.

† Thanks to the courtesy of Dr. Frederic Henry Gerrish of Portland, Me., who assisted at the operations in this and the previous case, I have photographs of this patient. There is nothing in the facial expression definitely to indicate Graves' disease.

that this case was more formidable than either of the others—involving both lobes, being of immense size, and more vascular than any goitre I had ever seen; and I did not believe that removal by the ordinary mode of enucleation of morbid growths, attempting to control hemorrhage step by step, was possible. I considered the chance to be a hundred to one that she would die upon the table or of secondary hemorrhage soon after."

Operation, Jan. 20, 1870: Ether. Vertical incision. "At very many points the thin coats of superficial vessels gave way, and uncontrollable oozing resulted. Still the hemorrhage was not immediately alarming until the dissection, which was carried on by the fingers, reached the calcareous portion of the tumor on the right side. Here adhesions were encountered of considerable firmness, and as they yielded to the most careful efforts I could make, the large branches, which had given the aneurismal thrill, and whose coats were extremely attenuated, burst, and immediately we had the most fearful hemorrhage, such as one who has not seen it can hardly realize. This took no one by surprise, as I had already forewarned my assistants of its probable occurrence, and in such event of the entire futility of any expedient, except the rapid completion of enucleation and seizure of the vessels at the base of either lobe. This I accomplished in a very few seconds and was enabled so to seize the pedicle with the fingers as to suppress the bleeding measurably until I could transfix it with the blunt needle, armed with double ligature made of eight strands of sadder's silk. This was carried in the median line from below upward, close upon the trachea, and either ligature tightened sufficiently by a single knot to control the hemorrhage and give time for examination. I had hoped to separate either half of the pedicle into as many parts as there were arteries, as I did in my first case. This I found impossible from the firmness of the tissue, unless I used a cutting instrument, which I did not dare to do. I, therefore, tied either half as tightly as possible, and carefully severed the tumor from its attachments. This being done, seven small arterial twigs, not connected with the growth, were tied, when all hemorrhage ceased. The wound was now kept open, only ether enough being administered to keep her quiet, and time given for glazing of the surface and reaction of the circulation. Within 10 minutes the vessels in every part of the exposed surface were throbbing violently, and in 15 minutes from the ablation of the tumor the inferior thyroid artery of the left side escaped from the ligature and spirted with great violence. In my own opinion, as in that of the attending surgeons, this vessel was equal in size to the common carotid in its normal condition. In a moment this was seized and secured; then, the entire left half of the pedicle being transfixed with a tenaculum, a new ligature of 12 strands was carried underneath both the original one surrounding the pedicle and the separate one around the inferior thyroid artery, and drawn as tightly as possible. From this time, all bleeding was arrested, and in a few minutes the wound was closed with

silver sutures, a light dry compress applied, and the patient placed bed with a fair pulse of 100 per minute, and presenting no mark signs of collapse."

Secondary hemorrhage occurred on the tenth day. "One week before the operation she lost her voice entirely. Since the removal the tumor she has fully recovered it."

It is interesting to note that the laryngeal nerves have rarely been paralyzed in the many cases operated upon more or less in this fashion and that neither cachexia strumipriva nor tetany developed. Presumably a considerable amount of thyroid tissue was left behind the *écraseur* ligatures en masse.

The thyroidectomies of Warren Greene deserve conspicuous mention in the history of American surgery; for this reason I have quoted such length from the picturesque and spirited descriptions of the dauntless practitioner.

E. L. MARSHALL. (No. 14.) *Excision of the entire thyroid gland. Recovery.* Chicago Med. Jour., 1867, vol. xxiv, p. 97.

"In your journal for December last, I find the report of a case of removal of one-half of the thyroid gland, by Prof. Wm. Warren Greene, being the third instance (so far as my own information extends) of this operation having been successfully performed in America. Dr. Geo. McClellan, Sr., of Philadelphia, is said to have succeeded in a single instance (his being a single lobe only) and I own, performed Jan. 18, 1852, comprising the entire gland, with I Greene's more recent case, of August 19, 1866; all of which patients have had good recoveries. I am unaware, at this time, of there being a single case of a fatal or unsuccessful operation in this country.

"My patient, Mr. John Mank, now residing at Bridger's Corner Mercer Co., Ill., had consulted a number of eminent surgeons, among whom were Professors Mussey and Joseph N. McDowell, also Prof. Brainard, and S. S. Cooper, of Peoria, all of whom, after an examination of the case, gave it as their opinion that an operation for removal of the gland might, eventually, become justifiable. To my own knowledge, Mr. Mank has been, from time to time, through a period of many years, subjected to vigorous treatment, with reference to absorption of the tumor, all of which had not even checked the progress of the morbid growth.

"Referring to my notes, I find that on the 12th of January, 1867, the patient had for three months been unable to lie down, and required constant watching to save him from suffocation; was subject to spasms of great dyspnea; constant headache; had twice had convulsions from attempts to lie down; was mentally despondent, declaring that preferred death to such an existence. After making a full statement

of the hazards incidental to extirpation, it being the only resource left upon which to fall back or recommend, I left it with himself for decision. He promptly requested me to undertake the removal of the tumor. In this decision I had the happiness of having the concurrence of Drs. Adam Clandanning and A. B. Campbell, whose valuable counsel and assistance I here take the occasion to acknowledge.

"The patient, Mr. Mank, aged 40, a gentleman of high order of intelligence, and, previous to his health having been impaired by his present affliction, a man of great muscular power, possessing a high order of moral courage—such courage, indeed, as I have seldom, if ever, witnessed in any other person.

"The patient, declining the use of an anesthetic, took his position (agreeable to his own request, in an arm-chair) and I proceeded to operate by making an incision through the median line, commencing a few lines above, and completing as much below, the lower border of the tumor. This wound I transformed into a crucial incision; detached the flaps and dissected them down to their base; fleshy fibres that were not easily pushed aside were divided transversely, until the entire superficial surface of the body was exposed. I now separated the tumor from its bed, by dividing the several fasciæ on the director and tearing up the areolar tissue with the finger and handle of the scalpel, until the base of the gland was freely exposed. There was but little hemorrhage from the superficial vessels of the tumor, and none that required especial care, save a couple of small arteries that were found lying alongside the thyro-hyoid muscle, imbedded in the cellular lamella. These were ligated—they were, perhaps, branches of the lingual or maxillary arteries. The pedicle of the tumor being reached, I found each lobe to be supplied with two arteries (the superior and inferior thyroid). Each portion containing a vessel was surrounded by a heavy ligature of loosely twisted saddler's silk. The inferior arteries were now sealed without any disturbance of organic function; but on attempting to tighten the ligatures of the superior vessels, we were met by a difficulty that was well-nigh fatal to our operation. This occurred incidental, as I believe, to pressure upon a branch of the great sympathetic, the pneumo-gastric, the glossopharyngeal, or fibres from two, or possibly all three, of those important nerves. Be that as it may, on any attempt to ligate these vessels, the patient suffered from severe paroxysmal cough, labored breathing, and a lessening of the force of the heart's action that was truly alarming. As we could not hope to be able, under the circumstances, to find and exclude the small, thread-like fibre from the ligature, we did that which I believed to be the next best thing in the premises—to destroy the functional integrity of the nerve; this was done by tightening the cord and holding it firmly so long as the patient was able to endure and live, when it was loosened and interrupted organic functions were allowed to resume something of their normal condition. This required but a few minutes, and here was witnessed a heroism

upon the part of Mr. Mank that was truly sublime. Nothing daunted by the peril, so well understood by himself, he was always ready, at his brief rests, to request that the work of nerve-crushing might be resumed.

"After several efforts of this kind, I had the happiness of knowing that the difficulty was so far overcome as to admit of ligation, which was accordingly done, and the tumor was removed without further trouble.

"The tumor, when examined, was found to be hard, firm, with cartilaginous deposits, and weighed 1 pound 11 ounces, avoirdupois. "I would especially invite attention to the fact that, in the case of Mr. Mank, the only serious difficulty encountered during the operation was in the dissection of the nervous communication between the gland and nervous centres, while in Dr. Greene's case no such trouble had, neither have I any knowledge of any such barriers to the successful execution of the operation being encountered by any other patient attempting the extirpation of this gland; while all refer to the fearful hemorrhage incidental to the rupture of delicate superficial vessels spread like a network over the body. In my own case, the walls of those vessels were sufficiently firm to admit of careful dissection without risk to their continuity."

F. F. MAURY. (Nos. 20 and 21.) *Extirpation of the thyroid gland for cystic enlargement.* Photographic Review of Med. and Surg. Philadelphia, 1871-'72, vol. ii, p. 17.

"During January of the present year, my colleague, Dr. Parr of the obstetrical staff of the Philadelphia Hospital, asked my advice in reference to a tumor of the neck, in a patient then an inmate of his wards. After repeated and careful examinations, it was clearly defined to be an enlarged thyroid gland.

"The history was as follows: The woman was 23 years of age, born in Cheshire, England, and when nine years old first discovered small swelling on the anterior part of the neck, its situation being somewhat to the right of the median line. This slowly but gradually increased up to the date of my seeing her. She then complained but little pain, some difficulty in deglutition, and scarcely any obstruction to her respiration, save in certain positions. She manifested great desire to be rid of the tumor, though the strongest representations of the gravity of the operation were fully made and understood. It was decided to attempt the reduction of the tumor by the process of electrolysis. This was fully tested and afterwards abandoned the result being entirely negative. In February, before extirpation was resorted to, a final effort was made to produce an impression on the morbid mass by electrical cauterization, which was effected by means of a large Bunsen's battery of 15 cells. This procedure was more effective than the former. The phenomena here evolved were of

of the hazards incidental to extirpation, it being the only resource left upon which to fall back or recommend, I left it with himself for decision. He promptly requested me to undertake the removal of the tumor. In this decision I had the happiness of having the concurrence of Drs. Adam Clandanning and A. B. Campbell, whose valuable counsel and assistance I here take the occasion to acknowledge.

"The patient, Mr. Mank, aged 40, a gentleman of high order of intelligence, and, previous to his health having been impaired by his present affliction, a man of great muscular power, possessing a high order of moral courage—such courage, indeed, as I have seldom, if ever, witnessed in any other person.

"The patient, declining the use of an anesthetic, took his position *supine, on his own request, in an arm-chair* and I proceeded to

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"The tumor, when examined, was found to be hard, firm, with cartilaginous deposits, and weighed I found 11 ounces, avoirdupois.

"I would especially invite attention to the fact that, in the case of Mr. Mank, the only serious difficulty encountered during the operation was in the dissection of the nervous communication between the gland and nervous centres, while in Dr. Greene's case no such trouble was encountered. I am, however, fully aware of any such barriers to the successful removal of the operation being encountered by any other party.

very interesting character. A perceptible crackling noise was audible in the tumor during the application of the needles, which were heated almost to a white heat. Great induration was developed around the negative pole, and the tumor at once began to increase in size, measuring before the operation 16 inches, and in two hours 17. Great dysphagia also followed, and excessive pain when the parts were touched or the head moved. During the day following, all the symptoms of acute inflammation were present, these, however, began to subside in a few days, leaving the patient in her former condition, save the induration around the site of the entrance of the negative pole. In April it was finally decided to resort to the knife. The patient being fully influenced by chloroform, an incision 5 inches in length was made over the most prominent part of the growth, parallel with its perpendicular diameter, and this joined by a horizontal one of sufficient extent to allow free manipulation during the operation. The firm, dense capsule of the gland was soon reached by a division of the bands of fascia overlying. It was soon seen that the thyroid arteries were greatly enlarged, more especially the right and left inferior. All these were well secured in turn, as likewise all smaller vessels. In this way *absolutely* all hemorrhage was avoided.

"The cyst was then peeled away from the trachea for the extent of 3½ inches. The sheath of the right carotid was undisturbed, but fully exposed, as also that of the left. The wound was closed, no hemorrhage followed, and the patient did well, excepting a slight attack of erysipelas, which came on three days after, and, queerly enough, involved the face and portions of the neck to the entire exclusion of the wound.

"This case is pregnant with interest, but space will not admit of its free elaboration. It must suffice to say that here the repeated use of electricity would not have availed much, as the consistency of the tumor would have resisted it entirely, or the time occupied by this mode of treatment would have compassed many months. When the capsule was opened, the structure was found to be dense, and very tenacious in character, and not apparently very vascular. The belief that this operation in many cases can be effected is confirmed by the fact that I removed, some weeks after, another very large growth of the same kind in the same manner, and with the best result, as respect hemorrhage and shock. This patient did well for 21 days, and was then seized with pneumonia and perished, after all the ligatures had become detached and the wound almost healed. The subject of this photograph was seen some days since in the enjoyment of perfect health. She has never experienced any difficulty, save slight aphonia, which has now disappeared."

H. G. Jameson (No. 3), was the first and only American on our list and the tenth in the world to tie a thyroid artery for the cure of goitre. The ligation was made in 1821, only 10 years after the opera-

tion of Sir William Blizard, who was, as I have said, the first to perform this operation. Four of Great Britain's surgeons besides Blizard attempted to cure goitre by ligation of one superior thyroid artery (Coates, 1819; Key, 1824; Earle, 1826; and Sir Benjamin Brodie, 1832). In Earle's case the opposite superior thyroid artery was tied at a second operation, a month after the first. Alquié (1854) was the only French surgeon to ligate the thyroid arteries *per se*. In Italy the first five operations for goitre were merely arterial ligations—Marzuttini, 1844, and Luigi Porta, 1835, 1846 and 1848 (2). At the autopsy of Luigi Porta's second case it was ascertained that his ligation had been placed on the internal carotid which he had mistaken for an enlarged inferior thyroid artery. In 1850 Porta ligated the inferior and superior thyroid arteries of the left side. The circumscribed goitre of the left lobe vanished, leaving no trace. No further attempts were made by Italian surgeons to cure goitre by ligation of the thyroid arteries. W. H. Welch in 1874* (unpublished thesis) collected 32 cases of ligation of one or more thyroid arteries for the cure of goitre.

Ch. G. Lange²⁰ is accredited with having been the first (1707) to suggest tying the thyroid arteries in case of goitre. This is what he has written:

"Magis vero efficax esset sectio Arteriae, quae ad strumosos tumores sanguinem deferret, modo vas illud prompte inveniri, & haemorrhagia statim iterum sibi posset. Veterinarii quidem hoc modo procedere dicuntur, & arteriam, quae ad strumosos tumores equorum deferretur, abscondendo, efficere, ut strumae evanescant; in homine tamen haec operatio non sine periculo instituitur."†

To base a claim of priority for Lange on the evidence furnished by the above quotation would seem to require a highly developed patriotism or a carefully nurtured naïveté. Lange, apparently, did no distinguish scrofulous tumors from goitre, or if he did he had in mind the former, not the latter, when he proposed ligating or dividing

* St. John's paper²¹ was founded upon this thesis of Dr. Welch.

† "But more efficacious would be the division or ligation of the artery which conveys blood to the strumous tumors, provided this vessel may be easily found and the hemorrhage forthwith checked. Veterinarians, indeed, are said to proceed in this manner and by dividing the artery which supplies the strumous tumors of horses to bring about the disappearance of the struma; in man, however, this operation will not be undertaken without peril."

"the artery." Furthermore, he had the impression that one artery supplied "the stromous tumors," and unquestionably had not the remotest notion of the whereabouts of this hypothetical vessel. And, finally, he warns against undertaking on man this operation, the credit the devising of which he accords to the veterinarians.

Apropos of patriotism, I yield to the temptation to offer my readers extracts from an amusing controversy between von Walther and Chelius on the subject of national as well as individual priority. Philipp von Walther was the first to the successfully the superior thyroid artery, the case of Blizard having terminated disastrously (*vid.* Table III, case No. 1).

Chelius writes: "Because I credit the Englishman Blizard with the first performance of this operation (and I know of no other German author who has done so) Herr von Walther has been stirred to direct against me the following rather strong attack. It will surely be a satisfaction to my highly esteemed Herr von Walther to have the matter cleared up, inasmuch as the correct history of the operation in question is at stake.

"Herr von Walther says: 'Moreover will our dear countrymen ever cease abasing German achievements in surgery to the indisputable minimum, and creating prejudice with scholarly industry against the German discoverer whenever they can exhumate from a foreign land the slightest trace of priority? Certain it is that among the English and French we have no competitors for the glory of such uprightness, probably also none to envy us. Even were it true that the ligation of the superior thyroid arteries for the cure of aneurismatic goitre is a discovery of English surgery, as a German writer relates, it still remains a fact that independent of this and simultaneously (?!) or with a trifling difference in time, the idea originated in Germany and was there successfully carried out. Untrue it is (1) that the operation was proposed by Jones. Jones speaks of the ligation of the thyroid arteries only interrogatively, as of a means to make possible the extirpation of the thyroid gland, not to cure the goitre without extirpation (?!). In regard to the time when Blizard performed his operation, there is nothing to indicate it either in the brief account by Burns nor in the equally brief notice in S. Cooper's *Surgical Dictionary*, 4th Edition. Nowhere is the date of the operation mentioned. From what source then does one know what so positively is asseverated, that Blizard undertook this operation before me? The meagre descriptions of Burns and Cooper seem indeed to prove that they and Blizard had no knowledge of my paper on goitre. But I know with certainty that this little paper was carried to England soon after its appearance. In that country, too, the *Salzburger medicinisch-chirurgische Zeitung* is read, in which some years earlier I had pub-

lished a brief report. Since, however, I do not know the date of this operation I will not quarrel about it. It would be just so much the more interesting and gratifying if indeed the idea of this undertaking had originated with him or Burns. Such a coincidence would be all the more likely to kindle a favorable fore-judgment and entitle to the hope of its future establishment in the field of operative surgery."

"The entire passage, so far as it concerns the history of the ligation of the thyroid arteries, contains nothing but untruth.

"In the second volume of my *Handbuch der Chirurgie*, p. 114, where I ascribe the priority of the ligation of the thyroid artery to the Englishman Blizard, I have quoted from S. Cooper's *Surgical Dictionary*, London, 1813, 2d Edition, and added the German translation from Burns' *Surgical anatomy of the head and neck*. Had Herr von Walther seen this second edition of S. Cooper in which on the dedication leaf the 4th of February, 1813, is noted, he would have been able to acquire the absolute conviction that Blizard several years earlier than he must have performed this operation. But if this interval time should not be great enough for the pronouncement of an opinion in regard to the priority of this operation, then the original paper by Burns (Edin., 1811, p. 202) suffices to dispel any doubt of the matter. These are the sources upon which I base my assertions. Inasmuch as I give reference to the second edition (1813) of Cooper, Herr von Walther should not have taken refuge in the fourth edition which appeared a long time thereafter. Concerning the date of Blizard's operation one need not harass himself so very much, since it is not a question of days or months, but of several years. . . .

"How does v. Walther happen to make such a statement as that 'It is untrue that the operation was proposed by Jones. Jones speaks of the ligation of the thyroid arteries only interrogatively, as of a means to make possible the extirpation of the thyroid gland.' Jones says: 'I inquire then further, cannot this procedure, stemming from the circulation of the blood through the arteries, be employed with advantage in cases of bronchocele?' Neither in this nor in the appended comment of Spangenburg is to be found the remotest justification of the view that this ligation was proposed as a means for making possible the extirpation of the thyroid gland; an inference quite to the contrary is to be drawn. The entire asseveration of v. Walther I explain to myself only in this wise, that with Jones he confound Charles Bell, who in his *System of operative surgery* says: 'Before making the attempt to excise the thyroid gland one might properly ligating the four arteries which supply it.' This passage has bearing upon the question of ligation of the superior thyroid artery of which we are speaking; wherefore I did not refer to C. Bell in relating the history of this operation. On whose side now is the untruth? After all, as a result of thorough investigation it develops that honor for the suggestion to ligate the thyroid arteries in cases of goitre belongs to a German, to Ch. G. Lange, who already in the year 1791