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ON THE TREATMENT OF THE SO-CALLED PHTHISIS OF THE LARYNX,

With Remarks on Primary Laryngeal Tuberculosis and its Curability.

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WE now proceed to the consideration of other medicaments used in the treatment of this laryngeal disorder.

2. *Iodoform.*—Among antiseptic drugs iodoform holds undoubtedly one of the first places, in spite of contradiction latterly on the part of the Danish physicians, Heyn and Rovsing, the more so that, thanks to the works of Binz, Buchner, Gosselin,[2] and others, it is to be seen that Heyn and Rovsing unjustly denied the antiseptic qualities of this drug. In surgery it has already gained extensive application (Mikulicz), along with sublimate and carbolic acid, and it has been pressed into the therapeutics of laryngeal tuberculosis, where it gained many ardent adherents, amongst whom we must particularly mention Schnitzler,[82] of Vienna, and Massei, of Naples,[83] further, Jarvis,[84] Masini,[85] Gleitsman,[86] Solis-Cohen,[87] Coomes, Geagh, John Mackenzie,[87] Schech,[3] Lincoln[4] (as long ago as 1874), Beetz, and Küssner.[4] According to the last two authors iodoform is a certain anti-tubercular drug, an opinion which most authors, *e.g.*, Fraenkel,[4] Blindermann, and others, do not share. On the other hand this drug has excited strong opposition on the part of Lennox Browne,[87] Schrötter,[88] B. Fraenkel, Schaeffer, Balmer,[3] and others. The beneficial action of iodoform is based upon a quick cleansing of ulcerations, formation of regular granulations, and even the possibility of entire cicatrization of ulcers. Schnitzler recommends iodoform especially in cases of very extensive ulcerative processes in the larynx. According to Heryng, the cases most suitable for treatment with iodoform are

principally those exhibiting superficial ulcerations—especially on the vocal cords, but he doubts if iodoform alone can produce cicatrization of deep ulceration in the larynx. Blindermann is also of the same opinion. From experiments made in the clinic of Jurasz this author obtained excellent results by the means of this drug, but very rarely entire recovery. Schech is of opinion that iodoform has sometimes a very great influence upon diminution of tubercular swellings. Massei and Blindermann likewise are of this opinion.

Some authors ascribe to this drug great importance, as an analgesic remedy in cases of painful swallowing in phthisical patients. Massei especially reported that having applied this drug constantly during six years, he concludes that it even surpasses cocaine for this purpose, the action of the latter being too quick and temporary. Against this statement we energetically protest. This statement has not been approved even by the greatest adherents of iodoform. We, personally, have applied iodoform many times, and must say that we do not belong to the great supporters of this remedy, although we cannot deny that iodoform may have sometimes a very beneficial influence upon ulcerations. Schrötter shares this opinion. We do not believe that iodoform can heal deep tubercular ulcerations in the larynx, and lactic acid is undoubtedly superior. The use of iodoform has besides many objections, which prevent its extensive application ; we only mention its disagreeable smell, insupportable to many patients ; further, it disturbs digestion (Lublinski); and, lastly, we must often apply it (Massei) three to four times daily, which is quite impossible in practice. Most authors (ourselves included) apply iodoform alone in the form of insufflations, in quantities of one to three grains per dose (Schnitzler). Massei previously uses inhalations of sublimate in ether (1 : 3 or 4). Schrötter does the same, but this method is not agreeable to patients. In order to mask the disagreeable smell of iodoform, Alvin[89] employed a solution of the drug in oleo amygdalarum dulcium, adding essence of bitter almonds. Heryng used an emulsion of iodoform for injections in doses of one to one and a half grammes daily, which seems to be well supported (naturally preserving precise antisepsis). According to the author the above method is indicated in fresh infiltrations, circumscribed, but not destroyed. Gouguenheim also made sub-mucous injections of iodoform (iodoform in vaseline), in quantities of 1·2—2 centigrammes per dose. The results, obtained by him, cannot, however, be considered striking.

3. *Iodol.*—The disagreeable, and to many patients even insupportable, smell of iodoform led Lublinski[90] to the idea of substituting for it a drug, which, possessing the antiseptic qualities of iodoform, would at the same time not have its disagreeable qualities. This drug was iodol, or tetraiodpyrol, a preparation containing 88·9 of pure iodine, in the form of powder, or glistening crystals, of yellow brown colour, without smell and taste, and easily soluble in alcohol and ether, though with difficulty in water.[2] Lublinski tried this drug upon seventy-five patients, in the form of insufflations, once daily, or more rarely (2—3 weekly), in quantities of 0,1—0,2 per dose ; in all cases he saw amendment, in two (ulceration of the posterior region and vocal cords) he was able to obtain recovery under

iodol. The beneficial action of iodol was affirmed further by Seifert, of Würzburg,[91] according to whom iodol has this superiority over iodoform, that it does not act as an irritant. Amongst other authors praising the action of iodol were Willy v. Schoewen,[92] and Prior,[93] who ascribed to iodol an especially beneficial influence on the subjective symptoms, ulcerations also cleansing, and sound granulations forming. Among the opponents of iodol are : Lennox Browne,[87] Schrötter (who states that the only difference it has from iodoform, is its more agreeable application), Gouguenheim,[5] and Rosenberg. Heryng prefers emulsion of iodoform, and Massei iodoform. We have applied, and still apply, iodol in the clinic of Dr. Sokolowski very often, either alone or in combination with cocaine, in the proportion of ten to one (10 : 1), for insufflation. In this latter form of application we have noticed satisfactory subjective amendment, namely, easing of painful swallowing, but whether it is due to the iodol, or the cocaine, we do not feel disposed to dogmatise. As to the objective improvement, we have never seen great results, and doubt whether iodol is superior in this respect to iodoform. It is certainly more agreeable in application, and therefore we apply it more willingly, especially in combination with cocaine in the intervals of brushing with lactic acid, because we do not believe that iodol alone can heal deep ulcerations any more than iodoform. As a subsidiary drug, iodol can, to a certain degree, have its importance. We apply it in all cases where lactic acid, for some reason, cannot be applied. Schaeffer[94] greatly recommends the following method :—At first cleanse the ulcer by means of injection of a solution of creosote (Cadier), or by means of brushing with 50 per cent. solution of lactic acid, and afterwards insufflate iodol, in combination with one-third part of boric acid. Iodol has certain qualities, which give it superiority over iodoform in absence of smell, and almost of taste ; it disturbs neither appetite nor digestion ; does not act toxically, because it is not so quickly absorbed as iodoform, although application of too great quantities should be avoided (Badt[95]). Lastly, iodol is a finely divided powder, and for this reason it covers pathological surfaces more equally.

4. *Creosote.*—Cadier, of Paris,[2] was the first who, in 1878, applied creosote locally in the form of brushings in cases of laryngeal tuberculosis. He employed the following prescription : R R,—Creosote pure de goudron de bois, 1,0 ; spiritus vini, 4,0 ; glycerini, 60,0 ; obtaining favourable results, which found approbation in the works of Pelan and Bordenave,[2] published in the same year. According to Cadier, creosote acts best in cases of ulcerations of the vocal cords, with affection of the posterior region of the larynx. According to Schmidt,[4] creosote in the form of brushings irritates ulcers, and therefore this author applied Cadier's solution of creosote (ten to twenty drops) on the base of the tongue, advising the patient not to swallow, but to breathe freely during phonation. The fluid thus remains a longer time in contact with the ulcerations. In general, Schmidt gives adherence to the use of this drug. He saw good results with creosote in certain cases, even healing of ulcerations, and diminution of infiltrations. Balmer[4] mentions that he saw healing of ulcerations after applications of creosote for a week, although in other places new ulcers

were forming. Knauthe, of Meran,[4] did not obtain recoveries, but only amendment. A decisive opponent of this drug is Gouguenheim.[5] Lublinski,[96] on the contrary, praises creosote very much, and in nine cases he obtained cicatrization of ulcers under its influence. We have no personal experience as to the local application of this drug in laryngeal tuberculosis. Creosote, indeed, as Guttmann's experiments[97] proved, is a strong antiseptic, and in general seems to have favourable influence upon pulmonary phthisis, but we do not believe that it has any superiority over other antiseptic drugs in laryngeal tuberculosis. On the other hand the local application of creosote is not without objections. It produces loss of taste and a strong burning sensation.

5. *Creolin.*—Of the newest drugs applied to the treatment of laryngeal tuberculosis, creolin has attracted much attention. We shall speak a little farther on of this drug. It is a dark-red, almost thick fluid, smelling like tar. Creolin mixes with water, alcohol, glycerine, oils in every proportion ; not, however, with acids (in which it is deposited in the form of great drops). Mixed with water it forms an almost white, or light-yellow fluid (in the sun this fluid takes a brown tinge). It is derived from heavy oils after dry distillation of pit coal. According to the analysis of Pearson,[98] it is composed of 66 per cent. indifferent coal hydrogens, 27 per cent. phenols (without carbolic acid), 2·2 per cent. organic bases, and 4·4 per cent. ash. Fisher found traces of carbolic acid, and considers creolin as a bye-product in the formation of carbolic acid. Froener[59] seems to have been the first to recommend creolin as a strongly antiseptic drug (according to Rausche, in even greater degree than carbolic acid), not possessing toxic properties. Creolin, at first employed in England for disinfecting purposes in 1887, speedily came into use in Germany, on account of its unusual cheapness. Esmarch[98] making experiments on this drug, was convinced that the addition of 1 per cent. of creolin to a fluid containing the comma bacilli of cholera, killed them within ten minutes, while carbolic acid, added in the same proportion, even in two days had no influence. Even soap composed of creolin acted more strongly on staphylococcus pyogenes aureus than sublimate soap. According to Penzold,[99] 0·4 creolin injected under the skin of a rabbit was fatal. Very favourable results seem to have followed the practical application of this drug, Neudorfer, Rausche[98] (as an antiseptic remedy ½ to 2 per cent with water—best each time freshly prepared). The same author praises ½ to 1 per cent. gargarisms for various diseases of the throat. Further, creolin was applied by Spaeth, Jenner, Korthum,[100] in obstetrics ; later, in otology, by Eitelberg[100] and Urbantschitsch (10 drops in half a litre of water. Schnitzler,[99] in Vienna, applies creolin very extensively in the form of gargarisms (1 to 5 per cent.) for different diseases of the throat. Malinowski, of Warsaw, applied it in diphtheria in children, remarking that its action, although positive, is very slow. We have also come to the same conclusion from applying creolin as a very cheap drug in poor ambulatory practice (from 5 to 10 drops in a glass of water). We must add that these gargarisms are not very agreeable. This drug has been employed by us for some time for the antiseptic cleansing of instruments in the same proportion. Schnitzler applies creolin in form of inhalations

(0·2 to 1 per cent.) and as brushings (1 to 5 per cent.) in laryngeal tuberculosis, but has not published his results. In the clinic of Dr. Sokolowski I began lately to apply creolin in the form of brushings in laryngeal phthisis. I have altogether five precise observations. It is to be understood that such number does not give us a right of absolute judgment of the action of creolin. Nevertheless, I must now report that I cannot consider the results obtained by this drug as at all excellent, although in all cases we were able to remark a subjective amendment (improvement in swallowing), but even this amendment was not constant. On the other hand, objective symptoms in four cases did not show visible change for the better, only in one case there occurred a little relative change in this direction. Altogether, therefore, although with reserve, we should be inclined to say that creolin will not occupy a prominent place among drugs locally applied for the treatment of laryngeal tuberculosis.

In our cases I applied creolin in form of brushings according to the following prescription :—

℞—Creolini, 0·25
Aq. dest.
Glycer. āā. 10·0
Ol. ment. pip. gtt. x.—M.D.S.

No. 1. B., aged fifty, a cooper, with hereditary predisposition. For many years cough ; for four months painful swallowing and hoarseness. General state, good. In the lungs, indurations at both summits (in sputa bacilli tuberculosi were found). Laryngoscopic appearance : great infiltration of false cords ; infiltration of posterior region, with deep ulcers. General treatment : creosote and fish oil. Local treatment : six brushings with creolin (every two days), first three in ambulatory practice. Burning sensation. Result : better swallowing (temporary) ; for this reason I passed to another drug, viz., menthol, the more so that, while objective symptoms at first remained without change, superficial ulcerations on false cords afterwards formed.

No. 2. L., thirty-six years old, shoemaker. Cough for many years. General state, satisfactory. In the lungs, slight changes at both summits (in sputa tubercle bacilli were found). Hoarseness ; dysphagia. Laryngoscopic appearances : infiltration of epiglottis and posterior regions ; ulcerations on posterior part of ventricular bands. General treatment : creosote and fish oil. Local treatment : five brushings with creolin (in ambulatory practice). Result : swallowing better ; hoarseness without change, as well as objective symptoms ; for this reason I passed to lactic acid, with subjective and objective amendment.

No. 3. A., aged twenty-five, locksmith ; with hereditary predisposition. Cough for two years ; for half a year hoarseness ; for three weeks dysphagia. General state, bad. In the lungs, destruction of both summits. Laryngoscopic appearances : infiltration of epiglottis ; less of posterior region and false cords. General treatment : creosote. Local treatment : four brushings with creolin (applied to epiglottis especially). Result : better swallowing ; infiltrations without changes. Menthol was then resorted to.

No. 4. G., forty years old, official. Cough for many years. General state, bad. In the lungs, considerable changes (destructive). Hoarseness ; painful swallowing. Laryngoscopic appearance : ulcerations on the vocal cords. Local treatment : four brushings with creolin (in ambulatorium). Result : swallowing better and better. Ulcers began to heal. On account of a relapse in the general state (œdema pedum) local treatment was discontinued.

No. 5. U., aged twenty-eight, organist. For nine months cough ; for five months dysphagia and hoarseness. General state, almost well. In the lungs, changes, mostly of interstitial nature. Laryngoscopic appearances : infiltration of epiglottis, less of posterior region. Otitis media suppurativa. General treatment : creosote ; kefir. Local treatment : three brushings with creolin (especially the epiglottis). Application of creolin to the ear. Result : subjective temporary amendment. Menthol was, however, resorted to.

In the third and fifth cases death ensued. Necropsy showed : in the lungs, the usual destructive form of consumption ; in the larynx, extensive destructions (ulcers).

6. *Menthol.*—In the year 1885, in the polyclinic of B. Fraenkel, in Berlin, Rosenberg [102] tried a new drug, viz., menthol, in laryngeal tuberculosis, and became its ardent adherent. The action of menthol, according to Rosenberg, is threefold : (1) Anæsthetic ; (2) analgesic ; (3) antiparasitic (Sormani and Brugnatelli). The author applied menthol in oily solutions (from 10 to 20 per cent.) once or twice daily, dropping this solution by means of Braun's syringe, in quantities of from 1 to 2 grammes per dose. Of fifty-seven cases treated by this method, he obtained recovery in nine (diminution of infiltrations, cicatrization of ulcers). Ulcers submit much better to the treatment by menthol than infiltrations. Soon after the first application the ground of the ulcer clears, sound granulations form, and a cicatrix ensues. The patients support this operation very well. He did not remark any more distinct reaction. B. Fraenkel affirmed Rosenberg's results, as also do Beehag,[103] McBride, Lennox Browne,[87] and Brunn[73] (who recommends menthol in delicate and nervous persons, in robust persons lactic acid). Hyndman [104] saw good results in employing a spray of alcoholic solution of menthol (5 to 20 per cent). On the other hand, Schrötter and Heryng are not adherents of this drug. As to myself, basing my opinion upon, though few, yet exact, observations made in four cases, in the clinic of Dr. Sokolowski, I must say that I was not able to remark any distinctly positive influence. The amendment was principally subjective (swallowing a little better), yet tubercular infiltrations, as well as ulcers remained without changes for the most part. In three cases we applied menthol after a trial of creolin, and it was equally fruitless. We employed in our observations, like Rosenberg, oily solutions (10 to 20 per cent.), dropping it daily in quantities of 1 to 2 grammes. The patients complained of moderate burning of short duration (one of them of the sensation of chills) ; likewise in cases where creolin was employed.

We report here, in short, the course of four cases precisely observed by

us, repeating once more that upon this basis they do not claim to give an absolute judgment of the merits of menthol.

No. 1. This case is the patient noted under creolin, No. 5, with tubercular infiltration of the epiglottis. After unsuccessful results from creolin, we employed menthol five times in the above described manner (10, afterwards 20, per cent.). Swallowing was made a little better (burning was complained of after dropping) ; infiltration of the epiglottis remained without change. The further treatment was suspended on account of a relapse in the general state, which at last caused the death of the patient, as we have already mentioned.

No. 2. This case is that of the patient noted under creolin, No. 1, with great infiltration of the false cords, and with superficial ulcerations, also with extensive affection of the posterior regions. After brushing with creolin without success, I employed menthol four times, which—except temporary amendment in swallowing—had no influence at all ; for this reason we passed on to lactic acid, which we have applied up to now with increasing amendment, subjective and objective.

No. 3. This case is that of the patient noted under creolin, No. 3, with infiltration, especially of the epiglottis, upon which creolin had no influence. We dropped menthol three times (ten per cent.), and the burning in this case was considerable. While great subjective amendment resulted (the patient could swallow better and better), yet the infiltration of the epiglottis remained without change. This patient died in a short time from general marasmus and progression of the pulmonary process. The results of the autopsy have already been mentioned.

No. 4. F., aged fifty-three, musician. Several years ago, syphilis. Laryngoscopic appearance: membrane under the vocal cords. Incision ; dilation (method of Schrötter). The anti-syphilitic treatment was without success. Some time after, very slight changes at both summits of the lungs appeared. In the sputa tubercle bacilli were found. Dysphagia, infiltration of the false cords and posterior region, and an ulcer in the neighbourhood of the left processus vocalis. We dropped menthol (10—20 per cent.) three times on the ulcer, which began to clear a little, but swallowing remained without change. Unluckily, the patient did not agree to further treatment, and left the hospital.

7. *Boric acid.*—Boric acid belongs to the antiseptic drugs, and was formerly very often applied, but nowadays this remedy possesses few adherents. Amongst these latter especially is Schech,[105] who ascribes to boric acid a better result than to iodoform, with which Gouguenheim does not agree. Amongst the adherents of this drug are also Bresgen and Schaeffer.[105] Heryng, on the other hand, ascribes to it an irritant action on the stomach. This author recommends for the disinfection of secretions in cases of abundant suppuration of ulcers the mixture of boric acid and iodoform (4 : 1). We can apply boric acid either in the form of insufflations alone, or āā with *pulv. gum. mim.* in quantities of 0,2—0,5 daily, or in the form of inhalations (1—4 per cent). The most ardent adherent of boric acid is Blindermann,[4] who made experiments with this drug in the clinic of Jurasz, where for six or seven years boric acid has been generally applied, especially in the form of insufflations, rarely

inhalation (3—5 per cent.), three times daily for ten minutes each sitting. According to Blindermann, the positive qualities of this drug are the following :—(1) It does not irritate at all, or very little ; (2) it is without smell ; (3) it is almost without taste. The inflammatory process diminishes under boric acid ; the ulcers after some days become more healthy in appearance, with a tendency to cicatrisation. Even great loss of substance in a relatively short time covers with sound granulations, and entire recovery is not rare. The author reports two cases confirmatory of the latter statement. In one iodoform was applied without success—there were ulcers on the vocal cords—boric acid produced entire recovery (although there was a relapse of the disease) ; in the second case carbolic acid, iodoform, finally lactic acid, remained without success, while boric acid only produced a favourable action. As to ourselves, we formerly applied this drug very often in the form of insufflations, sometimes with positive results, but never could we observe the cicatrisation of tubercular ulcers by means of boric acid, so that we are of opinion that nowadays we possess many more useful drugs, and have, therefore, latterly hardly ever used this drug in laryngeal tuberculosis. Sometimes, however, we prescribe it still in the form of inhalations (1—4 per cent.).

8. *Carbolic acid.*—Latterly carbolic acid (in our opinion unjustly) has almost entirely been removed from the list of drugs recommended in laryngeal tuberculosis. Yet this drug has its tradition. In the year 1880 M. Schmidt [4] recommended the use of carbolic acid, as follows : in cases of anæmic mucous membranes a tablespoonful of a two per cent. carbolic acid solution to half a litre of decoction of boiling camomile (inspiring for five minutes three to four times daily) ; in cases of great redness, instead of camomile (a little irritating), he employed only water. During three years this author treated three hundred and nineteen cases of laryngeal tuberculosis, and of these twenty recovered by means of carbolic acid (although in these cases he also applied incisions). According to this author, superficial ulcerations heal after some weeks ; the deeper ones require a longer time. Schech, Moure,[4] and Sokolowski confirmed also Schmidt's results. On the other hand, Löri and Krishaber [4] deny this drug to have therapeutic properties. Blindermann mentions that in the clinic of Jurasz carbolic acid was applied for a long time and very frequently in laryngeal tuberculosis with very successful results. It is there applied in the form of inhalations (one to two per cent. two or three times daily for ten minutes). In all cases the appearance of ulcers was made better ; in one, after four weeks' application, entire recovery (although afterwards relapse took place) ensued. We have applied carbolic acid for a long time in the clinic of Dr. Sokolowski, and we consider it, as a drug, useful in very many cases, though we have not seen entire recovery from it, but amendment very often. Where local treatment in the form of brushings, lactic acid or insufflations (iodoform, etc.) cannot be applied (weakness of the patients, residence in the country), inhalations of carbolic acid are recommended ; sometimes they may even have some influence upon the amendment of swallowing, of which I in some cases have had occasion to convince myself.

9. *Sublimate* ($Hg.\ Cl_2$).—It is astonishing that a drug possessing such

strong antiseptic properties as sublimate has been so rarely applied in laryngeal tuberculosis. Very probably what has prevented its extensive application has been the fear of intoxication, so easily produced in the application of sublimate. Balmer[4] applied this drug in twelve cases, but did not remark successful action, but rather deterioration. On the other hand, Lindsay Porteus[106] cites one case of laryngeal tuberculosis benefited by means of sublimate spray. John Mackenzie [107] also applied sublimate (1 : 2000) with success. Massei [83] at first employed sublimate only in the form of inhalations (1 : 1000) as a preliminary step before the application of iodoform. Latterly this author [105] has constantly employed sublimate (1 : 2000) with very good results in laryngeal tuberculosis. As we do not ourselves possess any experience we cannot say anything of this drug, but we do not believe that sublimate can have any superiority over other antiseptic drugs—for instance, carbolic acid.

10. *Charcoal.*—This preparation, also having antiseptic qualities, was tried by Blindermann,[4] in the clinic of Jurasz in Heidelberg, in three cases of laryngeal tuberculosis in the form of insufflations ; the results did not seem to be very encouraging, although sometimes he could remark the clearing up of ulcers. On the other hand, it produced disagreeable sensations (choking, cough, etc.).

Besides these drugs, of which we have spoken more or less at length, there exist still a whole series of others which have been recommended in laryngeal tuberculosis. These, belonging mostly to the group of antiseptics, are in most cases unsuccessful, and, as regards the therapy of laryngeal phthisis, entirely superfluous. We, however, make short reference to them.

11. *Salol* in the year 1887 was applied by Seifert [4] with no particular result. Nor did Gouguenheim [5] see any amendment from this drug.

12. *Natrum benzoicum*, still ardently recommended by Rokitansky [4] in laryngeal as well as pulmonary consumption, has fallen out of use.

13. *Hot air* was recommended in form of inspiratory inhalations in laryngeal tuberculosis by Fournier,[109] who started from this basis, that tubercle bacilli are destroyed by a temperature above 41°.

14. Jacobelli [110] recommends inhalations of *oleum terebinthinæ and aqua calcis.*

15. Woakes [111] ardently recommends in laryngeal phthisis inhalations of vapour of *kali sulphuricum.*

16. Char. Warden [112] recommends *thymol.* This latter drug we also prescribe sometimes in the form of inhalations (1 : 10 spir., five to eight drops in a small glass of water), but we do not ascribe to it any great importance.

17. Rethi [113] employs locally in laryngeal tuberculosis the treatment recommended by Kolischer for tubercular processes in the bones, viz., *Calcium phosphoricum*, according to the following formula :—

Rp.—Calc. phosph. neutr. 5,0.
Aquæ destillatae 50,0. Dein adde sensim ac. phosph. q. s. ad solut. perf. Filtra adde ac. phosph. dil. 0,6.
Aq. dest. q. s. ad. 100,0. Ds. inject. or brush.

Schnitzler,[114] on the other hand, employs the following mixture :—

Rp.—Cocaini 0,2.
Calc. phosph. 10,0.
Ol. menth. pip. gtt. x.

This author mentions that he saw under this treatment clearing of ulcerations, diminution of swellings, and sometimes even recovery.

18. The application of *bacteriotherapy* to laryngeal tuberculosis is reported by Roquer y Casadesus, of Barcelona,[115] who in one case seemed successfully to apply pure cultures of *bacterium termo* in the form of pulverisation, inhalation, and brushings.

19. Fronstein [116] reports that he sometimes saw splendid results from *resorcin* in the form of inhalations (two per cent.), as well as brushings (10—20 per cent.)

20. *Iodine* primarily applied by Isambert, is used by Gouguenheim, [5] especially in tubercular growths without extensive ulcerations. In some cases we have also applied iodine as Lugol's solution (1 or 1½ to 2 per cent.), in the form of brushings, but we have never remarked any very favourable action.

21. In some cases of laryngeal phthisis we have applied, in the clinic of Dr. Sokolowski, *hydrate of chloral*, a drug which possesses distinct antiseptic qualities (Keen [117]), The brushing of solutions of five to ten per cent. gave us relatively satisfactory results.

22. *Argentum nitricum* formerly was greatly used in laryngeal phthisis. Amendment in the objective state of the larynx, and even recovery was ascribed to it. Krishaber[5] preferred the use of nitrate of silver *in substantia*, Isambert in solution (1 : 30). Marcet also applied this drug successfully in laryngeal tuberculosis. But since the discovery of Koch, and since the introduction into pulmonary and laryngeal therapeutics of antiseptics, this drug has been abandoned. Among its opponents are Gouguenheim,[5] and especially Stoerk, who ascribes to nitrate of silver a noxious action—namely, artificial loss of substance.

23. *Ferrum sesquichloratum* is applied by Morell Mackenzie[5] in solution 1 : 30. Gouguenheim is opposed to the use of this drug.

24. *Zincum chloratum*, employed by Isambert[5] in solutions 1 : 50—1 : 25, does not find an adherent in Gouguenheim.

We have here a series of drugs, especially belonging to the antiseptic group, which have been recommended for laryngeal tuberculosis. Their number, as we see, is enormous. Although the greater number of these remedies can be put aside, as regards the therapeutics of laryngeal phthisis, without any disadvantage, they are evidence of the fact how much the minds of physicians have laboured, and still labour, in order to discover a drug which can overcome this destructive disease. We ought not, however, to submit to pessimism, but persist in therapeutical experiments. Meanwhile, we may be comforted with this conviction, that we are not so impotent as formerly in the treatment of this dreadful disease, so long considered incurable. We possess besides, unquestionably useful drugs (lactic acid, etc.), another therapeutic method, new indeed, but already abundant in positive results, *i.e.*, the surgical method, with which is closely connected the names of Moritz Schmidt, and Heryng. To this method we must now draw attention—speaking first, however,

briefly of the application of chromic acid and the galvano-cautery in laryngeal tuberculosis.

Chromic acid.—Although in the year 1878, Pelan, in Paris, observed the favourable action of chromic acid upon tubercular ulcers, yet the merit of the introduction of this drug into the therapeutics of diseases of the nose, throat, and larynx, and especially in laryngeal phthisis, belongs to Heryng. This author, in the year 1884, published a large work upon the application of this drug.[118] He applies chromic acid by fusing it on the silver probe. In order to avoid acute intoxication, he advises drinking before the operation a solution of soda (ʒj: ʒjjj); by this means any acid swallowed is rendered innocuous. In cauterising the larynx with chromic acid we must proceed cautiously, especially in persons previously unaccustomed to local treatment; the first cauterisations must be made superficially, and should be of short duration, because we cannot be sure what reaction will ensue. In persons inclined to vomit, this may be prevented by neutralizing any excess of acid employed by strong solutions of soda (ʒj : ʒj). After the operation the patient must be directed to spit out the secretion (generally yellow coloured), to gargle with a solution of bicarbonate of soda (ʒj : ʒjjj); neither to eat, nor to drink, for two to three hours after the operation; an ice pack should be applied to the neck, silence should be enjoined, and the only food permitted should be cold milk. After cauterisation of larynx, there is generally a little reaction (sometimes strong cough and pain), dysphagia diminishes, as well as the swelling of the neighbouring tissues. A scurf forms, which after four or five days falls off. Chromic acid, according to Heryng, is, *par excellence*, suitable for ulcerations running a chronic course, with tendency to the formation of granulations, and along with which there is a good general condition likewise of the lungs. The author saw much better results from the application of chromic acid in laryngeal tuberculosis in private than hospital practice. The results of the author were confirmed by Bayer, of Brussels, and by Schiffers,[119] who warmly recommends this application. This author applies chromic acid in the form of brushings (1 : 6 or 1 : 10). Rethi[120] is of opinion that chromic acid acts energetically, produces neither the pain nor the strong reaction of nitrate of silver or the galvano-cautery. We can apply it successfully in tubercular swellings of the larynx. Przedborski[3] cites one case where chromic acid proved to be very useful, and he considers this application suitable to hard infiltrations, where lactic acid does not act. To the adherents of chromic acid belongs also Isambert.[5] Gouguenheim, on the contrary, is very much opposed to this drug. He is of opinion that the action of chromic acid quickly spreads to sound tissues. We must not overlook the interesting observations of John Mackenzie,[121] of Baltimore, who, in persons working in chromic acid, constantly found perforation of the nasal septum, ulcerations of the turbinated bones and of the post-nasal cavity, sometimes also in the lower part of the throat. He did not detect anything in the larynx, but there was sometimes otorrhœa. Although we have not applied chromic acid to laryngeal phthisis, yet, basing our opinion upon experience in the application of this drug to the nose, throat, and larynx (polypous growths), we may express our opinion of chromic acid as

follows : there is no doubt that chromic acid is an excellent drug, energetically destroying pathological tissues, and in this respect it has an absolute superiority over other caustic remedies (*e.g.*, nitrate of silver) ; on the other hand the application of chromic acid must always meet with some objection to extensive use on account of its great toxic properties. When toxic symptoms arise no precautions are usually effectual, the best are abundant drinking of a solution of bicarbonate of soda before and after operation, brushings with strong solutions of soda, etc. In the greater number of cases more or less distinct symptoms of intoxication appear : such as violent burning in the face, obstinate vomiting, lasting several days (as has frequently occurred in our cases), sometimes very severe pain in the stomach, etc. No wonder then that this drug does not find many supporters, the more so, that in the galvano-cautery we have also an excellent and energetic application, which does not seem to produce any disagreeable symptoms. Therefore, we most decidedly give a preference to the galvano-cautery (although we do not deny the positive action of chromic acid) in cases of operations upon hypertrophic nasal conditions, and in operations upon the larynx, especially in laryngeal phthisis. Of this latter method we shall now speak more fully.

Galvano-cautery.—It is strange that the galvano-cautery is not more frequently applied in laryngeal tuberculosis. It is, however, an excellent application, having a favourable influence upon the absorption of tubercular infiltrations, and can also produce cicatrization of tubercular ulcers. Surgeons seem to fear inflammatory symptoms, such as acute œdema of the glottis, which Moure[122] appears to have often seen, but neither we, nor Gouguenheim,[122] have met with it. This fear is the principal obstacle to extension of the use of the galvano-cautery, and therefore the number of surgeons who practise this method is still relatively small. To these belong Voltolini,[123] Cahn,[124] Srebrny,[105] Schaeffer, and Lublinski.[105] Schmiegelow[125] rather cautiously expresses himself in regard to this method. Schrötter does not believe in the galvano-cautery, and is of opinion that in certain cases it may cause injury by irritation, although in two cases of tubercular growths, situated on the posterior region of the larynx, the galvano-cautery gave him good results. Gouguenheim used to apply the galvano-cautery very often in swollen epiglottides and ary-epiglottic folds, and in cases of polypous growths situated on the posterior region ; but latterly this author limits the application of the galvano-cautery only to the latter changes, which we meet with in laryngeal phthisis (growths). Of the sixteen observations of laryngeal tuberculosis reported by me further on, in six of them we applied the galvano-cautery with more or less success. The most frequent place of application was the posterior region of the larynx (ulceration, polypous growths), rarely the epiglottis (infiltrations, ulcers), and lastly, the ventricular bands. Basing our views upon the above experiments, we can say that amongst applications for laryngeal phthisis the galvano-cautery must occupy one of the principal places, and seems to have a future before it.

We pass to the consideration of one of the most important advances of recent times in the therapeutics of laryngeal tuberculosis, thanks to which we especially owe the radical change which has taken place in our opinions

as to the curability of laryngeal phthisis. This is the so-called surgical method. Under this name we understand three operations: (1) endo-laryngeal incisions (scarifications), *i.e.*, the method of M. Schmidt; (2) curettement (endo-laryngeal scraping), *i.e.*, the method of Heryng; lastly (3), tracheotomy, *i.e.*, opening of the windpipe. Of these methods we shall now speak more fully, at the same time showing the results of sixteen suitable observations derived from our hospital practice.

C. *The surgical treatment of laryngeal tuberculosis.*—1. Endo-laryngeal incisions, or scarifications. Although before M. Schmidt, Marcet, in the year 1869, employed endo-laryngeal incisions in laryngeal phthisis, yet to Moritz Schmidt, of Frankfurt, belongs the honour of the introduction of this method into the treatment of laryngeal tuberculosis. This author, in the year 1877, in a total of ninety-eight cases, obtained recovery in three by the use of this method, and amendment in ten other cases.

In the next year, of 106 cases, there were seven recoveries, and ten cases exhibited amendment; finally, in the year 1879, of 115 cases, entire recovery occurred in six, and amendment in thirteen cases. Thus, during three years (1877-1879), out of a total number of 300 odd cases, this author, applying surgical treatment (deep incisions), obtained recovery in sixteen cases—*i.e.*, five per cent., and in thirty-three cases amendment—*i.e.*, ten per cent.

These favourable results encouraged other specialists to adopt Schmidt's method. Sokolowski [126] was one of the first to (in 1881) publish the results obtained in the treatment of laryngeal phthisis by the surgical method. This author applied incisions to the epiglottis and posterior region, and from his own experiments he was of opinion that this method was excellent in laryngeal phthisis. For this treatment the author considered those forms of laryngeal tuberculosis as most suitable, in which, besides relatively small change in the lungs, and the absence of fever, the changes in the posterior region of the larynx were of œdematous character, in which the epiglottis was thickened and swollen, and there was great dysphagia, which diminished very much, or disappeared entirely, after making incisions. The later periods of pneumo-laryngo-phthisis were not suitably treated by this method. Rossbach, of Würzburg, is a great supporter of incisions (although only on the posterior region of the larynx). The method of Schmidt was further applied by Krause, Schaeffer, Schech, and, lastly, Jurasz,[4] who applies incisions in the first period of tubercular infiltration. Opponents to the practice of surgical treatment of laryngeal phthisis are Lennox Browne,[127] and Stoker,[128] who is of opinion that incisions give an impulse to the penetration of the tubercle bacilli According to Stoerk, a well-known therapeutic nihilist, every energetic treatment of tubercular ulcers of the larynx is decidedly noxious. In the clinic of Sokolowski, we have often applied deep incisions (see cases reported hereafter), mostly to the swellings of the posterior regions, especially in cases of perichondritis arytenoidea, and also in infiltrations of the epiglottis. The result of such incisions was always more or less favourable; the swellings diminished, and painful swallowing often entirely disappeared. We also applied with great success deep incisions into the swollen parts (plastic, hard infiltrations), with subsequent rubbing

of concentrated lactic acid (100 per cent.—*i.e.*, pure acid), which did not act very energetically alone in these cases. Schmidt justly considers as the only drawback to the making of these incisions, too rapid agglutination of the edges of the sore, which takes place especially in superficial incisions. For this reason this author advises very correctly (of which we have had occasion to convince ourselves more than once) that deep incisions or piercings be made, *e.g.*, in swollen arytenoid cartilages. He sometimes made complete excision of the epiglottis. We must admit that this operation is nowadays easily performed and painless. We need only anæsthetise beforehand by means of cocaine (10-15 per cent. for the throat, and 20-25 per cent. for the larynx). These incisions are made by means of ordinary laryngeal knives differently modified.

II. *Curettement.*—Heryng is one of the most ardent supporters of the surgical treatment of laryngeal tuberculosis (129 and 2). This author, besides incisions, successfully employs a new method introduced by himself, the so-called curettement (*evidement*), *i.e.*, scraping of the larynx. This method has been extensively employed in surgery for a long time, surgeons employing the so-called Volkman's spoon for this purpose. It was applied for the first time to the larynx by Heryng, who employs instruments designed by himself (*see his work*[2]).

The author starts from the assumption that scraping renders the ulcer benign, and considers his method to be indicated (1) in primary laryngeal tuberculosis, which he considers to undoubtedly occur, although rarely; (2) in cases of tubercular growths of the posterior part of the larynx; (3) in cases of ulcers with sclerotic ground and hypertrophic edges. The places where the author applied scraping, were the following:—the posterior region of the larynx, the false cords (infiltrations in the form of growths, ulcers), the vocal cords in cases of exuberant granulations on superior surface, and the epiglottis, on which, on account of its yieldingness, scraping is most difficultly performed. The author considers the principal merits of his method to be the complete destruction of the tubercular process, even when situated deep in the tissues (with which, however, Schrötter does not accord); further the small inflammatory reaction after the operation, and a speedy diminution of pain and difficulty of swallowing due to cicatrisation, which the author obtained in fifteen out of twenty cases thus treated. With the latter opinion of the author we entirely accord, although we have not applied scrapings so often (in five cases reported after), but always with success (the amendment of swallowing, or entire cessation of dysphagia), in two cases entire cicatrisation of the ulcer on the posterior region, as proved at the necropsy by pathological examination. We think that with regard to the epiglottis, this method has less favourable chances. Rosenberg also obtained good results from this method. On the other hand Stockton, of Chicago,[127] denies the advantages of curettement, while Heryng's method has not hitherto gained universal acceptance, and, while there are as yet few suitable observations, which can lead one to determine in its favour or the opposite, which may be accounted for by the difficulties of its execution. Still, basing our opinion upon our own experience, we cannot deny the positive importance of Heryng's method, and we share the opinion arrived at by the

greater number of laryngologists present at the meeting in Wiesbaden, during the discussion of Heryng's lecture (Cube, Schmidt, Gottstein), that the method of Krause (lactic acid), and the curettement of Heryng must be considered as a great step in the direction of obtaining recovery of laryngeal tuberculosis.

Before passing to tracheotomy, as applicable to laryngeal phthisis, we shall briefly mention a method which, in one case, Sokolowski successfully employed. It was a case in which, through the formation of abundant granulations on the free edges of vocal cords, narrowing of the rima glottidis occurred to such an extent that alarming stenotic symptoms ensued, and we considered the advisability of tracheotomy. In this case, three extirpations of the largest granulations, by means of Fauvel's forceps, removed the dangerous symptoms of suffocation each time, so that tracheotomy was superfluous.

III. *Tracheotomy.*—Tracheotomy, as a palliative remedy, performed to relieve attacks of suffocation, has been applied for laryngeal phthisis a long time. At the end of the last century, Desault, Fleury in 1844, Obédenave in 1866, Eugène and Jules Boeckel, Krishaber,[4] and many others had performed this operation ; but to Moritz Schmidt,[130] to whom the surgery of laryngeal tuberculosis owes so much, belongs the credit of advising tracheotomy as a therapeutic operation *par excellence* in laryngeal phthisis. Before him, indeed, in the year 1877, our countryman, Serkowski,[131] had considered tracheotomy a treatment more than palliative in laryngeal tuberculosis. In 1883, Sokolowski[131] described two cases of laryngeal phthisis successfully treated by means of tracheotomy. Louis Grégoire[132] regarded tracheotomy in laryngeal phthisis to be a therapeutic method ; and of the same opinion are Latouche,[133] Pilcher,[134] and Betz.[135] Further, as supporters of tracheotomy as a therapeutic method, we must add Gouguenheim, Woakes, and Hunter Mackenzie of Edinburgh,[136] who considers, as favourable features of this operation, (1) rest to the larynx—removal of irritating agents ; (2) the facility of the access to surgical treatment. On the other hand, opponents of this method are Morell Mackenzie (who maintains that, although the larynx receives indeed requisite rest, tracheal irritation may occur) ; further, Isambert, Lennox Browne, Solis-Cohen, and Beverley Robinson. Schrötter remarks in his latest manual : "That I must still regard laryngotomy as a symptomatic indication." M. Schmidt, of eight cases of laryngeal tuberculosis, in which tracheotomy was performed, saw recovery in five. This author gives the following indications : (1) Stenosis—we must not defer the operation (likewise Schrötter, who advises tracheotomy to be performed as low as possible, *i.e.*, as far as possible from the pathological cause). (2) Extensive affection of the larynx, with a relatively small degree of implication of the lungs, even without symptoms of stenosis. In practice this indication meets with great opposition, and it is indeed well-known how unwillingly patients consent to the operation, even in threatening dyspnœa. (3) In a rapidly progressive process in the larynx, even before dyspnœa arises. Lastly, (4) in difficult, painful swallowing ; after operation, the larynx is at rest, the swelling diminishes, and the blood is aerated. This last indication

in the face of the numerous drugs we now possess to control dysphagia more or less successfully, must be considered untenable. With some of these points Schrötter does not agree. Although we have only in one case (reported further on) performed tracheotomy, and that without success, still, from the experience of others, we must consider tracheotomy in laryngeal tuberculosis not only a palliative method, but having a still greater importance, in that it puts the organism in a much better condition, permits a more successful performance of local treatment (Schmidt), and has a favourable influence upon the general condition and upon the pulmonary affection. But the first and foremost indication for the performance of tracheotomy in laryngeal phthisis will always be stenosis, with symptoms of great dyspnœa, arising from (1) extensive infiltrations, (2) formation of exuberant granulations, especially on the free edges of the vocal cords, *viz.*, stenosis of the rima glottidis ; (3) inflammatory processes of the perichondrium (perichondritis arytenoidea), with an immobility of the crico-arytenoid articulation. Tracheotomy performed under these conditions removes the symptoms threatening life, and fulfils vital indications. It can, consequently, be used as a therapeutic method, making possible recovery of the local process in the larynx. In many cases, subsequent dilatation by Schrötter's method may be very useful (Schaeffer).

We have above endeavoured as fully as possible to review the numerous methods of treatment, recommended by different authors at various times, for laryngeal tuberculosis. We have reported previously a table of thirty-four cases of laryngeal phthisis, observed by us in hospital (not ambulatory) practice, in which we used local treatment by lactic acid with very satisfactory results. We now wish to present another series of experiments, comprising sixteen cases, with the former a total of fifty cases, in which we applied not lactic acid alone, but also other methods (galvano-cautery ; surgical treatment ; iodol). This "combined local treatment" was applied in sixteen cases with the following results (*See Table.*)

Of the total number of sixteen cases, in fifteen we obtained amendment, subjective (less hoarseness, improved or normal swallowing) as well as objective (less infiltration, ulcers healed). Of these cases, in ten we were able to remark a more or less distinct cicatrisation of ulcers, sometimes very extensive (third, fourteenth and fifteenth cases). Almost all these cases were exactly observed for a long period (in the eleventh case one year) in hospital, not ambulatory, practice (except cases 11 and 12) ; in all cases the treatment was founded upon methodical brushings, with lactic acid (in the eleventh case forty times). In many cases, besides this treatment, especially where lactic acid did not act quite energetically, we took refuge in surgical operations, namely, deep incisions, scrapings (curettement) ; and in many cases besides we applied iodol alone, or with cocaine (8 : 1) in form of insufflations in the intervals of the brushings with lactic acid. In the majority of cases in which we obtained amendment, namely, in eleven, we had to do with slight, or especially interstitial, changes in the lungs ; there were cases with almost satisfactory general condition, sometimes excellent (third, eleventh, and fifteenth cases), running a favourable course, without fever, or with very little increased

No.	Name.	Age.	Occupation.	Anamnesis.	General state.	Lungs.	Tubercle bacilli.	Laryngoscopic appearance.	General treatment.	Local treatment.	Subjective symptoms.	Objective symptoms.	Result of treatment.	Duration of observation.
1	S.	27	Locksmith.	——	Fair ...	Commencing destruction of summits	Were found	Dysphagia. Hoarseness. Infiltration of post. part. and false cords. Swelling of right aryt. cart.	Cod liver oil, creosote	5 brushings with lactic acid, incision of right aryt. cart.	Good swallowing, hoarseness a little less	Infiltrations much less	Death: extensive inf. and ulcers in lar. (begin. cicatr); in lungs destruc.	5 months.
2	M.	41	Shoemaker.	Abusus in Baccho	Good ...	At summits slight changes	Were found	Dysph. Hoarseness. Marginal ulcerations on vocal cords.	,,	18 brush. with lact ac. iodol (insufflat.) symptoms of stenosis, 3 extirpation of granul. on voc. cords	Good swallowing less hoarse	*Cicatric degeneration of vocal cords*, passing into stenosis	Was discharged	4 months.
3	R.	34	Merchant..	——	Very well	Very slight changes at summits	Were found	Dysph. Slight hoarseness. Extensive ulcers on left false cord. Swelling of left aryt. cart.	,,	15 brush. with lact. ac. incision of ar. cart.	Good swallowing	*Cicatrization* of ulcers. No swelling.	Was discharged (after 3 months death at home)	2 months.
4	S.	37	Official ...	Syphilis ...	Bad ...	Commencing destruction of summits	——	Dysph. Excrescentio (ulcer) on post. part. Ulcers on vocal cords	,,	7 brush. with lact. ac. 3 curettements of post. part	Good swallowing (after curett.)	*Cicatrization* of ulcer on post. part.	Death: near exten. and deep ulcers in lar. *cicatrix* on post. part; in the lungs destructions.	2 months.
5	L.	41	Official ...	Hereditary predisposition	Bad ...	Indurations at summits	——	Dysph. Infiltration of post. part, ary-epiglottic folds and vent. bands. Excrescentio (ulcer) on post. part.. Superficial ulceration on right vocal cord	,,	5 brush. with lact. ac. iodol incision of swollen left ar. cart. 3 galvan. on post. part, 1 curett. on post. part	Much better swallowing (after curett. and galvan)	*Cicatrization* of ulcer on post. part.	Death: On post part *cicatrix* near deep ulcers; in lungs in sum. old changes besides new process	7 weeks.
6	J.	30	Paperhanger	Diathesis, Hæmoptysis	Good ...	Interstitial changes of summits	——	Dysph. Great infiltration of epiglottis with ulcers. Infiltration of post. part	,,	11 brush. with lact. ac. 1 curettement of epigl.	Good swallowing	*Cicatric degeneration of epigl.*	Death: cicatrised epigl.; in lar. extensive ulcers; in lungs destr.	9 weeks.
7	W.	40	Official ...	Hæmoptysis	Bad ...	Great changes (destructive)	——	Dysph. Infiltr. of post. part. Swelling of right aryt. cart.	Ac. carb. (inject.)	In ambul. practice several insufflat. of iodol and brush. with lact. ac.; incision of right ary. cart.	Better swallowing	Less of right aryt. cart.	Death: in lungs destruc.; in larynx infiltr. and ulcers.	Some weeks.
8	R.	34	Joiner ...	Pneumonia..	Good ...	Indurations at summits (dyspnœa)	——	Hoarse. Dysph. Swelling of right aryt. cart.	Cod liver oil, creosote	1 brush. with lact. ac. 2 incis. of ary. cart.	Better swallowing (less dysph.)	Swelling much less.	Was discharged.	3 weeks.
9	D.	54	Engineer ...	Syphilis ...	Good ...	Slight changes (dyspnœa)	Were found	Dysph. Great infiltr. of epigl. with ulcerat. Infiltr. of post. part.	,,	Tracheotomy, 2 brush. with lact. ac.	Without change	Without change.	Death: in larynx extens. destruction; in lungs fresh tuber. proc.	7 weeks.
10	T.	45	Merchant's wife	Hæmoptysis	Bad ...	Slight changes at summits	Were found	Dysph. Extensive infiltrations and ulcerations in throat (soft palate, uvula, arcus, post. part. of pharynx). Infiltr. of epiglottis	Solutio Fowleri	20 brush. with lact. ac. iodol, uvulotomy	Better swallowing	*Cicatrization of ulcers.*	Was discharged. (In a short time death at home.)	3½ months.
11	S.	36	Summoner.	Hereditary predisposition	Very good	Indurations at summits	Were found	Hoarse. Ulcers on vocal cords. Infiltr. of epigl. (ulcers)	Creosote ...	40 brush. with lact. ac. 1 galvanoc. on epigl.	Less hoarse	*Cicatr. degen. of voc.cords.* Passing into stenosis Begin. cicatr. of ulcer on epigl.	Till now under observation.	1 year
12	K.	29	Printer ...	——	Middle..	Slight changes at summits	Were found	Dysph. Infiltr. of epigl. and post. part. (ulcer). Ulcerat. on vocal cords	,,	Several brush. with lact. ac. in ambul., incis. of epigl.	Better swallowing	Infiltr. of epigl. less.	Death at home.	3 months
13	S.	53	Carpenter..	——	Good ...	Indurations at summits	——	Dysph. Inf. of post. part. and ary-epigl. folds. Superf. ulcer on right vocal cord	,,	9 brush. with lact. ac. 2 incis. of right ary. cart.	Better swallowing	Less swelling of right aryt. cart.	Death: in larynx and lungs extensive destr.	5 weeks.
14	F.	33	Official ...	Diathesis, lues, Pneumonia (twice)	Almost good	Extensive indurations at summits	Were found	Dysph. Extensive ulcerations on left false cords. Swelling of left aryt. cart.	,,	7 brush. with lact. acid incision of aryt. cart.	Good swallowing	*Cicatr. of ulcers.* Less swelling of aryt. cart.	Was discharged.	5 weeks.
15	J.	48	Tailor ..	Diathesis ...	Very good	Slight changes ...	Were found	Dysph. Extensive ulcers on left ventricular bands. Infiltr. of epigl.	,,	16 brush. with lact. ac. 2 galvanoc. on epigl.	Good swallowing	*Cicatr. of ulcers.* Less infiltr. of epigl.	Was discharged.	4 months.
16	C.	56	Shoemaker.	Diathesis, lues, hæmoptysis	Bad ..	Great changes at summits (destruction)	——	Dysph. Ulcer on left proscessa vocalis. Swelling of left aryt. cart. and ary-epigl. fold.	,,	8 brush. with lact. acid iodol	Good swallowing	Begin. cicatr. of ulcer. Infiltr. a little less.	Was discharged.	2 months

temperature, although the changes in the larynx were considerable, great infiltration, extensive ulcerations, and the general state was even sometimes bad, and the process in the lungs was extensive. In these cases even (*e.g.*, in third) we attained partial cicatrisation of ulcers. If we now compare the results obtained by application only of lactic acid (of thirty-four cases, in twenty-five amendment, and in ten cases more or less distinct cicatrisation of ulcers) with the result above cited, where, besides lactic acid, we also applied other therapeutic methods, we must admit that from the combined method of treatment, the most favourable results must be expected, and that it is at present the most rational therapeutic method of treatment of laryngeal tuberculosis. Of the above sixteen cases the following deserve particular attention :

No. 3. R., aged thirty-four, merchant ; duration of observation, two months ; cough for ten years ; hoarseness and painful swallowing for a year ; previous history, good (neither hæmoptysis nor syphilis), without hereditary predisposition ; general condition, very good (no pyrexia) ; very slight changes in the lungs (at summits expiratio prolongata, vocal sound a little increased). In sputa I found tubercle bacilli. Examination by the laryngoscope gave the following results :—Extensive ulcerations on greatly infiltrated left ventricular band, spreading on to the laryngeal surface of the epiglottis ; left vocal cord is entirely covered (not visible) ; swelling of left arytenoid cartilage ; the swallowing, especially of fluids (a very frequent phenomenon in phthisics), impossible ; moderate hoarseness. The patient was prescribed cod liver oil, creosote, and at first every two, afterwards every three, days, brushings with lactic acid (25, 50, 75 and 100 per cent.) were made, fifteen in number, upon the ulcerated false cord. Lactic acid produced violent burning of long duration, in spite of previous anæsthesia of the larynx by means of cocaine (10-15 per cent.). After the first brushings the swallowing was easier, the ulcers began to clear, and their bases began to cover with sound granulations ; at last they entirely cicatrised. Resisting lactic acid, the swelling of the left arytenoid cartilage disappeared only after its deep incision, with subsequent rubbing in of strong lactic acid (100 per cent.). On the discharge of the patient from the hospital, the general condition was excellent, the changes in the lungs the same (very slight), the swallowing quite good, the hoarseness still existing, although less, and as regards the larynx there was entire cicatrisation of the ulcers on the left ventricular band. Some time after we accidentally heard that this patient had died at home several months afterwards. Whether any relapse of the laryngeal affection took place in this case we do not know.

The above case is important, in that it shows clearly how careful we must be in prognosis in such patients, and *that the cicatrisation of tubercular ulcers of the larynx does not mean recovery from laryngeal tuberculosis*, of which we may be convinced best by the autopsy. See the following case :—

No. 4. S., thirty-seven years old, an official ; duration of observation, two months ; cough for two years ; hoarseness for a year ; for several days, painful swallowing, *especially of fluids and saliva* ; fifteen years ago, syphilis ; general condition, bad (high temperature) ; in the lungs,

at both summits, commencing destruction ; in the larynx, on posterior part, an excrescence, *i.e.*, the upper edge of a deep ulcer ; ulcerations of both vocal cords, especially the left ; hoarseness—swallowing almost impossible. Creosote and antifebrin (in order to diminish pyrexia) were prescribed. Locally, in the larynx, methodic brushings of lactic acid (25, 50, 75 and 100 per cent.), seven in number, were applied. They were very painful, in spite of the use of cocaine (10 to 15 per cent.). The ulcer on the posterior part of the larynx remained without change ; not submitting to the above treatment, the same painful swallowing continued ; then three scrapings (curettement) of the base and edges of the ulcer (method of Heryng) were made ; afterwards, the swallowing began to amend very much ; the ulcer on the posterior part healed. The patient, in this state, was discharged from the hospital. Not long after, however, he returned again, and died some days after with symptoms of increasing weakness and progression of the pulmonary affection. At the autopsy was found, in the lungs signs of the destructive form of consumption ; in the larynx, near the deep ulcers (in many places penetrating to the cartilage), we found a distinct cicatrix on the posterior part, the presence of which Prosector Przewoski, a well-known pathologist, entirely confirmed.

The above case is important in two ways: (1) It clearly shows that the cicatrisation of tubercular ulcers of the larynx is possible under suitable treatment. (2) It proves the importance of Heryng's method (curettement).

No. 5. L., aged forty-one, an official ; duration of observations, two months ; with hereditary predisposition (the mother died of pulmonary phthisis) ; for two years, cough and hoarseness ; for five months, entire aphonia ; difficult swallowing ; general condition, bad (great pyrexia) ; phthisis of lungs of fibroid nature (induration of both summits) ; in the larynx, excrescence (ulcer) of the posterior part ; infiltration of false cords and ary-epiglottic ligaments ; ulcer on the right vocal cord ; brushings with lactic acid, five in number, and insufflations of iodol with cocaine produced neither subjective nor any marked objective amendment. Even gelatinous swelling (œdema) of the left arytenoid cartilage ensued, which diminished after deep incision. The ulcer on the posterior part of the larynx resisted the above treatment, and was entirely scraped by Heryng's sharp curette, and was also three times cauterised with the galvano-cautery. From this time the swallowing improved very much, and the excrescence on the posterior part disappeared. Exitus letalis, not long after, ensued, with symptoms of general consumption. The autopsy showed : in the lungs, besides the fibroid process, fresh dissipated tubercular affection in the larynx ; on the left processus vocalis a deep ulcer, penetrating to the cartilage ; extensive infiltrations of almost all parts of larynx ; on the posterior part, extensive and distinct cicatrix, the presence of which was confirmed by Professor Brodowski and Prosector Przewoski, well-known pathologists.

The above case presents, more or less, the same points as the former. Both show, that even in cases of bad general condition, and relatively advanced affection of the lungs, entire cicatrisation of the tubercular

ulcers can take place under rational treatment (curettement, galvano-cautery, etc.).

No. 10. T., forty-five years old, a merchant's wife; duration of observation, three months and a half; cough for fifteen years; the first hæmoptysis thirteen years ago; hoarseness and painful swallowing for four months; she had not been ill before; general condition, bad; in the lungs, very slight changes—at right summit, expiratio prolongata; vocal sounds intensified; in the sputa, after four examinations, I found tubercle bacilli; extensive infiltrations and ulcerations on the posterior part of the pharynx, spreading on to both faucial pillars, the uvula and the soft palate; epiglottis, a little infiltrated. Prescribed: cod liver oil, sol. Fowleri, and, locally, lactic acid (25, 50, 75 and 100 per cent.) was rubbed in. In the intervals, insufflations of iodol with cocaine (8 : 1). After such treatment, lasting one month, the swallowing began to amend; the appearance of the ulcers in the pharynx was much better; the infiltrations were less; the ulcers clearer—they began to cover with good, sound granulations, and at last to cicatrise. Only the tubercularly degenerated uvula showed the greatest resistance to healing; it was, therefore, removed by uvulotomy, and afterwards the cicatrisation made rapid progress. But the general condition deteriorated more and more; the changes in the lungs became more extensive; infiltration of the epiglottis became greater; the swallowing painful; in the pharynx, however, the large cicatrix remained without change. In this state, the patient left the hospital, and, not long after, she died at home. In this case, lactic acid proved to be really wonderful in its effects, as regards the extent of the tubercular process in the throat.

No. 14. F., aged thirty-three, an official; duration of observation five weeks; hereditary predisposition (the father died of pulmonary consumption); cough for five years; hoarseness and painful swallowing (especially of fluids) for a year; syphilis twenty-two years ago. He suffered acute inflammation of the lungs twice. General condition, good (without fever). Changes in the lungs especially interstitial (extensive infiltrations of summits). In sputa I found tubercle bacilli in great number. In the larynx extensive ulcerations on greatly infiltrated left ventricular band, which entirely covered the corresponding vocal cord. Moderate infiltration of right ventricular band and vocal cords. Swelling of both arytenoid cartilages, especially the left. The patient took creosote, cod liver oil, and to the ulcerated cord lactic acid was applied seven times (25, 50, 75, and 100 per cent.); in the intervals insufflations were made of iodol with cocaine. The swallowing became better and better, the left false cord began to cover with sound-looking granulations, and to heal. Resisting swellings of the left arytenoid cartilage disappeared after deep incision. The patient was discharged, and we subsequently found on examination: general health good, changes in the lungs *in statu quo*, the swallowing quite good, voice moderately hoarse, in the larynx the ulceration of the left false cord quite healed, and the infiltrations almost entirely disappeared.

No. 15. This case is very similar to the former. F., forty-eight years old, a tailor; duration of observation, four months; diathesis (the

father died of pulmonary phthisis); cough for three years; hoarseness and painful swallowing for five weeks, especially of fluids; typhoid fever in youth; syphilis was absent; general state, very satisfactory, without fever. In the lungs, very slight changes at right summit; posteriorly expiration prolonged; vocal sounds a little increased. In the sputa I found tubercle bacilli in great number. In the larynx, infiltration of left half of epiglottis. Extensive ulcerations on left false cords (as in cases 3 and 14); swelling of the left arytenoid cartilage. Creosote and cod liver oil were ordered; locally in larynx, lactic acid was rubbed into the ulcerated cord sixteen times (25-100 per cent.), after previous application of cocaine. In spite of this latter, the burning was violent and of long duration (after every brushing abundant hæmoptysis ensued); in the intervals of brushings, insufflations were made of iodol with cocaine, producing also slight hæmoptysis. Already, after the first brushings, the appearance of the ulcerations was much better, afterwards the ground of the ulcers began to cover with sound granulations, and cicatrisation slowly began. At the same time the swallowing began to improve, and the voice was clearer. To the infiltrated epiglottis the galvano-cautery was applied with favourable result; the patient was discharged from the hospital presenting an excellent general condition. In the lungs were the same slight changes; the swallowing was quite good, and the voice a little hoarse. In the larynx, the ulcers on the left false cords were entirely healed; the infiltration of the epiglottis was much less. The further fate of the patient is not known to us.

The two further cases we separately report on account of their importance. No. 2. M., aged forty-one, a shoemaker; duration of observation four months; cough for ten years; hoarseness and painful swallowing for a year; abusus in baccho; without hereditary predisposition; no syphilis; general state, good (without fever); symptoms of emphysema at pulmonary summits; very slight changes (exp. prol. voice increased); in sputa I was able to detect tubercle bacilli in small number. The swallowing, especially of fluids, was impossible; attacks of tormenting cough. In the larynx, on the edges of vocal cords, ulcerations (marginal). Cod liver oil, creosote. Eighteen brushings with lactic acid (25-100 per cent.), finally made without cocaine, because after cocaine, as well as after lactic acid, the patient suffered exceedingly violent attacks of coughing and dyspnœa. In the intervals of brushings, insufflation of iodol with cocaine were made. The swallowing improved, at last became quite well; ulcers healed, so that the vocal cords presented a sort of cicatric degeneration in great degree; unevenness (a sort of granulation) on the free edges of the vocal cords, projecting into the rima glottidis, narrowed it very much, producing more and more alarming attacks of dyspnœa. We were almost resolved to perform tracheotomy, but before doing so Sokolowski tried to extirpate by endo-laryngeal means, with Fauvel's forceps, the most prominent granulations, occupying three sittings. Symptoms of stenosis partially disappeared, and tracheotomy was not performed. The patient was discharged with good general health, and with slight dyspnœa, swallowing quite well, and with cicatric degeneration of the vocal cords.

No. 11. S., aged thirty-six, a porter ; duration of observation, one year ; diathesis (the father died of pulmonary phthisis) ; cough for three years ; hoarseness and painful swallowing for one and a half years. He was then locally treated ; hoarseness and pain then disappeared ; for half a year deterioration ; no syphilis ; changes in the lungs more of fibroid nature (extensive indurations at summits). At second examination I found tubercle bacilli in the sputa ; general state, excellent. The patient is still employed as a porter, and is treated in our ambulatory. In the larynx : ulcers on vocal cords ; moderate hoarseness ; swallowing well. After forty brushings of lactic acid (25-100 per cent.), cicatrization of ulcers. Stenosis of rima glottidis to a certain degree resulted, being due to the formation of a sort of arch in the vocal cords, the bow of which is situated at the anterior angle of the vocal cords. This patient, however, in opposition to the former case, in spite of comparatively great stenosis, did not suffer from dyspnœa. After half a year we saw the patient again ; the vocal cords cicatricially degenerated ; the same stenosis as formerly. The epiglottis, on the contrary, was infiltrated ; on its right half there was an extensive ulcer, with dirty base and uneven, elevated edges. The ulcer was cauterised with the galvano-cautery, and, after removing the scurf, sound granulations formed, and after a week the ulcer began to cicatrise, the infiltration of the epiglottis diminished considerably. The swallowing was always good, and moderate hoarseness existed. Some months after, we saw the patient again, and the state of the vocal cords remained without change ; the epiglottis presented fresh infiltration, and in the lungs there were greater changes. The patient is now under observation.

The two last cases claim our particular attention. In both we had to do with a certain degree of stenosis of the glottis, in the first case, in consequence of too abundant formation of granulations on the vocal cords, cicatricially degenerated ; in the second case, on account of a cicatrix producing a malformation. Stenoses of the larynx of tubercular nature belong to the exceedingly rare phenomena. Many authors, even up to the present time, do not accept them. To such belong Morell Mackenzie, Stoerk, Hueter, Lünning, and Heryng, who collected one hundred cases of various stenoses of the larynx. Syphilitic stenoses are the most frequent, and moderately frequently occur stenosis during abdominal typhus. Stenosis may occur, although rarely, in other diseases, as in diphtheria, small pox, &c. Not only partial stenosis of the larynx, such as occurred in our cases, but complete formation of membranes between the cords of undoubtedly tubercular character has been observed. The first case was described by Lenicke, of Rostock. A teacher, aged fifty-two, had had symptoms of pulmonary phthisis, lasting for a long time. In the larynx, a long-existing tubercular process, produced at last the formation of a complete membrane between the vocal cords, with a small oval aperture in the centre. Endo-laryngeal treatment, by means of dilatations of Schrötter, gave no result, and, at last, laryngotomy was performed with excision of the membranes. Recovery afterwards ensued. Rosenberg[17] described a case, observed by B. Fraenkel :—A man, thirty-six years old, had hereditary predisposition, but no syphilis. There was

affection of the right pulmonary summit (induration); tubercle bacilli in sputa ; aphonia. On the left false cord infiltration with ulcers. Climatic treatment ; inhalation of carbolic acid ; cicatrisation of ulcers. Formation between the false cords of a complete membrane, with only a small aperture in its posterior part. The above formation of membrane of tubercular nature we have also observed (see fourth case treated by menthol), but they will be the subject of more particular description. I shall only add here that, in such cases, therapeutic treatment consists in incision of the membrane by endo-laryngeal means, with subsequent methodic use of Schrötter's dilators, as was done in our cases, or as in Lenicke's case, laryngotomy, with the subsequent excision of the membrane. In the greater number of such cases we cannot avoid tracheotomy.

If we sum up our thirty-four cases, treated by lactic acid, with sixteen cases, in which the combined method was applied, we get a total of fifty cases in which local treatment was systematically carried out. The general results in these fifty cases are as follows :—

(1) Amendment in forty cases, *i.e.*, eighty per cent.

(2) Without amendment in ten cases, *i.e.*, twenty per cent.

The amendment was (1) only subjective in ten cases ;

(2) subjective and objective in thirty cases.

From the latter we must separate ten cases in which we had only more or less amendment, from twenty cases in which we obtained more or less distinct cicatrisation of tubercular ulcers. This number, *i.e.*, eighty per cent. of amendment, obtained by local treatment, eloquently proves the advantage of this therapeutic method, and is still more evident, if we compare it with the per centage obtained on analysis of the same number of cases (fifty) in which we applied no treatment at all, except of a general character (cod liver oil, creosote, arsenic). These cases were also observed by us in the clinic of Sokolowski for diseases of the throat and lungs in the Hospital of the Holy Ghost in Warsaw ; they belong to the same class of patients, and are under the same conditions as the former. The general results obtained by us in these fifty cases are as follows :—

1.—Amendment in eight cases, *i.e.*, sixteen per cent.

2.—Without amendment in forty-two cases, *i.e.*, eighty-four per cent.

This amendment was especially subjective, *i.e.*, it referred to hoarseness and difficult swallowing, and only in one case, where the changes in the lungs were slight, the ulceration of the posterior parts of the vocal cords was partially cicatrised, although in this case, though for only a short time indeed, insufflations of boric acid were made. In these, as well as in the remaining seven cases in which amendment was obtained without local treatment, there existed relatively slight changes in the lungs, especially of interstitial nature, and the general state was more or less satisfactory. In most of the remaining cases (forty-two), where no amendment was remarked, the tubercular process in the larynx, as well as in the lungs, progressed generally to a fatal termination (in twenty-three cases). At the autopsies we were able to prove the enormous destructions of the larynx without anywhere any trace of cicatrisation.

If we now compare the results obtained by us in our two series of observations, we note very remarkable differences, namely :—

Of fifty cases locally treated, amendment in forty, *i.e.*, eighty per cent. Of fifty cases without local treatment, amendment in eight, *i.e.*, sixteen per cent.; and the most pessimistic should be convinced of the importance of local treatment in laryngeal tuberculosis.

In the second series of cases under our observation, the following merits particular attention :—

No. 1. C., aged fifty-one, a confectioner ; duration of observation, five weeks ; hereditary predisposition ; twice he has had acute inflammation of the lungs ; no syphilis ; cough for several years, and for a month hoarseness and painful swallowing, especially of saliva ; no fever ; general state, good ; in the lungs, changes very slight (on right summit at the back expiration slightly prolonged) ; in the sputa I did not find tubercle bacilli ; moderate hoarseness and dyspnœa ; dysphagia. Epiglottis, false cords, ary-epiglottic folds, and posterior parts do not present any distinct changes. The vocal cords swollen ; occupying one-third of the right vocal cord, a growth was seen during inspiration, originating from the inferior surface of the right vocal cord ; the growth was almost red, and of the size of a hazel-nut, with uneven surface. Sokolowski partially extirpated the growth by means of Fauvel's forceps ; the extirpated parts of the growth were kept in alcohol in order to examine them under microscope, which, unluckily, on account of the loss of the preparation, could not be done. We afterwards brushed with weak solutions of nitrate of silver, and after a month, the patient was discharged from the hospital, with the general state, good, less hoarseness, the right vocal cord reddened and greatly swollen, and a little trace remaining of the growth. Three months afterwards the patient returned with great dysphagia, and great infiltration of the false cords, which quite covered the vocal cords. Fever: slight pulmonary changes in sputa however. I was this time able to find great quantities of tubercle bacilli. Unluckily, the patient was soon discharged from the hospital, and his further fate is not known to us.

Although the above observation leaves very much to be wished in regard to its exactness, and although what was most important, viz., microscopical examination of the growth was not made (for the above reasons), and consequently we cannot say anything absolutely definite as to its character, yet from its microscopic appearance, and from the affection of the lungs, which, though slight, was undoubtedly tubercular (tubercle bacilli), and especially from the course of this case (infiltration of false cords—dysphagia), and its analogy to others which I have found recorded, we are inclined to regard this case as a probable tubercular growth of the larynx, perhaps primary.

These growths are not exceptional. (1) John Mackenzie, of Baltimore,[137] was the first, who drew attention to them in the year 1882. He proved the tubercular nature of the growth by means of microscopic examination (in two cases—in one of them the growth was situated in the larynx, in another in the trachea).

(2) In the year 1884 Percy Kidd [138] described the following case: The patient, aged fifty, had for eight months a cough, hoarseness, and dyspnœa. Induration of left summit was found. On the posterior part of the left vocal cord a round growth the size of a little pea was

found, and on the analogous part of the right cord a slight red excrescence, which increased slowly to the same size (pea), and presented the same aspect as the left side. For several months the state of the lungs and larynx was without change. Not long after the symptoms occurred of a cavity at the left summit of lungs, with swelling of the ary-epiglottic folds. The growth remained without change (nine months). Exitus letalis—fibroid form of pulmonary phthisis—tubercular ulcers on the posterior part of larynx and trachea, on both processus vocales growths the size of a pea. Microscopic examination of the growths proved their tubercular nature (tubercle bacilli).

(3) Lermoyez [139] described a case of movable polypous growth (vegetation), situated at the anterior angle of the right vocal cord, causing symptoms of suffocation. Tracheotomy. Death. At the autopsy tuberculosis of the lungs was proved. In the above case the nature of growth was not (as in our case) proved by the microscope.

4. Schnitzler [140] reports the following case : A man, twenty-one years old, with extensive tubercular process in the lungs. In the larynx numerous growths, varying from the size of a pea to a hazel-nut. Tracheotomy. The growths were extirpated by means of the guillotine. Microscopic examination proved their tubercular nature. Besides the above case, the author described two cases of tubercular growths of the larynx, in one of which the growth was situated on the posterior part of the trachea ; in another it originated in the ventriculus Morgagni.

5. Ariza, of Madrid,[141] pretended that to himself belongs the priority of drawing attention to tubercular growths of the larynx, since he had in the year 1877 already described such a case. The growth was of the size of a small nut, red, originating from the epiglottis. Partial extirpation. The microscope proved the tubercular nature of the growth, and below the above growth numerous polypous growths likewise of tubercular character, microscopically. This author, besides the above case, observed one case of tubercular growths the size of an almond at the anterior angle of the vocal cords. The author is of opinion that tubercular growths in the larynx are relatively frequent—their favourite place is the epiglottis, between the arytenoid cartilages, or the vocal cords (especially their anterior angle).

6. In the year 1885, Percy Kidd [142] described three new cases of tubercular growths of the larynx (two with post-mortem examination). Kidd is of opinion that the extirpation of these growths is indicated, when the growth is too large, or so situated that it produces the symptoms of dyspnœa.

7. In the year 1887, Schaeffer and Nasse [143] described the following case : A manager, thirty-three, presented at the extremity of the left vocal cord a growth the size of a bean, with a slightly uneven surface. The patient died of pulmonary phthisis. The microscopic examination of the growth showed tubercles with giant cells and tubercle bacilli.

8. In the same year Percy Kidd [144] described still another case (together five) of tubercular growths in the sub-glottic region below the right vocal cord. The growth was grey-red, and of the size of a bean.

9. Heryng [2] in two patients observed on the false cords in the

neighbourhood of the processus vocales small hemispherical growths. One of them extirpated by forceps was microscopically examined, and showed tubercles with giant cells.

10. Foa, cited by Gouguenheim,[5] described one case of small growth (cauliflower-like), situated on the epiglottis and vocal cord. The microscope proved the tubercular nature of the growth (tubercle bacilli).

11. Gouguenheim[5] had occasion to observe three cases of tubercular growths in the larynx, one of them occurring in a young man, on whom tracheotomy was performed on account of dyspnœa, in the sinus anterior cavi laryngei. At the level of the base of the epiglottis there was seen a pale-red, cauliflower-like mass. Lungs intact. Parts of growth examined by the microscope showed tubercle bacilli. In the second case the growths were situated under the rima glottidis; in the third, on the cords.

12. Although John Mackenzie was justly the first, who by histological and bacteriological examination showed the tubercular nature of these growths, they had previously been mentioned by Mandl in his manual of diseases of the throat and larynx (1872), and he gave them the name of "vegetations primordiales," which, in the form of growths of different size and of pale colour, are especially situated on the anterior surface of the posterior region of the larynx. This author describes a case. A healthy man, with hoarseness, presented in the larynx numerous polypous growths on the posterior part, and one on the left vocal cord at its anterior part; nowhere were ulcers visible. In the lungs no changes—no syphilis (specific treatment without effect). After a year ulcers occurred in the larynx (on the place of former growths), and in the lungs were distinct tubercular changes. This kind of growth Mandl[135] only describes in connection with primary tuberculosis of the larynx. We must distinguish them from the growth (excrescentio) on the posterior regions, appearing sometimes in the course of pulmonary phthisis, and which is generally the prominent edge of an invisible deep ulcer, as we can best convince ourselves at the necropsy.

13. Before Mandl, Tobold, in the year 1866, mentioned similar cauliflower-like growths.

14. A very interesting case of primary tubercular growth in the larynx was described by Dehio, of Dorpat,[26] in 1888: An otherwise healthy man, aged forty-one, complaining of hoarseness and slightly painful swallowing, was found on laryngoscopic examination to have a growth, originating from the left false cord; growth large, uneven, and grey; lungs intact. Laryngo-fissure. Excision of the whole left false cord, together with a growth. Examination of the growth proved its tubercular nature (tubercles with giant cells and tubercle bacilli). Afterwards the symptoms of pulmonary phthisis became more and more distinct, ending in death.

Besides the above case, we have had occasion to observe a case, which in other respects deserves closer attention, *i.e.*, presenting the combination of tuberculosis with syphilis of the larynx, to which latterly attention has often been drawn.

B., aged thirty-seven, a printer. Duration of observation, about one

year; he descends from a healthy family; cough for several years; hoarseness for a year; painful swallowing for two months; five years ago, syphilis; general condition, good. The patient was treated in our ambulatory. In the lungs, the changes were especially of interstitial nature (at right summit posteriorly—expiratio indeterminata, bronchophonia). In the larynx, on the left false cord, an ulcer about one centimètre in diameter. Great infiltration of both arytenoid cartilages, especially the right. Other parts of larynx without change. In the sputa I found, though not at the first examination, enormous quantities of tubercle bacilli. Anti-syphilitic treatment was prescribed (kali iodatum); after five weeks the hoarseness considerably diminished, painful swallowing entirely disappeared, and the ulcer on the left ventricular band had quite healed. Infiltration, however, of the arytenoid cartilages remained without change. In the lungs the same changes. Examination of sputa for tubercle bacilli gave a negative result this time. General state, very good. The patient feeling well did not frequent our ambulatory. After nine months he appeared, saying, that two weeks before he had had hæmoptysis, that for two months the hoarseness increased, accompanied by gradual painful swallowing.

On examination we found a bad general condition; in the lungs, at the right summit, symptoms of destruction (ronchi consonantes, respiratio bronchialis); in the sputa I found distinct (in bundles) elastic fibres and great quantities of tubercle bacilli. On examination by the laryngoscope we found ulcerations on the posterior part of the vocal cords, and swelling, especially of the right arytenoid cartilage. Several times brushings with chloral were made (5-10 per cent.), with relative subjective, as well as objective, amendment (ulcers a little clearer), but the general state made further ambulatory treatment impossible. The patient did not wish to enter the hospital, and not long after died at home.

In the above case, we had probably to do with a combined process in the larynx—tuberculosis and syphilis. In support of this supposition, we may indicate: (1) Syphilis in anamnesi, as well as the healing of a large ulcer under specific treatment (the so-called method: "Ex juvantibus et nocentibus"); (2) undoubted pulmonary tuberculosis (tubercle bacilli in sputa), likewise the affection of the arytenoid cartilages, resisting the specific treatment; (3) lastly, the course of the disease.

To the cases of a combination of syphilis and tuberculosis of larynx, much attention has latterly been drawn, and many observations have been made.

1. Schnitzler,[145] of Vienna, considers these forms even relatively frequent. He is of opinion that syphilitic ulcers can in consequence pass into tubercular, forming very suitable ground for Koch's bacilli. With this latter B. Fraenkel[147] agrees. Schnitzler remarked that patients with hereditary predisposition were more readily inclined to syphilis. This author reports a case where a syphilitic ulcer was formed on the epiglottis, which under specific treatment cicatrised, little by little; however, there began to form in the whole larynx typical tubercular ulcers, and death occurred after one and a half years. At the autopsy, pulmonary phthisis, and tuberculosis of the throat and larynx were found.

In the above case, in a patient with syphilis of the larynx, further tubercular infection took place. But both these diseases may co-exist in the larynx, as in our case. Such a possibility had already been indicated by Rokitansky.

2. In the same year (1886), Cardone, of Naples,[148] described the following case :—A woman, aged twenty-six ; anamnesi, syphilis. The condition of the larynx was undoubtedly syphilitic (swelling of the epiglottis with great loss of substance, gumma in the pharynx). Hectic, slight changes at the right summit (respiratio aspero). The secretion from the laryngeal ulcer contained tubercle bacilli.

3. A similar case is cited by Massei[149] : Ulcer on epiglottis, affection. of both summits, gumma in the pharynx, and the secretion of the laryngeal ulcer contained tubercle bacilli.

4. Grünwald [150] and Schnitzler also consider the combination of syphilis and tuberculosis of the larynx a relatively frequent phenomenon. The diagnosis of these cases is difficult. If, he says, there at the same time exist distinct radiating cicatrices and destruction of the epiglottis, besides polypous growths on the posterior part of the larynx, there is no doubt that we have to do with syphilis and tuberculosis of the larynx combined.

5. A very interesting case is reported by Arnold.[151] The patient had extensive pulmonary affection, aphonia ; ulceration of the epiglottis ; swelling of the arytenoid cartilages; ulcer in the inter-arytenoid region ; and ulcerations on the vocal cords ; tuberculosis of the larynx and lungs was recognized. Palliative treatment was adopted. Some time after the patient confessed that three years before he had contracted syphilis. Anti-syphilitic treatment was applied ; after five days, the ulcers on the cords and epiglottis began to heal, and after three weeks they were entirely cicatrised ; on the other hand, the swelling of the arytenoid cartilages, and the ulcer of the posterior part remained without change, showing clearly their tubercular nature in regard to the pulmonary affection.

6. Rienzi [27] observed one case of the combined disease (syphilis with primary laryngeal tuberculosis).

7. Heryng[2] reports a case in which he also supposed this form of disease to exist—undoubted pulmonary tuberculosis (tubercle bacilli) along with syphilis. In the larynx were ulcers on the vocal cords, hard infiltration of the posterior part, swelling of the ary-epiglottic folds, and over the capitula Santorini. Near the epiglottis these folds were tense (in opposition to what is seen in tubercular processes of the larynx). The appearance of the posterior region gave a supposition as to the combined disease. The general state was good ; under iodide the appearance in the larynx improved. By means of the sharp scrubber the hypertrophic edges of the ulcer were scraped. Under the microscope tubercle bacilli were not found, but giant cells existed in great quantities.

8. I believe, that in the case recorded by Rosenberg,[102] we can with a certain probability suppose the combination of syphilis with tuberculosis of larynx. A girl, fifteen years old, had suffered for one and a half years from hoarseness, and latterly from painful swallowing. Neither hereditary,

nor acquired syphilis seemed to be present. At the left pulmonary summit very slight changes existed ; in the sputa Koch's bacilli were found. In the larynx extensive ulcers existed on the epiglottis and false cords with swelling over the right arytenoid cartilage. The secretion of the ulcers, several times examined, did not contain tubercle bacilli. Under iodide of potash, cicatrisation of the laryngeal ulcers began, but further treatment remained without effect.

9. Lately Oltuszewski[152] described the following case : the patient was aged twenty-four. Hereditary predisposition existed : four years ago, syphilis. For a year there had been cough, hoarseness, and dysphagia. In the lungs, indurations existed at the summits. Anulcer was found in the throat. On the posterior part of the larynx there was unevenness. Under specific treatment the ulcers healed, but the changes on the posterior part remained *in statu quo.*

10. The case of Arnold Poci, cited by Oltuszewski. With a phthisical ulcer on the epiglottis, there was swelling of the posterior part, likewise superficial ulcers of the vocal cords. A history of syphilis was obtained under specific treatment. The ulcers healed, but the changes on the posterior part remained *in statu quo.*

According to Gouguenheim,[5] we meet very rarely with syphilis and tuberculosis of the larynx, with which statement we (Schnitzler also) cannot agree. On the contrary, we are of opinion that this combination occurs relatively often, but hitherto too little attention has been drawn to it. In all cases where there is a history of syphilis, where specific treatment has only a partial favourable influence on the changes of the larynx, where certain portions of the ulcers heal and others resist, we find on direct examination of the secretion tubercle bacilli present, and at the same time of affection or not (primary laryngeal tuberculosis) of the lungs, we are justified in supposing the combination of the diseases in the larynx, viz. : syphilis and tuberculosis. Gouguenheim counsels us to suspect these forms in all cases, where, having in addition to undoubted laryngeal tuberculosis, a rapid destruction of the epiglottis takes place. This author considers the inclination to growths as pathognomic for tuberculosis, while syphilis of the larynx is characterised by the inclination to ulceration. But these symptoms by no means can be regarded as sufficient evidence of the co-existence of the two diseases. We have a surer criterion for the diagnosis of laryngeal tuberculosis, namely, the method (applied first by B. Fraenkel) of direct examination of the secretion from the laryngeal ulcer, of which we have already fully spoken.

Summing up our own observations and those of others, we arrive at the following conclusions :—

1. Primary laryngeal tuberculosis exists undoubtedly.

2. This disease, however, is exceedingly rare.

3. The curability of so-called laryngeal phthisis is undoubtedly possible.

4. Recovery from laryngeal tuberculosis is rare, but it can take place in certain cases under local treatment, or even without it (sanatio spontanea).

5. Partial recovery from laryngeal phthisis, viz., the cicatrisation of

single ulcers, must be considered not only as possible, but even apparently often obtained.

6. This partial recovery occurs under the influence of local treatment.

7. The recovery of laryngeal tuberculosis and cicatrisation of single tubercular ulcers takes place especially in those cases where the general state is good, and the changes in lungs are of interstitial nature, showing the tendency of the organism to the formation of connective tissue.

8. Local treatment is the only rational method of treatment of laryngeal tuberculosis.

9. Cocaine is an inappreciably useful drug in laryngeal phthisis.

10. Of the numerous drugs, locally applied for laryngeal tuberculosis, lactic acid is the most important.

11. From the combined method (lactic acid, galvano-cautery, surgical treatment) we can expect the best results in treating laryngeal tuberculosis.

12. As in syphilis, typhus, etc., stenosis may result from tubercular disease.

13. Tubercular growths of the larynx are not rare, and they may be symptoms of primary laryngeal tuberculosis.

14. We have often to do with a combination of syphilis and tuberculosis of the larynx.

LITERATURE.

1.—Gaz. Lekar., No. 35, 1888, i. Wien. Klin. Woch., 4, 5, 1889.

2.—" O chirurgioznem leczeniu suchot i ich wyteczalnosci." Gaz. Lek., 22-32, 1887.

3.—" Obecne metody leczenia gruzlicy krtani." Gaz. Lek., 37-39, 1887.

4.—" Ueber die neueren Behandlungsmethoden der Kehlkopfschwindsucht." Inaug. Dissert. Heidelberg, 1887.

5.—" Phthisie Laryngée." Paris, 1889.

6.—" The relation of Laryngeal to Pulmonary Diseases." Med. Jour., 4, 1885. Ref. Int. Cent. f. Lar. 1, p. 254.

7.—" Neurere Anschaungen in Bezug. auf Pathologie und Therapie der Tuberculose der Pharynx und Larynx." Die Laryng. Section des IXth Int. Med. Cong., Washington, 1887.

8.—" Tubercular Disease of the Upper Air Passages." Jour. of Lar., March, 1887.

9.—" Lehrbuch der Spec. Path. Anat.," 1885, p. 319.

10.—" Przyczynek do patologii gruzlicy Krtani pierwotuej." Works of phys. from Odessa, 1-4, 1881. Ref. Medycyna, 14, 1887.

11.—" Ein Fall von primärer Larynx Tuberculose." Bericht ü d. Thät. d. Jen. Kindesp., 1882. Ref. Int. Cent. f. Lar., etc., 1, p. 213.

12.—" A proposito di un caso di tracheotomia per tuberculosi delli larynge." Arch. d. Lar., 4, 1884. Ref. Int. Cent. f. Lar., etc., i. p. 217.

13.—Congress des Associété fran. p. l'avanc. d. sciences. Toulouse, 1887. Ref. Int. Cent. f. Lar. etc., 4, p. 238.

14.—" The Heart in Chronic Bright's Disease, Ulceration of Larynx." Aust. Med. Jour., October 1884. Ref. Int. Cent. f. Lar., etc., 1, p. 212.

15.—" Carie du cart. thyr. Abscès consec.," etc. Ann. de mal. de l'or, 2, 1884. Ref. Int. Cent., 1, p. 254.

16.—" Case with symptoms resembling those of Lar. Phthisis," etc. Med. Times, Aug. 1884. Ref. Int. Cent., 1, p. 360.

17.—" Laryngite tuberculeuse primitive," etc. La France Med., 135, 1884. Ref. Int. Cent. 2, p. 25.

18.—" Un caso probabile di laring. tub. prim." Bott. del. mal. d. l'or, etc., 5, 1887. Ref Int. Cent., 4, p. 171.

19.—Verhandl. d. laryng. Section der 58th Vers. d. A. und Nat. in Strassburg, 1885. Ref. Int. Cent., 2, p. 315.
20.—"Ueber die Farbung des Kochschenbacillus," etc. Berl. Kl. W , 13-14. Ref. Int. Cent., 1, p. 215.
21—"Il bacillo di Koch nella diagnosi," etc. Gar. deg. Osp. 24, 1885. Ref. Int. Cent., 2, p. 174.
22.—"Przyczynek do nauki o. t. zw. nadzarciach niezytowychi i ch stosunku do gruzlicy Krtani, 1884." Jubil. wyd. Hoyera.
23.—"System of Pract. Med.," ed. by Pepper, 1885. Ref. Int. Cent.
23*.—"Wkwestyi wyleczalnosci i leczenia owrzodzen gruzliczych Krtani." Medycyna, 13, 1886.
24.—"Bad Bericht ueber d. Saison 1885," etc. Ref. Int. Cent., 3, p. 36.
25 —"Bericht u. d. 21 Section d. 60 N. Vers. zu Wiesbaden." Ref. Int. Cent., 4, p. 287.
26.—"Primäre tuberculöse Neubildung des Larynx." St. Pet. A. Med. Woch., 16, 1883. Ref. Gaz. Lek., 44, 1888.
27.—"Tuberculosi e sifilide laryngea." Riv. cl. e ter., 10, 1886. Ref. Int. Cent., 3, p. 344.
28.—"Primäre Larynxtuberculose." Monat. f. Ohr., 12, 1885. Ref. Int. Cent., 2, p. 451.
29.—"Traité pratique des maladies des larynx et du pharynx." Paris, 1872.
30.—"Primäre Kehlkopftuberculose." Deut. Med. Woch., 28, 1885. Ref. Int. Cent., 3, p. 385.
31.—"Tuberculose laryngée primitive." Rev. mens. de lar., etc., 8, 1889. Ref. Int. Cent., 1, p. 213.
32.—Congress des Associété fr., etc. Toulouse, 1887. Ref. Int. Cent., 4, p. 288.
33.—"Traitement local de le phthisie laryngée." Thèse de Bordeaux, 1887. Ref. Int. Cent., 4, p. 361.
34.—"The Local Treatment of Lar. Tuberculosis." Ph. Med. News, Nov. 28, 1885.
34*.—"Thèse pour le doctorat en medicine." 1880, and *l. c.* 1.
35.—"Owyleczalnosci owrzodzen gruzliczych przy. t.zw. suchotach Krtani owych napotykanych." Gaz. Lek., 28, 29, 1886.
36.—"Die Behandlung der Kehlkopftuberculose." Ther. Mon., 7, 1888.
37.—"Sections befund einer Kehlkopftuberculose." Münch. Med. Woch., 14, 1887. Ref. Int. Cent., 5, p. 1.
38.—"Milchsäure gegen Larynxtuberculose." Berl. Klin. Woch., 29, 1885. Ref. Int. Cent. 2, p. 341.
39.—Berl. Klin. Woch., No. 7, 1888. Berl. Med. Gesell.
40.—"Ueber Anwendung des Cocains als anæst.," etc. Wien. Med. Blat., 1884, 43-39. Ref. Int. Cent., 1, p. 198.
41.—"De l'anesthesie produite par le chlor. de cocain," etc. Gaz. d. Biol., 131, 1889. Ref. Int. Cent., 1, p. 375.
42.—"Cocain, als örtliches Anaesthyeticum." Berl. Kl. Woch., 1884, 50. Ref. Int. Cent., 2, p. 49.
43.—"Note preliminaire sur l'action phys. de cocain," etc. Soc. de Biol. d. Paris, Nov. 22, 1889. Ref. Int. Cent., 1, p. 376.
44.—"Laryngeal Phthisis, etc." Brit Med. Jour., Dec. 5, 1884. Ref. Int. Cent., 1, p. 201.
45.—"Cocaine Hydrochl. in Diseases of the Nose and Throat." Con. Med. Surg. for Apr., 1885. Ref. Int. Cent. 2, p. 90.
46.—"Hydrochlorate of Cocaine in Laryngeal Phthisis." Phil. Med. News, Nov. 29, 1889. Ref. Int. Cent. 1, p. 234.
47.—"Solution contre la dysphagie des tuberculeur." Un. Méd., 33, 1886. Ref. Int. Cent. 3, p. 98.
48.—"Hydrochlorate of cocaine," etc. Brit. Med. Jour., Dec. 13, 1889. Ref. Int. Cent., 1, p. 531.
49.—Reference to the work of Seifert—"Zur Wirbung des Cocains," etc. Cent. f. kl. med. 1, 1885. Ref. Int. Cent., 2, p. 93.
50.—Ueber die Anwendung des Cocains," etc. Wien. Med Bl , 51, 52, 1887. Ref. Int., 1, p. 373.
51.—Compte rendu de la Soc. d'Ot., etc., Dec. 25, 1884. Ref. Int. Cent., 1, p. 334.
52.—"O stosowaniu kokainy u. laryngologii rynologii." Med. 5, 1885. Ref. Int. Cent. 2, p. 98.
53.—"Wirkung des Cocainum mur ," etc. Berl. Kl. Woch. 87, 1850. Ref. Int. Cent. 1, p. 374.
54.—"Ueber Anwendung und Wirkung des Cocainum," etc. Wien. Med. Pres., 1885-7, ii. Ref. Int. Cent. 2, p. 50.
55.—"Das Cocain, als differentialdiagn," etc. Wien. Med. Woch. 44, 1887. Ref. Int. Cent. 4, p. 491.
56.—"L'idroclorato di cocaine nelle mal., etc." Arch Ital. di lar. ii. 2-3. Ref. Int. Cent. 1, p. 374.
57.—"Contribuzione all'uso della cocaine, etc." Arch. Ital. di lar. iv. Ref. Int. Cent. 2, p. 50.
58.—"Zur Wirkung des Cocain mur. etc." Deut. f. Kl. Med. 1, 1885. Ref. Int. Cent. 2, p. 93.
59.—"Cocain mur n. gortowoj, etc." Russ. Med., 6-7, 1885. Ref. Int. Cent. 2, p 527.
60.—"Erythroxylon Coca in the throat." Phil. Med. News, 15, 1884. Ref. Int. Cent. 1, p. 232.

61.—" Vergiftungs erscheinungen nach Cocainisirung der Nose." Deut. Med. W., 46, 1885. Ref. I.C. 2, p. 526.
62.—" Ueber Intoxication durch Cocain." Berl. kl. Woch., 48, 1885. Ref. I.C. 2, p. 526.
63.—" Laryngeal spasm caused by cocaine spray." Lancet, 21 Nov., 1885. Ref. I.C. 2, p. 527.
64.—" Zur Casuistik der Cocain—Intoxication." Deut. Med. Woch., 6, 1886. Ref. I.C. 3, p. 74.
65.—" Accidents causée par le cocaine." Gaz. Méd. de Nantes, 5, 1886. Ref. I.C. 3, p. 74.
66.—" Ein Fall von Cocain Vergiftung." Ther. Monat., 7, 1888.
67.—" Przypadek otrucia chlorkiem Kokainy." Gaz. Lek., 41, 1888.
68.—" Ein Fall von Cocain Intoxication nebst brit, etc." (See 67).
69.—" Ueber die Wege der Intoxication durch Cocain." Allg. Med. Cent. Zeit. ii., 1886. Ref. I.C. 3, p. 74.
70.—" Gleditschine (stenocarpin), the new local anæsthetic." New Yor. Med. Rec., Oct. 1, 1887. Ref. I.C. 4, p. 433.
71.—" Ueber Milchsäure Behandlung in Kehlkopfe, etc." Wien. Med. Prof. Cott. 9, Nov., 1885. Ref. I.C. 2, p. 528.
72.—" Submucous injection of lactic acid, etc." Phil. Med. News, Nov., 1886. Ref. I.C. 3, p. 343.
73.—" Zur therapie der Lungentuberculose." Deut. Med. Woch. 19, 1887. Ref. I.C. 4, p. 100.
74.—" Traitement local de la phthisie laryngée." Rev. gen. de chir. et ther., March 24, 1887. Ref. I.C. 4, p. 172.
75.—" Anolen Beretning fro Kommunehosp, etc.," Sep. abd., 1887. Ref. I.C. 4, p. 338.
76.—" Kwas mleczny jako srodeklecznicy przy. owrzodz, etc." Medycyna, 1886, 24-28.
77.—" Przyczynek do dzialania kwasu mlecznego w gruzlicy krtani." Medycyna, 1887, 7.
78.—" Trzy przypadki wygojinia owrzodzen gruzlichych krtani." Medycyna, 1887, ii. Also:
78*.—" Prdyczynek do dzialania kwasu mlecznego, etc." Gaz. Lek., 43, 1886.
79.—" Sulla cura locale della tuberculosi larynegia." Arch. Ital. d. lar 6, 1886. Ref. I.C. 3, p. 214.
80.—" Sul valore negative dell acido lactico, etc." Bull. d. mal. d. or et 3, 1886. Ref. I.C 3, p. 99.
81.—" Zur Therapie der Larynxphthise." Verh. der lar. Sect. d. 59, Ver. in Berlin, 18-25, Sept. 1886. Ref. I.C. 3, p. 264.
82.—" Der gegenwärtige Hand der Therapie," etc. Wien. Med. Pres., 15-26. Ref. I.C. 1, p. 216.
83.—" Traitement local de la tub. lar.," etc. Rev. mens. d. lar. 5-8, 1886. Ref. I.C. 3, p. 414.
84.—Review of the transactions of the fifth An. Meet. of t. Amer., etc., 83. Ref. I.C., 1, p. 36.
85.—" Sulla cura di alcune mal.," etc. Arch. di lar. 3-4, 1884. Ref. I.C. 1, p. 268.
86.—Annual report of the throat, etc. New York Med Rec. 16, Jan., 1886. Ref. I.C. 3, p. 35.
87.—Die laryng. Section d. IX. Int. Med. Con. Wash. 5-10, Sep., 1887. Ref. I.C. 4, p. 185.
88.—" Vorlesungen ueber die Krankheiten des Kehlkopfes," etc., 3 fasc., 1888.
89.—" Emploi de l'iodoforme dans les dysphagies." La Loire Méd. 9, 1887. Ref I.C. 4, p. 468.
90.—" Ueber die Iodol Behandlung der Larynxtub." Deut. Med. Woch. 51, 1886. Ref. I.C. 3, p. 390.
91.—" Ueber Iodol." Münch. Med. Woch. 4, 1887. Ref. I.C. 4, p. 113.
92.—" Ueber Iodol." Inaug. Dissert., Würzburg, 1887. Ref. I.C 4, p. 114.
93 —" Das Iodol und sein therap. Werth.," etc. Münh. Med. Woch. 38, 1887. Ref. I.C. 4, p 433.
94.—Reference to the work of Prior. Deut. Med. Woch. 8, 1883.
95.—" Ueber Iodol." Diss. Würzburg, 1887. Ref Int. Cent. f. Lar., etc, 4, p. 482.
96.—" Zur Kreosot Behandlung der Lungen," etc. Deut. Med. Woch. 38, 1887. Ref. I.C. 4, p. 360.
97.—See my work: " Oleczeniu suchot plucnych kreozotem." Gaz. Lek. 1888, f. 8.
98.—Wien. Med. Bl. 22, 1888. Ref. Kronika Lek., 1888.
99.—Gaz. Lek. 44, 1888. Ref. of report of Szumlanski: " O kreolinie weu irp. gardz., etc."
100.—Cent. f. Gynec., 6, 1888. Ref. Kron. Lek. 8, 1888.
101.—Wien. Med. Pres., 13, 1888. Ref. Kron. Lek. 8, 1888.
102.—" Das Menthol ein Ersatz des Cocains z. Erzeugung, etc." Berl. kl. Woch., 28, 1885. Ref. Int. Cent. 2, p. 527.
103.—" Menthol in Laryngeal and Pulmonary Phthisis and in other Diseases." Edinb. Med. Jour., Jan. 1888. Reference to Bride (Int. Cent. 5, p. 3).
104.—" Report on the use of Menthol, etc." Cinc. Lanc. Clin. 8, Oct., 1887. Ref. I.C. 4, p. 493.
105.—See work of Srebrny: " Gruzlica gardieli i krtani, etc.," Gaz. Lek. 10, 1888.
106.—" The Topical Treatment of Tubercular Phthisis." Ed. Med. Jour., March, 1887. Ref. I.C. 4, p. 317.
107.—Die lar. Section des IX. Int. Med. Congr. in Washington, 1887. Ref. I.C. 4, p. 185.
108.—" The Local Treatment of Laryngeal Phthisis." Jour. of Laryng., etc., Mar., 1887.
109.—" Notes sur le traitement médical de la lar.," etc. Thèse. Paris, 1886. Ref. I.C. 3, p. 343.
110.—" Des inhalations caustiques." Bul. gen. de ther., 1887. Ref. I.C. 4, p. 199.
111.—Congress des Associété franc., etc. Toulouse, 1887. Ref. I.C. 4, p. 238.
112.—Ibidem.

113.—" Die Behandlung der Kehlkopftuberculose," etc. Wien. Med. Presse, 44-45, 1887. Ref. I.C. 4, p. 361.
114.—" Die Behandlung der Kehl. mit Phosphorsaurem Kalke." Intern. klin. Rundschau, 51-52, 1887. Ref. I.C. 4, p. 362.
115.—" Tuberculosis laringo pulm.," etc. Gior. Med. Catal., 1886. Ref. I.C. 3, p. 98.
116.—" Rezorcin pri tuberculose gortani." Russ. Med. 47, 1887. Ref. I.C. 5, p. 1.
117.—" Farmakologija Nothnagelai Rossbacha," 1883, p. 386.
118.—" Kwas chromny, jako srodek leczniezy w. chorohack nosa, gardzieli krtani." Gaz Lek., 1887, 41-47.
119.—" Syphilis laryngée. Emploi de l'acide chromique," etc. Extr. des Ann. de l. Soc. ch. d. Liège, 1887. Ref. I.C. 2, p. 25.
120.—" Die chromsäure und ihre Anwendung," etc. Wien. Med. Presse, 14-18, 1885. Ref. I.C. 2, p. 248.
121.—" Some observations on the toxic effects of Chrome on the Nose," etc. Jour. Am. Med. Ass. Nov., 24, 1887. Ref. I.C. 1, p. 377.
122.—" Du traitement local de la tuberculose laryngée." Bull. gen. de. th. 10, 1887. Ref. I.C. 1, p. 121.
123.—" Einiges ueber Phthisis laryngea und deren operation." Wien. Med. Zeit., 1887, 13. Ref. I.C. 1, p. 56.
124.—" Tuberculose pulmonaire." Ann. des. mal. de l'or., etc. July 3, 1885. Ref. I.C. 2, p. 45.
125.—" Forste Beretning fro commune hosp, etc." Hosp. Tid., Mar., 1885. Ref. I.C. 2, p. 45.
126.—" Przyczynck do leczenia miejscowego t. zw. suchot krtaniowych." Med. October, 1881.
127.—" Die laryng." Section IX. Int. Med. Congress in Washington, 1887. Ref. I.C. 4, p. 185.
128.—Congress des Associété Franc. etc. Toulouse, 1887. Ref. I.C. 4, p. 238.
129.—" Das Curettement Tuberculoser Larynxgeshwüre und seine Erfolge," etc. Bericht ueber d. 21 Section d. 1860 N. in Wiesbaden. Ref. I. C. 4, p. 287.
130.—" Ueber Tracheotomie bei Kehlkopfschwindsucht." Verh. der lar., Section d. 59, Vers. in Berlin, 1886. Ref. Int. Cent. 3, p. 267.
131.—" Rozciecia tchawicy (tracheotomia) przy. such. gard." Medycyna, 1883.
132.—" Contributions à l'étude de la tracheot. chez les tuberc." Thèse, &c., Paris, 1887. Ref. Int. Cent. 1, p. 217.
133.—" Phthisie laryngée," etc. Rev. d. cl med. 1, 1884. Ref. Int. Cent. 2, p. 25.
134.—" Tracheotomy in lar. stenosis of tub. origin." Ann. of Surg. 1885. Ref. Int. Cent. 2, p. 175.
135.—" Verh. d. lar. section d. 59 V." etc. Berlin, 1886. Ref. Int. Cent. 3, p. 264.
136.—Congress des Ass. fr., etc. Toulouse, 1887. Ref. Int. Cent. 4, p. 238.
136*.—" Berl. Klin. Woch.," 13, 1888. Beihag aus Behandlung der. nar. bigen Larynxstenosen.
137.—" Tuberculose Tumouren der Luftröhre." Priorstätsreclam. Int. Cent. 1, p. 307.
138.—" Tuberculous tumours of the Larynx." Brit. Med. Jour., April 26, 1887. Ref. Int. Cent. 1, p. 57.
139.—" Vegetations tuberculeuses énorme du larynx." Ann. d. mal. d. l'or., etc., July 5, 1889. Ref. Int. Cent. 1, p. 217.
140.—" Tuberculöse Tumouren in Kehlkopfe, etc." Wien. Med. Presse, 44, 46, 1884. Ref. Int. Cent. 1, p. 290.
141.—" De la tuberculosis laryngea poliposa," etc. Madrid, 1885. Ref. Int. Cent. 2, p, 451.
142.—" Note on Tuberculous Tumours of the Larynx." St. Barth. Hosp. Rep. 21, 1885. Ref. Int. Cent. 2, p. 452.
143.—" Tuberkel tumor im Larynx." Deut. Med. Woch. 15, 1887. Ref. Int. Cent. 4, p. 171.
144.—" A case of Tuberculous Tumour of the Larynx." Clin. Soc. Fran. 20, 1887. Ref. Int. Cent. 4, p. 362.
145—" Traité pratique des maladies de larynx et de pharynx." Paris, 1872, p. 678.
146.—" Combination von Syphilis und Tuberculose des Kehlkopfes." 59 Section in Berlin, 1886. Ref. Int. Cent. 3, p. 264.
147.—*Loc. cit.*—See discussion on lecture of Schnitzler.
148.—" Cronica della clinica laringojatrico." Arch. Ital. d. lar. 3, 4, 1886. Ref. Int. Cent. 3, p. 39.
149.—" Syfilide tertiania tuberculosi d. lar." Riv. cl., etc. 4, 1886. Ref. Int. Cent. 3, p. 503.
150.—" Ueber Combination von Syphilis und Tuberculosis in Larynx." Dissert. München. Med. Woch., 1887. Ref. Int. Cent. 4, p. 101.
151.—" Associated Syphilitic and Tuber. Disease of the Throat." Pac. Med. and Surg., 1887. Ref. Int. Cent. 4, p. 317.
152.—" Przyczynek do rozpoznawania leczenia przyniotu krtani." Gaz. Lek. 46, 47, 1888, p. 127.