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

With Remarks on Primary Laryngeal Tuberculosis and its
Curability.

BY DR. JOHN SEDZIAK,

Assistant Physician to the Hospital of the Holy Ghost, in Warsaw.

At the fifth meeting of Polish physicians and naturalists in Lemberg, Dr. Sokolowski¹ read a Paper on "The Curability and Local Treatment of so-called Phthisis of the Larynx," showing briefly the results of his experience, based upon two hundred and fifty cases in his private and hospital practice.

At the suggestion of Dr. Sokolowski, to whom I render my sincerest thanks, I undertook the special examination of this rich material, which, as well as his private observations kindly given to me, form the substance of the following work. In my work I principally endeavoured to direct my attention to the importance of the local treatment of laryngeal tuberculosis, considering all therapeutic methods hitherto known. First, however, I think it necessary to say something of the primary form of laryngeal tuberculosis, and also as to its curability. Profiting at the same time by suitable cases observed by me, I shall briefly speak of the mixed forms (combination of tuberculosis and syphilis of the larynx), further, of tubercular growths (tumours) and stenoses of the larynx. Besides the above rich material observed by me in the practice of Dr. Sokolowski, I have also profited by the works of Heryng² and Przedborski,³ and others, the inaugural dissertation of Blindermann,⁴ and the monograph of Gouguenheim and Tissier,⁵ and lastly, reports published in special journals.

I have endeavoured to give my work as much as possible a critical character, basing it upon my great experience derived from an assistantcy

of several years in the section of Dr. Sokolowski (diseases of the throat and lungs).

The local treatment of laryngeal tuberculosis has gained a rational ground in two facts, at present regarded as undoubted—viz. :

1. That primary tuberculosis of the larynx exists, although rarely.
2. That laryngeal tuberculosis is curable, for which we have anatomical, as well as clinical, proofs.

I.—PRIMARY LARYNGEAL TUBERCULOSIS.

Does primary laryngeal tuberculosis exist—*i.e.*, with perfectly sound lungs, is a tubercular affection of the larynx possible? This is the principal question which, as regards its great practical importance, we must examine. Although the opinion of Orth, who in his *Pathological Anatomy* (page 319) expresses himself as to this question, as follows:—"Only in very rare cases the larynx is primarily affected by tuberculosis, yet those authors go too far who deny this appearance at all," gains more and more adherents (Schrötter, Schech, Lefferts, Bresgen, Voltolini, Heinze, etc.), yet there are others who deny the existence of primary consumption of the larynx. To these belong Ziemssen, Klebs, Bosworth,⁶ and Morell Mackenzie. On the other hand, some authors, as Lennox Browne⁷ and Hunter Mackenzie,⁸ suppose that primary laryngeal tuberculosis is not such a rare phenomenon as Orth affirms. That this is not so is proved by the fact that only three cases of undoubted primary tuberculosis of the larynx are recorded, as follows:—

1. The case of Orth⁹ : At the autopsy of a young soldier, the author found extensive tubercular ulcers in the larynx, the lungs being perfectly sound.

2. The case of Pogrebinsky¹⁰ (from Odessa) : A butcher, eighteen years old ; in the larynx extensive ulcers on the vocal cords, the rest of the larynx infiltrated. The lungs seemed to be unchanged. Death. Autopsy showed the left ventriculus Morgagni entirely, the right one partly, ulcerated. Both vocal cords completely destroyed, the ulcers spread all over the trachea, in some places cartilage bare. The edges of the ulcers uneven, tubercles on their base. The microscopic examination proved the tubercular character of the ulcers. The lungs quite healthy.

3. The case of Demme¹¹ (from Berne) : a boy, four years and a half old, healthy-looking ; hoarseness. The laryngoscopic examination showed the mucous membrane very red and swollen, especially on the posterior part of the larynx. At the posterior part of the vocal cords (in the neighbourhood of the processus vocales) a flat and uneven ulcer, the size of a cherry stone. In the lungs no change. A month later, lepto-meningitis tuberculosa (tubercles in the retina). Death. Necropsy showed inflammation of meninges. In the posterior part of the larynx, an extensive ulcer (in the secretion of the ulcer very numerous tubercle bacilli were found). The lungs entirely sound.

Besides these three cases, Massucci¹² reports that Marchiava observed three autopsies, in which were found tubercular changes in the larynx without affection of the lungs.

There are two factors on which we must base the recognition of primary laryngeal tuberculosis :—

1. The lungs entirely sound, which we are able to prove at the autopsy (Stoker¹³).
2. Undoubted tubercular character of the laryngeal affection—only to be discovered by microscopic examination.

The three above stated cases (Orth, Pogrebinski, and Demme) entirely agree with both these points, and for this reason they furnish undoubted proof of the existence of primary laryngeal tuberculosis. On the other hand, they show that Orth is right when he says that the condition is extremely rare. Indeed, as we are going to convince ourselves further on, there still exist, relatively, almost a great number of observations, mentioned as primary consumption of the larynx, yet they do not agree with one of the above points, and, therefore, deserve the name of probable primary laryngeal tuberculosis. Thus, in one of them the necropsy showed, in fact, perfectly sound lungs, yet the character of ulcerations remains doubtful, on account of the want of histological and bacteriological examinations. In the other cases the character of the affection was undoubted, but they did not end in death ; so there is no absolute certainty that the lungs had not really been affected. To the former category belong the following observations :—

1. The case of Williams¹⁴ : a man of twenty-one years of age with symptoms of inflammation of the kidneys. At the autopsy, besides changes in the kidneys and heart (secondary), the larynx exhibited swelling of the ary-epiglottic folds, ulcers of epiglottis, with grey tubercles, the same on the posterior part of the larynx. Lungs entirely healthy—no trace of tubercles similar to those in the larynx.

2. The case of Gouguenheim¹⁵ : At the autopsy of a man, aged forty-two years, ulcerations were found in the larynx, the lungs being perfectly sound.

3. The case of Cockle¹⁶ : at the necropsy, lungs unaffected, ulcerations on the left vocal cord, supposed to be tubercular.

4. The case of Morell Lavallée,¹⁷ described as primary laryngeal tuberculosis. At the autopsy were found extensive ulcerations above the vocal cords, swelling of the epiglottis and ary-epiglottic folds, lungs perfectly sound.

To the second series belong all those cases, recognised during life, as primary laryngeal tuberculosis, yet not affirmed by necropsy :—

1. The case of Trifiletti¹⁸ : a girl, twenty-one years old, lungs healthy, in the larynx slight changes at the commencement (symptoms of catarrh) ; later, ulcerations, and great amendment by local treatment ; finally, slight changes at the summits of the lungs were remarked. The author bases the probable diagnosis of primary laryngeal consumption in this case upon the following points : (1) on the course of the disease ; (2) on the long duration until the occurrence of the first pulmonary symptoms ; and lastly (3), on the relative amendment by local treatment.

But in the present state of science the proofs, given by the author, by no means convince us. Nowadays we have more certain proofs as to the

character of this disease of the larynx, *i.e.*, ulceration, in doubtful cases—namely, examination of the secretion of the ulcers in reference to the presence of tubercle bacilli, reserving, of course, all precaution to avoid diagnostic mistakes. For this purpose we must first brush the larynx with cocaine—in this manner we are able to avoid the contamination of pulmonary secretions, resting accidentally on the ulcerated surface. We must afterwards use sterilised platina (Rosenfeld).

B. Fraenkel²⁰ was the first who drew attention to the importance of this method, later on Masini,²¹ and others. This method, in my opinion, deserves attention. Now, however, it is known, that in the course of pulmonary phthisis other, not exactly tubercular, affections may appear. I mean among others (syphilis) the so-called catarrhal superficial ulcerations (*erosions Geschwüre* of Virchow). Indeed, Orth affirms that they mostly form from the scattered tubercles, yet Heryng,²² and later, Lennox Browne,⁷ Elsberg,²³ Sokolowski,⁴ Schnitzler,¹⁹ affirm them to be catarrhal. Gottstein,¹⁹ however, does not admit this. These “erosions” heal easily, and thus are to be explained the rather quick results obtained under treatment. Although Fraenkel and Schnitzler affirm that they are able to discriminate between catarrhal and tubercular ulcerations, Heryng and Schech do not think this possible. We return to further criticism of the second series of cases :—

2. The case of Zieglmeyer²⁴: primary laryngeal tuberculosis with probably healthy lungs; healing of ulcerations.

3. The case of Sinclair Coghill⁷: a woman with hereditary predisposition; in the larynx tubercular ulceration of the epiglottis (in the secretion of the ulcer tubercle bacilli were found); lungs intact.

4. The case of Morelli²⁵: primary growth of the larynx.

5. Case analogous to the preceding, reported by Dehio,²⁶ from Dorpat: a man, forty-one years old; in the larynx a growth, arising from the left false cord; lungs sound. Removal of the growth by means of external operation (laryngo-fissure). The histological and bacteriological examination proved the tubercular character of the growth.

6. The case of Stoerk³: during several years the author could not find any changes in the lungs—in the larynx, however, existed undoubted tubercular changes. Lastly, to this series belong the cases cited by Hunter Mackenzie,⁸ namely, of Cahn (primary tuberculosis of epiglottis), of Déjérne and Neidert, likewise the case of Renzi,²⁷ combination of primary laryngeal tuberculosis with syphilis. Here we must also add our case described at the end of this work.

Hitherto we have spoken of primary laryngeal tuberculosis, understanding by it the tubercular changes in the larynx without affection of the lungs. Yet there exist, in literature, cases for which the name of primary consumption of the larynx will almost be more appropriate, namely, where the disease lodges itself in the larynx earlier than in the lungs. This form Neidert²⁸ believes only to be possible. Indeed, Orth advises to be very careful in similar cases; we can never be sure if the primary changes in the larynx gave an impulse to the secondary affection of the lungs (as always happens, according to Mandl²⁹), or the reverse.

It is, however, possible (Orth): "that in the lungs the process comes to a standstill, while in the larynx, once commenced, it continually advances."

We must make an exception for these cases, in which undoubted tubercular, more or less extensive, changes were observed in the larynx with intact lungs, only affected in the later stage by disease, which has been proved at the necropsy. These cases are noted in literature, and for them, in my opinion, the name of "primary laryngeal tuberculosis" is perfectly appropriate. To them chiefly belongs the case observed by E. Fraenkel,³¹ Hamburg: A man, aged thirty-one, under observation five years. In the lungs, no changes; in the larynx, from the beginning evident tubercular (in secretion of ulcers tubercle bacilli were found) changes (infiltrations, afterwards ulcerations) existed. The necropsy showed deep destruction of the larynx and trachea, in the lungs discrete peri-bronchial miliary tubercles; caseous and necrosed foci were nowhere discovered.

To this series we must also add the case of Rabain,³¹ of Bordeaux. At the autopsy of a man fifty-one years of age, miliary tubercles were found in the lungs—in the larynx deep destruction, as the author supposes (without microscopic examination), of a tubercular character.

Summing up all the cases we have been able to collect of primary laryngeal phthisis, we come to the following results:—

1. Primary laryngeal tuberculosis undoubtedly exists (cases of Orth, Pogrebinski, Demme, and E. Fraenkel).
2. The appearance of primary tubercular affection of the larynx is exceedingly rare, as Orth justly affirms.
3. The diagnosis of primary laryngeal phthisis must be based—
 - (a) Upon the post-mortem examination (intact lungs, acute miliary tuberculosis of the lungs).
 - (b) On the proof of the character of the laryngeal affection by means of histological and bacteriological examinations.
4. During life we can only speak with more or less probability of primary tuberculosis of the larynx.

II.—THE CURABILITY OF SO-CALLED LARYNGEAL PHTHISIS.

The curability of laryngeal tuberculosis has hitherto been looked upon with scepticism, for, as late as the year 1885, Orth expresses himself, as follows:—

"I have never seen an entirely recovered laryngeal tuberculosis myself, nor has, so far as I know, such a case been anatomically described and investigated."

This author by no means denies the possibility of a partial recovery (*partielle Heilung*), viz., that is to say, a cicatrization of individual ulcers in the larynx.

Heinze and Eppinger,⁵ and also Hooper³² and Krishaber,⁵ likewise oppose this opinion, which, however, gains more and more adherents, especially among clinicians, as Schnitzler, Prosser James,³² Rossbach, Hayes,³² Senesse,³³ Tobold, Prior, Ziemssen, Bosworth, Schech, Reichert,

Cadier, Tauber,³⁴ Moure, Krause, Sokolowski, Heryng, Schmidt, Gouguenheim, and lastly, Schrötter.

The question of curability of laryngeal tuberculosis is of very great practical importance. A decision in the negative brings with it therapeutic nihilism, while the acknowledgment of its possibility gives an impulse to the whole series of experiments having for their aim this recovery.

That phthisis of the larynx is curable we now possess certain proof. Heryng,² in his work lately published (1887), described a very interesting case of spontaneous recovery in a woman, aged twenty, with fibrous phthisis of the lungs, and a cicatrix in the posterior part of the larynx.

The microscopic examination showed here the cicatrization of an extensive laryngeal ulcer.

Thus we have an anatomical proof that laryngeal tuberculosis is curable, and that this recovery can take place spontaneously. On the other hand, clinical observations convince us that, although rarely, laryngeal phthisis can be cured. Under what conditions this spontaneous recovery can take place is a question to which we are not able to reply in the present state of science. Generally it happens in those cases in which the general condition is good, that is to say, where the organism can more successfully oppose the struggle with pathological micro-organism, and in which but little change exists in the lungs, especially of interstitial nature, likewise showing the tendency of the organism to produce the same changes in all organs, and more so in the larynx.

The greater number of those patients in whom the local process in the larynx has been cured spontaneously, belong to favourable social conditions ; for this reason we meet with these cases especially in private practice, where general treatment (*hygienic, dietetic*) can be rationally applied in the whole sense of the word. As a proof of the correctness of the above assertion, it may be permitted to me to cite six cases of spontaneous recovery from the private practice of Dr. Sokolowski.

1. G., thirty-three years old, an official. Cough of many years' duration ; hoarseness for many months ; dysphagia a short time ; general state, satisfactory. In the lungs : extensive induration of the right summit. In the larynx : great infiltration of epiglottis (wall-like). Little infiltration of the posterior region. Every year frequent treatment in the mountains. Afterwards : deglutition good—*entire cicatrization of epiglottis (cicatric degeneration)*, Duration of observation : four years ; the patient is now under observation.

2. L., aged forty, an official, with hereditary predisposition. Cough for many years. Hæmoptysis ; hoarseness for a week ; general state, good. In the lungs : extensive indurations of both summits. In the larynx : slight ulceration on right processus vocalis. General treatment : living in the forest. Result : *cicatrization of the ulcer*. Duration of observation : four months.

3. D., fifty years old, a merchant. Cough lasting many years ; hoarseness for three months ; little pain in swallowing for a short time ; general state, satisfactory. In the lungs : induration of both summits. In the larynx : ulceration on one third of the anterior part of the left vocal cord. Little infiltration of the posterior part, and ary-epiglottic

folds. Without any treatment : *entire cicatrization of ulcer*. Duration of observation : four years ; now under observation.

4. R., twenty-one years of age, a merchant's wife. Cough for a long time ; hoarseness for one year ; general state, almost well (without fever). In the lungs : induration of the right summit. In the larynx : deep ulcerations on the posterior parts of the false cords. General treatment : creosote ; country. Result : *cicatrization of ulcers* ; amendment of general state and lungs. After three years a relapse : infiltration of posterior part. Duration of observation : two years.

5. S., thirty-four years old, an unmarried woman. Cough for four years ; hoarseness ; general state, satisfactory. In the lungs : induration of both summits. In the larynx : on right processus vocalis a little ulceration (two millimètres). Little infiltration of the posterior part. General treatment : creosote ; country. Result : *cicatrization of ulcer* ; voice almost clear. Duration of observation : half a year.

6. S., aged forty-five, a farmer. Cough lasting a long time ; hæmoptysis ; acute inflammation of lungs (pneumonia) two years ago ; dysphagia ; general state, good. In the lungs : induration of both summits. In the larynx : infiltration of epiglottis with ulcerations. No treatment. Result : *cicatrization of ulcers*. Duration of observation up to present time : two years.

In most of the above cases tubercle bacilli were found in the sputa.

The above cases teach us : (1) that the spontaneous recovery of laryngeal tuberculosis is possible (in the first and third cases the cicatrization of ulcers has lasted four years) ; (2) that we should not be too optimistic in the prognosis of this disease, for we can never be sure whether the local process in the larynx may not break out again sooner or later (for instance, in the fourth case, after two years), which generally occurs with deterioration of the general state and progression of the local process in the lungs ; (3) that we obtain the best prognosis in those cases in which there is a good general condition with little or interstitial changes in the lungs, and which cases are placed under suitable hygienic and dietetic treatment, as previously noted.

Heryng³⁵ described eleven cured cases of laryngeal tuberculosis during ten years. The author's observations prove, more or less, the above conclusions : thus mostly relatively little interstitial changes existed in the lungs ; in most cases the general condition was satisfactory, the greater number of the patients were able to undertake a climatic cure ; and lastly, although the recovery of some of these cases lasted a longer or shorter time (in one case, nine years ; in another, four), yet even in these cases a relapse, or fatal termination, could occur, due to the progression of the pulmonary disease, as happened in the above mentioned case after nine years.

Finally, Rosenberg³⁵ also records a case of spontaneous recovery, observed by B. Fraenkel. In this case a very interesting form of stenosis—that is to say, a complete membrane in the larynx—was observed, to which we shall return later on.

If, however, spontaneous recovery, an undoubted proof of curability of any disease, really exists, as regards laryngeal tuberculosis, on the

other hand, there can be no doubt that it occurs very rarely. Thus of seventy cases of laryngeal phthisis, observed in private practice during the last four years, Dr. Sokolowski remarked recovery only in six cases, which makes four per cent. Heryng, as noted before, observed during the period of ten years eleven such cases (it is a pity that the author did not cite the total number of his patients). Precise statistics in this direction would be desirable for the future, in order to determine, if the spontaneous recovery of laryngeal phthisis actually occurs so seldom. If some physicians are still pessimistic as to the curability of laryngeal tuberculosis, as to partial recovery of the local process in the larynx, viz., cicatrization of single ulcers, even these pessimists (Orth) do not deny the possibility of its occurrence. Recently, so many facts proving this partial curability (Orth—*partielle Heilung*) have been recorded, that the most prejudiced ought to be convinced. Especially important becomes the question of local treatment in laryngeal tuberculosis; in all cases the cicatrization of single ulcers having been obtained in this way. In certain cases the process of cicatrization of ulcers was affirmed by means of precise microscopic examinations, as in the case of Heryng,² where, during life, cicatrization of an extensive ulcer on the posterior part of the larynx was obtained in a patient with fibroid phthisis by means of local treatment, lactic acid and curettement, which after death was completely proved by detailed histological examinations.

Again, the same event occurred in the case of Seifert³⁷—cicatrization of ulcer during life with local treatment, after death also proved by microscopic examination. Krause³⁸ showed, at the meeting of the Medical Society in Berlin, a larynx with cicatrization of ulceration, obtained under the influence of lactic acid, which was entirely affirmed by Virchow.

Applying the combined method (lactic acid, surgical treatment, galvano-cautery), we obtained in two cases entire cicatrization of tubercular ulceration in the posterior part of the larynx, which also was affirmed by anatomico-pathological examination. In both these cases, however, near the cicatrization, deep ulcerations also existed somewhere, penetrating towards the cartilage.¹

The same occurred in the case described by Virchow,³⁶ where, in a man with fibroid phthisis (at the necropsy) a distinct cicatrix was found on the vocal cord, but near it deep ulcerations (this case Virchow supposes to be spontaneous recovery).

The above cases (with necropsy) convince us, on one hand, of the possibility of cicatrization of tubercular ulcers in the larynx, under the influence of lactic acid: on the other hand, they show how careful we must be in the prognosis of such cases. We must not forget that the cicatrization of single tubercular ulcers is not the recovery of laryngeal tuberculosis, for we cannot be sure if the ulcerative process in some other place, not attainable for local treatment, may not develop in the course of the disease. In these cases one fact is worth noticing, viz., that changes of especially interstitial character existed in the lungs. To

¹ See table of Surgical Treatment.

this circumstance we have already drawn attention, in speaking of the spontaneous recovery of laryngeal tuberculosis.

The partial recovery of laryngeal tuberculosis, viz., cicatrization of single ulcers, obtained by means of local treatment, is undoubted. As, however, recovery from laryngeal phthisis is, as we have said, the rarest of phenomena, so cicatrization of single ulcers happens relatively often, as is proved by clinical observations lately published, thanks to the improved methods of local treatment of laryngeal tuberculosis (Krause, lactic acid ; Heryng, Schmidt, surgical treatment).

Thus, of thirty-five cases of tubercular ulcers in the larynx, Heryng² obtained, with local treatment, cicatrization, lasting a longer or shorter time in twenty-seven cases. In fifty cases of laryngeal phthisis we have obtained more or less distinct cicatrization of ulcers in twenty-one under local treatment, either by means of brushing with lactic acid or by the combined method (lactic acid, surgical treatment, etc.).¹

We have already mentioned, speaking of the curability of laryngeal phthisis, that spontaneous recovery occurs, especially in private practice, in connection with—(1) good social conditions under which such patients are living (the possibility of climatic treatment, good nourishment) ; (2) the long time during which such patients can be observed. (In one case of Heryng's, for instance, the observation lasted nine years ; in two cases of Sokolowski's, four years.)

In hospital practice, especially with us, these two conditions are wanting, and for this reason we cannot speak of recovery of laryngeal phthisis in the hospital. In clinical practice we can only expect partial recovery of the tubercular process in the larynx—the more so, in that continual infection is possible, arising from the affected lung being under exceeding unfavourable conditions, which renders the treatment difficult.

That this is the case is proved by twenty-one cases of partial or entire cicatrization of ulcers, obtained by us exclusively in hospital practice. But it is without the least doubt that spontaneous recovery of laryngeal tuberculosis, as well as that obtained by local treatment, is much easier and oftener obtained in private practice, where there exists a whole series of conditions favourable to recovery.

Let us not forget another, and, perhaps, the most important, condition, which is exclusively met with in private practice—I mean the period of the disease at which the patients seek our assistance, namely, the commencement of the pulmonary as well as of the laryngeal affection. The hospital physician very rarely meets with patients at this stage. Hospital patients remain, also, too short a time under our observation ; for this reason we cannot regard these cicatrizations as constant symptoms. As an illustration, I may be permitted to cite four observations from the private practice of Dr. Sokolowski, where, thanks to the local treatment, the cicatrizations of tubercular ulcers obtained constantly existed a longer or shorter time.

1. S., twenty-three years old, apothecary. Cough a long time ;

¹ See Tables of lactic acid and surgical treatment.

hæmoptysis and hoarseness for three months; dysphagia latterly; general state, satisfactory. In the lungs: induration of both summits. In the larynx: slight swelling of posterior part; ulceration on left processus vocalis; after two years, a relapse in the same place. General and local treatment: creosote, inhalation of carbolic acid, cauterization with lactic acid. Result: after two months, *cicatrization of ulcer*; amendment in the lungs and general state. After two years, a relapse; then cicatrization again. Duration of observation: four years.

2. E., forty-two years of age, a merchant's wife. Hereditary predisposition: cough and hoarseness for nine months; general state, very good. In the lungs: at both summits, slight changes (indurations). In the larynx: swelling of posterior part; extensive ulcerations in the neighbourhood of left vocal process. Local treatment: lactic acid. Result: after two months, *cicatrization of ulcer*; slight hoarseness. Duration of observation one year.

3. M., twenty-eight years old, a physician. Cough a long time; for one month, hoarseness; little pain in swallowing; general state satisfactory. In the lungs: at right summit slight changes (interstitial). In the larynx: epiglottis very much infiltrated; a little moveable. On anterior surface of epiglottis, superficial ulcerations; little swelling of both ary-epiglottic folds. Local treatment: brushing with lactic acid during two months. Result: *entire cicatrization (cicatric degeneration of epiglottis)*; grew stout. Observed for one year and a half (and now under observation.)

4. F., aged forty, an official. Six years ago, pneumonia; cough; hoarseness for many years; general state, good. In the lungs: indurations at both summits. In the larynx: in the neighbourhood of left processus vocalis a little ulceration. Local and general treatment: nitrate of silver (brushing during six months). Climatic cure. Result: *cicatrization of ulcer*; general state, excellent. Duration of observation: three years (last examination in June, 1888).

In all these cases the general state was satisfactory, in the lungs existed slight and especially interstitial changes. That cicatrization of tubercular ulcers, obtained by means of local treatment, ought not to be considered constant is proved by the first case, in which, after two years, on the former cicatrix a process of the same character (tubercular ulcer) developed again, although it came to a standstill under the influence of repeated local treatment, which seems to prove that in the present case, as well as probably in the remaining three cases, there existed a tendency to the production of connective tissue in the lungs and in the larynx. The local treatment was probably here only one of the agents favouring this natural tendency of the organism towards recovery. That such reaction undoubtedly exists in certain organisms is proved by the fact, that certain forms of laryngeal affections may exist (laryngeal tuberculosis of chronic nature of Heryng), which may remain relatively a long time (sometimes whole years) unchanged without local treatment, where the organism possesses so much resistance that it is able to counteract successfully too great energy of pathological micro-organisms, until it is at last exhausted, when the destructive process quickly spreads in the lungs and

in the larynx, causing the death of the patient. Dr. Sokolowski observed four such cases in his private practice.

1. K., aged twenty-four, an apothecary. Cough a long time ; general state, good. In the lungs : extensive indurations at both summits. In the larynx : commencing infiltration of the posterior part. Climatic cure. Result : *four years st. idem in the larynx*; further dysphagia : infiltration of epiglottis. In the lungs : destructive processes. Death.

2. A., twenty-five years old, tradesman's wife. Cough for many years : hoarseness ; general state, good. In the lungs : extensive indurations of both summits. In the larynx : extensive ulcerations on right vocal cord. General treatment (Gleichenberg). Result : *three years after, the same changes in the larynx*; ultimately death, with usual symptoms of consumption of the larynx and lungs.

3. N., aged thirty-six, merchant. Cough a long time ; general health, almost well. In the lungs : symptoms of fibroid phthisis. In the larynx : ulcerations on both vocal cords. No treatment. *Three years after, changes in the larynx in statu quo*; later on, deterioration of general condition, lungs, and larynx.

4. T., thirty-eight years old, a merchant's wife. Cough for eight years ; hoarseness for four years ; general state, satisfactory. In the lungs : interstitial phthisis. In the larynx : ulceration on posterior region. *Four years after, in the larynx the same changes*; afterwards death, with symptoms of deterioration in larynx and lungs.

Summing-up as to the curability of so-called laryngeal phthisis, we must arrive at the following results :—

1. The curability of laryngeal tuberculosis, from both anatomical and clinical standpoints, must be considered as positively proved.

2. The recovery of laryngeal phthisis is, however, a rare phenomenon. In most cases a relapse of the laryngeal disease takes place, usually in connection with deterioration of general health and the pulmonary process.

3. The partial recovery of laryngeal tuberculosis—viz., cicatrization of single ulcers is a relatively frequent phenomenon.

4. On this frequency the lately improved method of local treatment of laryngeal phthisis has had great influence.

5. Certain micro-organisms possess reactionary power in a greater degree—viz., resistance to pathological causes (tubercle bacilli), showing probably the tendency of the organism to the production of connective tissue in all organs (lungs, larynx).

III.—THE LOCAL TREATMENT OF LARYNGEAL TUBERCULOSIS.

The time of therapeutic nihilism in regard to laryngeal phthisis has disappeared to return no more. After having obtained a rational basis in two undoubted facts : (1) that primary laryngeal consumption exists, although rarely, and (2) that this disease is undoubtedly curable, local treatment (especially surgical), although it forms one of the youngest developments of general treatment, gains a greater and greater number of adherents among the principal representatives of laryngology, and is rapidly advancing to greater improvement.

With the development of local treatment of laryngeal tuberculosis are

intimately connected the names of Schmidt and Heryng (laryngeal surgery), Krause (lactic acid), and lastly, Jellinek, who, having introduced cocaine into laryngeal treatment, rendered valuable service by making possible the application of more energetic operations to the larynx. For this reason I shall more fully speak of this remedy.

(A.) *Cocaine*.—As chloroform in surgery, so cocaine in laryngology, establishes an epoch. From the time of its application to diseases of the upper air passages (nose, larynx) commences the great progress of laryngeal surgery, thanks to the anæsthetic properties of this drug. Moreover, cocaine in laryngeal phthisis possesses its particular application as an excellent analgesic remedy in the painful, difficult swallowing of these patients. Although Jellinek, assistant to Schrötter, in Vienna,⁴⁰ was the first who introduced this drug to laryngology in the year 1884, yet looking over the voluminous literature regarding this remedy, it is evident that before Jellinek cocaine was tried, although it did not then attract general attention.

In the year 1869, Fauvel, in Paris,⁴¹ successfully applied cocaine. Further, in 1879, Anrep, cited in the work of Rossbach,⁴² referred to the anæsthetic action of cocaine. Two years before Jellinek (1882), Labord,⁴³ published in the *Tribune Médical* his experiments with coca and cocaine. Leaving aside the question of priority as to the application of cocaine in laryngology, we shall now pass over to the action, application, and negative properties of this remedy.

Jellinek applied cocaine in solutions of ten and twenty per cent. Some authors, as Godhart,⁴⁴ Geo. Major,⁴⁵ Lefferts,⁴⁶ and Audhui,⁴⁷ employ very weak solutions (4—5 per cent.), considering them quite sufficient to produce an absolute anæsthesia. But most laryngologists employ much stronger solutions, as for instance Morell Mackenzie,⁴⁸ who applies twenty per cent. in cases of painful swallowing in phthisical patients; yet our experience, as well as that of others, shows that in these cases weaker solutions (fifteen and ten per cent.) are generally sufficient, but in cases of endo-laryngeal operations a solution of cocaine of less than twenty per. cent. will not produce sufficient anæsthesia. In these cases we constantly employ a solution of twenty-five per cent., which is quite sufficient, although there exist very rare cases (we, however, have observed them) where repeated brushings of the larynx, with strong solutions (25 percent.) are not able to render the larynx entirely anæsthetic. These cases, in our opinion, must be regarded as having a particular idiosyncrasy. Of this opinion are also Schech,⁴⁹ Stoerk,⁵⁰ Schiffers,⁵¹ Myerson,⁵² etc. How long does the anæsthetic action of cocaine last? As to this question the opinions of authors widely differ. Jellinek thinks it to be from five to ten minutes, Morell Mackenzie two hours, Heryng fifteen minutes to several hours (yet after half an hour this action becomes weaker), Stoerk regards it as from two hours to two hours and a half. We tend more to Geier's⁵³ opinion, who made precise, suitable experiments with Jurasz in Heidelberg. The author regards the period of anæsthesia to be from fifteen to twenty minutes. We must also make a difference between absolute anæsthesia of shorter duration (some minutes) and relative, which can last two hours. Further it depends on the concentration of the solution employed.

How quickly does anæsthesia of the mucous membrane of the upper air passages appear after applying cocaine?

The greater number of authors (Jellinek, Geier) maintain that it takes place very quickly, from one to two minutes; Morell Mackenzie about ten minutes. According to our own experience, it seems that not before three to four minutes after brushing does complete anæsthesia appear.

The method of applying cocaine differs. It is generally applied alone by means of brushings. Schnitzler,⁵⁴ in laryngeal tuberculosis, employs brushing of cocaine with morphia, or insufflations of pure cocaine, likewise with morphia, or with some other drug (plumbum aceticum, Magisterium Bismuthi). This author also applied cocaine in form of inhalation (0,5 : 2500, Aq. dest.), and Heryng uses it as a gargle (gr. xvi— $\frac{3}{4}$ vj.) Besides pure watery solution of cocaine, generally employed, there exist others, for instance, Jellinek employs the following forms: one part of cocaine in two parts of alcohol and eight (or three) of aqua dest.

Piniaczek, of Cracow, and later Heryng, introduced cocaine injections of ten per cent. into the sub-mucous tissues of the larynx, by means of Krause's syringe. Heryng usually injects in two places, two or three, increasing up to ten drops (which is equivalent to one grain of cocaine, that is to say, one-fourth part of the contents of the syringe). In order to avoid intoxication the author adds a solution of two per cent. of carbolic acid.

(℞. coc. mur. 0,25 : (gr. jv.)

Sol. ac. carb. 2 per cent. 2,5 (℥j). S. the injection.)

This author mostly applies injections into the posterior region of larynx (swellings, ulcerations), piercing the needle half centimètre deep (in the epiglottis also). Injecting it into the posterior part, the author remarked anæsthesia at the same time of the mucous membrane of the throat, uvula, and soft palate. The anæsthesia of the larynx lasts from three to four hours, beginning some minutes after the injection. As to the merits of this method the author reports as follows: (1) Limitation of anæsthesia to certain regions and spontaneous graduation. (2) The anæsthesia lasts longer. (3) Great economy (about one grain per dose), which, having regard to the high price of this remedy, is not without importance. (4) In ulcerations of the œsophageal surface of the posterior part of larynx (which the author was able to prove at the necropsy) injection of cocaine may ease the pain, while brushing the interior of larynx is fruitless in these cases. Lastly, (5) it facilitates laryngoscopic examination, thanks to the partial anæsthesia of the neighbouring parts (throat).

Besides Piniaczek and Heryng these injections were employed by Fraenkel, who confirmed Heryng's result. Of the advantages of this method we are not able to say anything, as we have no personal experience as to how cocaine hydrochlorate is generally used. We do not apply other kinds (salicylate, benzoate). As to the quality of cocaine, experience shows that the best preparation is of Merck's manufacture. The cocaine of other manufactures (Scherring, Jaffe) is indeed cheaper, but not so good. In a prescription the manufacturer's name should be mentioned. Lately the price of cocaine, at first exceedingly high, has diminished very much.

Baumgarten, of Buda-Pest,⁵⁵ uses cocaine as a diagnostic accessory:

hyperæmia and secondary swellings disappearing under cocaine, infiltration however of vocal cords remaining without change. In cases difficult of laryngoscopic examination in irritable patients, cocaine in weak solutions (ten to fifteen per cent.) is an excellent accessory.

There are very few physicians who do not speak favourably of cocaine. These more especially belong to the Italian school, represented by Massei, of Naples,⁵⁰ and Massucci.⁵⁷ We shall show later on that the same school also condemned lactic acid. It is possible that the cocaine used by these authors differed in quality from that of Merck's manufacture. Opponents are also found in Seifert, of Würzburg,⁵¹ Fronstein, of Moscow,⁵² and Tauber.³⁴ The latter author advises instead of cocaine the following mixture :—℞. ac. carb. 6,0, Tinct.-iodi. 15,0, glyc. 8,0.

It is remarkable that such an author as Solis-Cohen doubts of the possibility of complete anesthesia of the mucous membrane of the larynx by means of cocaine in cases of endo-laryngeal operations.

Cocaine is not one of the most agreeable remedies. Patients do not very willingly consent to its application, complaining especially of the disagreeable bitter taste in the mouth, the disagreeable sensation of astringency, dryness in the throat, sensation of a foreign body, &c. These, however, are but trifling objections, which by no means discredit this remedy. But, latterly, more and more objections are raised, which seem to prove that this drug is not so innocent, since it can produce acute intoxication. Amongst these cases are those of :—

1. Bresgen,⁶¹ who upon himself and his wife proved the poisonous action of cocaine (1·5 alcohol).
2. Heymann,⁶² after brushing the throat and larynx with cocaine (1·5 aq. d.), in the case of a boy nine and half years old.
3. Havilland Hall,⁶³ in the case of a nervous woman, aged fifty-six during an operation for nasal polypi (ten per cent. spray of cocaine), where the fluid penetrated into the throat.
4. George Bock,⁶⁴ with injection of cocaine into the gum in order to extract a tooth.
5. Gourand,⁶⁵ in the case of a healthy young man after several brushings of hypertrophic tonsils with four per cent. solution of cocaine (in all sixteen grains of cocaine were used).
6. Stadler,⁶⁶ in a woman, aged twenty-five, after extraction of a decayed tooth, brushing the gum with twenty per cent. solution of cocaine (undoubtedly pure).
7. Modrzejewski, of Warsaw,⁶⁷ in a woman, thirty-two years old, symptoms of intoxication after having dropped into the ear two or three times daily eight drops of cocaine (four gr. 3j aq. dest).
8. Szuman, of Thorn,⁶⁸ in a young lady, aged twenty, after subcutaneous injection of ten per cent. cocaine.
9. B., of Warsaw, cited in the above article of Szuman, four per cent. solution of cocaine applied to the ear of a boy.
10. Sokolowski,⁶⁹ who in his practice observed the following case of intoxication with cocaine :—A healthy man, aged thirty, was almost

¹ Not before published.

strongly cocainized (twenty per cent., Merck's cocaine), in order to extract a laryngeal polypus. After the operation pallor suddenly appeared, irregular breathing, with quick and uneven pulse after two minutes, and slight clonic contractions of the whole body. After application of stimulant remedies this state passed quickly away. During the whole day the patient felt great weakness, loss of appetite, together with general depression. Next day the patient felt quite well.

The symptoms, appearing during acute intoxication by cocaine, described by all the above authors are : weakness, staggering gait, giddiness, fainting, sleeplessness, temperature a little increased (in the case of Heymann), loss of appetite, spasms, contractions in hands and feet (in the cases of Durand and Sokolowski). Seiffert reports another symptom, as constant during cocaine intoxication, namely, sensation of enlarged incisor teeth. The same author mentions that he saw profuse bleeding after operations, where cocaine had been previously used, which he explains as due to secondary dilatation of blood-vessels after previous contraction.

Heryng mentions slight temporary symptoms after brushing with strong solutions of cocaine, especially after having swallowed the saliva, such as : paleness, fainting, trembling of hands, weakness, uneasiness ; these symptoms, however, generally disappear quickly by themselves, or after taking wine. But in the above cited cases the symptoms were more threatening, lasting longer for instance, in the case of Heymann for about five hours.

An excellent remedy for cocaine intoxication was found in amyl nitrite (George Bock), the vapour from a few drops on cotton being inspired. According to Ziem,¹² intoxication can occur not only from the passage of cocaine into the throat (during operations of the nose), but also directly through the absorption from the mucous membrane of the nose. Trials in order to replace cocaine by other drugs have been made : thus Gouguenheim⁵ proposes caffeine and Claiborne stenocarpin, but these remedies have not hitherto found adherents.

Menthol is recommended by Rosenberg.

We may conclude as follows :—

1. Cocaine is a drug which cannot be replaced as an anæsthetic and analgesic in the treatment of diseases of the throat and nose generally, and of laryngeal tuberculosis especially.
2. In applying cocaine we must observe certain precautions in reference to the possibility of acute intoxication. We must, however, add here, that we personally have never observed such intoxication, or even slight symptoms of poisoning, notwithstanding the very frequent use of cocaine, especially in hospital practice.

(B.) *Drugs, especially Antiseptic, locally applied in Laryngeal Tuberculosis.*—Since the time of Koch's immortal discovery (1882) of the nature of so-called pulmonary consumption (tubercle bacilli) the physician's efforts have been continually directed to the discovery of a drug which will extirpate this dreadful enemy of mankind. Hence the efforts towards a rational antiseptic treatment of pulmonary as well as of laryngeal phthisis : hence the enormous number of antiseptic drugs lately introduced into the

treatment of pulmonary and laryngeal tuberculosis. The greater part of these drugs have disappointed the expectations entertained respecting them, but a few have attained more or less success.

1. *Lactic Acid*.¹—Prof. Schrötter, in his latest manual of diseases of the throat, larynx, and nose, page 163, expresses himself about this drug as follows:—"Hitherto I have not known another remedy with which I had succeeded in obtaining so many amendments, and such a relatively great number of cures." It is without the least doubt that a drug which has been able to satisfy such a conscientious enquirer as Schrötter has undoubtedly merited it. Indeed, from the time when Krause,³³ in 1885, published his first experiments upon this drug, the number of its adherents has enormously increased, amongst whom we may mention Jellinek,⁷¹ George Major,⁷² Braun,⁷³ Gouguenheim,⁷⁴ Schmiegelow,⁷⁵ Rosenfeld,² Betz, Gottstein,⁵ Heryng,⁷⁶ Sokolowski,¹ Przedborski,³ Oltuszewski,⁷⁷ Wróblewski,⁷⁸ etc.

On the other hand, as always happens, lactic acid has also its opponents, amongst whom are Schnitzler,⁷¹ Lublinski,³³ Boecker, and Heymann,³⁸ and especially the representatives of the Italian school Massei,⁷⁹ and Masini.⁸⁰ Before I come to the special therapeutic properties, and manners of application of this drug, I present in this place the results of my own experiments, with this drug in thirty-four hospital patients (in the clinic of Dr. Sokolowski). In these cases lactic acid alone was applied, in the remaining sixteen cases of a total number of fifty patients, locally treated, lactic acid was combined with other methods (surgical treatment, etc.), these cases will be described in another place.

Let us now analyse our cases. Of thirty-four cases, in nine we obtained no amendment, neither subjective nor objective; in the remaining twenty-five cases we were able to remark a more or less favourable effect, produced by lactic acid (*i.e.*, in 73·5 per cent.). Of these latter, in seven cases the amendment was limited to the diminution or cession of subjective symptoms (hoarseness, difficult or painful swallowing), so that it was merely a relative amendment—subjective. In the remaining eighteen cases, the amendment was also objective. In eight of these cases, it was fair (diminution of infiltrations, lessening of ulcerations) in the remaining ten cases, we were able to remark a more or less distinct cicatrization of ulcers (in two cases confirmed by necropsy). The number of cicatrizations in our cases (ten out of thirty-four, that is to say, 29·4 per cent.) is seen to be less considerable than in the observations of other authors. Oltuszewski, in a total of nine cases, obtained recovery, *viz.*, cicatrization of ulcers in six of them. Heryng, out of twenty cases of laryngeal tuberculosis, had seen complete recovery in two, and very great amendment in eight. Let us examine in which cases we failed to obtain any amendment by lactic acid. At first the observations were of too short duration (from four days to two weeks); further, the number of brushings was very small (from one to five); and in the greater number of these cases considerable changes existed in the lungs (destructive form), the general

¹ Lactic acid, according to experiments upon animals, which were inoculated with tuberculosis by Sermann and Brugnattelli, is rather destructive to tubercle bacilli (*see* Heryng's work.⁷⁶)

state was mostly bad, there were hectic symptoms, and in the larynx, in most cases, considerable changes were present (for instance, in the thirteenth case, etc.). In two cases, the larynx and throat were very much affected. In these cases, however, where, thanks to the lactic acid, we obtained more or less amendment, the conditions were more favourable, viz., longer observation (in one case, five and a half months), and longer application of lactic acid (in one case, thirty brushings). In most cases, changes in the lungs were not extensive; these were especially interstitial, and the general condition was more or less satisfactory, viz., absence of the fever and other hectic symptoms, generally accompanying the caseous, destructive form of pulmonary phthisis. In many cases, indeed, the changes in the larynx were more or less remarkable, and in some cases at the same time the changes in the lungs were extensive; but in these cases the amendment was especially seen in the subjective symptoms, although in one case, in spite of these unfavourable conditions, we obtained with lactic acid, partial cicatrization of ulcers.

It seems to be the case that even in most unfavourable conditions we can even in the worst cases obtain relief for the patient by facilitating deglutition—the most troublesome symptom of the patient. From the above experiments there seems to be undoubted proof of what we have emphasized previously as to the curability of laryngeal tuberculosis, viz., where the general condition is satisfactory, where slight or interstitial changes exist in the lungs, where we may presume that there is a natural tendency on the part of the organism to the production of connective tissue—a conservative process obstructive to the vital energy of pathological micro-organisms—here, I repeat, local treatment, especially by lactic acid, favouring nature, may do much good, and sometimes heal the local process in larynx. But that we must not be deluded too much, as to the permanence of such recoveries, goes without saying. Recurrences take place not rarely in the immediate or distant future, as the patient, having recovered from laryngeal tuberculosis, falls a victim to pulmonary phthisis.

To return to lactic acid.

As already noted, Krause was the first, in the year 1885, to introduce lactic acid into the therapeutics of laryngeal tuberculosis, basing his observations upon experiments of Moosetig-Moorhof upon lupus, which showed that lactic acid acts energetically upon pathological tissues, but at the same time has no effect upon sound tissues. As regards the mucous membranes, lactic acid does not seem to be so innocent, especially in strong solutions. Jellinek⁷² had already drawn attention to this. According to him, irritation of sound mucous membranes undoubtedly occurs, yet without disintegration of the epithelium. Krause applied lactic acid in the form of brushings, commencing with weak solutions (10 per cent.); passing quickly on to stronger solutions (50, 60, at last 80 per cent.). Latterly we have applied lactic acid in solutions of 25, 50, 75, and 100 per cent. (pure acid). We begin always with weak solutions, as we cannot say how the organism will react, applying them every second day, or even every day, passing to stronger solutions after some days.

Case No.	Occupation.	Anamnesis.	General state.	Tubercle bacilli.	The state of the lungs.	Laryngoscopic appearance.	Local treatment.	Subjective symptoms.	Objective symptoms.	Result of treatment.	Duration of observation.
124	Joiner	Diphtheria pneumonia many years ago	Well	Present	Slight changes in- durations	Hoarseness, little swelling of post. 5 part. Marginal ulcerations on left vocal cord.	brushings with lactic acid (25- 75%). Burning	Less hoarseness...	Commencing cicatrization of ulcers	Great amendment ... 3 weeks.	
131	Coarse	Two years ago pneumonia-cough	Satisfactory now	Present	Indurations at both summits	Dysphagia. Excrecentia (ulcer) 12 on post. part. Infiltration of right vocal cord.	12 brushings with lactic acid (25- 75%). Burning	Swallowing good.	Cicatrization of ulcer	Recovery of the 13 months.	
351	Official	Haemoptysis-syphilis.	Almost well	Present	Cavities at both summits	Hoarseness. Great infiltration of epiglottis with ulceration	6 brushings with lactic acid	Good swallowing.	Commencing cicatrization of ulcer	Great amendment ... 1 month.	
422	Telegraphist.	Abusus in Baccho	Good	---	Indurations on both summits	Hoarseness. Ulcer on posterior part.	6 brushings with lactic acid	Less hoarseness...	Beginning cicatrization of ulcer.	Great amendment ... 2 weeks.	
525	Official	Hereditary predisposition	Well	Present	Very slight changes in both summits	Dysphagia. Infiltration of post. 13 part. Ulcer on infiltrated left false cord	13 brushings with lactic acid	Improvement in swallowing	Ulcers beginning to cicatrize	Great amendment ... 1 month.	
636	Shoemaker	Diphtheria	Well	Present	Indurations at both summits	Dysph. Hoarse. Infiltration of 38 false cords and post. part. Ulcers on vocal cords.	38 brushings with lactic acid (25- 100%)	Voiced almost clear	Ulcers beginning to cicatrize. Less infiltration	Great amendment ... 13 months. Return and death. (In larynx extensive ulcers)	
722	Merchant	Syphilis many years ago	Well	Absent in examinations	Very slight changes..	Dysph. Infiltr. of post. part and epigl. Ulcer of epiglottis	In good swallowing. Injections of Hg. CF, without success. 12 brushings with lactic acid	Good swallowing	Cicatrization of ulcer	Recovery ... 2 months.	
829	Farmer	Cough for many years	Bad (nephritis).	---	Indurations at both summits	Ulcer of tongue (on summit). Infiltr. of post. part. ulcer on right vocal cord	3 brushings with lactic acid. (Ulcer on tongue)	---	Ulcer on the tongue begins to cicatrize	Death. Commencing cicatrization of ulcer on tongue	
925	Joiner	Diphtheria	Bad	---	Cavities at both summits	Dysphagia. Infiltration of false cords (on left, ulcers)	13 brushings with lactic acid (Great burnings)	Swallowing good	Ulcers beginning to cicatrize	Death: some ulcers beginning to cicatrize in cardiac deep ulcers	
1041	Musician	Haemoptysis (in ambulatory 13 brush- lac. ac. successfully)	Satisfactory	---	Changes, especially interstitial of sum- mits	Hoarseness. Marginal ulcerations 12 on both vocal cords. Little infiltr. of epigl. and post. part.	12 brushings with lactic acid	Less hoarseness..	Cicatrization of ulcers	Recovery ... 3 weeks.	
1155	Priest	Haemoptysis...	Well	Present	Very slight changes at both summits	Dysph. Infiltr. of epigl. Marginal 2 ulcerations on vocal cords. Ulcer summits (destr.)	2 brushings with lactic acid	Dysphagia and ulcers without changes	No amendment	No amendment ... 4 days.	
1232	Workman	Cough for many years	Bad	---	Great changes at both summits (destr.)	Dysph. Infiltr. of epigl. Marginal 2 ulcerations on vocal cords. Ulcer on post. part	2 brushings with lactic acid	Without change	Death: in larynx extensive ulcers	Death: in larynx extensive ulcers	
1346	Bricklayer	Cough for two years	Almost well	---	Indurations at both summits	Dysph. Ulcers of epigl. (trace of 5 in). Ulcers on false cords. In- filtration of post. part.	5 brushings with lactic acid	Without change	No amendment	No amendment ... 2 weeks.	
1435	Gardener	---	Bad	---	Indurations at both summits	Pharynx Extensive ulcerations 3 and infiltrations. Infiltr. of epigl. lactic acid	3 brushings with lactic acid	Without change	Death: extensive ulcers in pharynx and larynx	Death: extensive ulcers in pharynx and larynx	
1535	Official	Diphtheria	Bad	---	Cavities at both summits	Dysphagia. Infiltr. of epigl. Ulcer 3 on post. part	3 brushings with lactic acid	Without change	Death: ulcers penetrating to cartilage	Death: ulcers penetrating to cartilage	

16 38 Shoemaker	Hamoptysis ..	Bad	...	Indurations at both Dysphagia. Great infiltration of epiglottis and posterior part of post. and ventricular band. Ucers on vocal cords.	brushings lactic acid brushings lactic acid	with ...	Without change	No amendment	2 weeks.
17 46 Blacksmith	Diathesis - hamoptysis	Well	...	Great change at both Dysphagia. Ucers on vocal cords.	brushings lactic acid	with ...	Without change	No amendment	2 months.
18 27 Student	Diathesis, syphilis, hamoptysis	Bad	...	Great change at both Dysphagia. Ucers on vocal cords.	brushings lactic acid	with ...	Without change	No amendment	4 days
19 5 Joiner	Alusius in Baccho	Bad	...	Great changes in Dysphagia. Infiltration of posterior part and ventricular band. Ucers on vocal cords.	brushings lactic acid	with ...	Without change	No amendment	2 months.
20 59 Official	Alusius in Baccho	Almost well	...	Slight changes in both Dysphagia. Great swelling of left arytenoid cartilage.	brushings lactic acid	with Better swallowing (great)	Without change	Death. Extensive ulcers in larynx and infiltration	13 months.
21 26 Workman's wife	Hereditary predilection	Bad	...	Great changes at Dysphagia. Extensive infiltration of epiglottis, post. part, and ventricular band.	brushings lactic acid	with Better swallowing	Without change	Subjective amendment	2 weeks.
22 24 Official	Diathesis, Hamoptysis	Almost well	...	Indurations at both Dysphagia. Infiltration of post. part and false cords.	brushings lactic acid	with Good swallowing	Without change	Subjective amendment	2 weeks.
23 20 Locksmith	Diathesis, Alusius in Baccho	Almost good	...	Great changes ... Dysphagia. Infiltration of epiglottis and post. part.	brushings lactic acid	with Better swallowing	Without change	Subjective amendment	2 weeks.
24 26 Workman	Hamoptysis	Bad	...	Slight changes at Dysphagia. Infiltration of epiglottis and post. part.	brushings lactic acid	with Better swallowing	Without change	Death. Extensive ulcers in larynx, trachea and rt. bronchus	5 weeks.
25 24 Messenger	Diathesis, Hamoptysis, Pneumonia, Alusius in Baccho	Almost good	...	Commencing destruction at summits	Great infiltration of epiglottis	with Swallowing well	Without change	Subjective amendment	3 months.
26 14 Soldier	Diathesis, Hamoptysis	Bad	...	Cavities at summits. Dysphagia. Infiltration of post. part.	brushings lactic acid	with Good swallowing	Without change	Death (without ne-cropy)	2 months.
27 45 Postilion	Diathesis, Hamoptysis	Bad	...	Cavities at both summits. Dysphagia. Great infiltration of epiglottis	brushings lactic acid	with Better swallowing	Infiltration less	Death. In larynx extensive ulcers	3 weeks.
28 30 Baker	Hamoptysis	Bad	...	Indurations at summits. Dysphagia. Inrimula-excrecent (ulcer).	brushings lactic acid	with Swallowing well	Infiltrations less	Death. Frequent ulcers, some beginning to cicatrize	14 months.
29 47 Dependiant	Diathesis	Almost well	...	Indurations at summits. Dysphagia. Infiltration of epiglottis	brushings lactic acid	with Swallowing better	Infiltration less	Fair amendment	3 weeks.
30 52 Tailor	Alusius in Baccho	Almost good	...	Cavities, especially at Dysphagia. Great infiltration of epiglottis and post. part.	brushings lactic acid	with Better swallowing	Infiltration less	Fair amendment	1 month.
31 46 Farmer	Hereditary predilection, Pneumonia	Satisfactory	...	Induration at left Dysphagia. Infiltration of epiglottis and post. part.	brushings lactic acid	with Better swallowing	Infiltration of epiglottis less	Fair amendment	2 months.
32 18 Songstress	Alusius in Baccho	Almost good	...	Cavities at both summits. Dysphagia. Infiltration of post. part and ary-epiglottic folds.	brushings lactic acid	with Good swallowing	Less infiltration	Fair amendment	24 months.
33 34 Saddler	Hamoptysis, Alusius in Baccho	Bad	...	Great changes (destructive) at both summits. Dysphagia. Infiltration of epiglottis and post. part.	brushings lactic acid	with Better swallowing	Less infiltration of epiglottis	Death. In larynx ulcerations	1 month.
34 36 Farmer	Diathesis, Hamoptysis	Bad	...	At both summits. Dysphagia. Infiltration of epiglottis with ulcerations	brushings lactic acid	with Better swallowing	Ulcer a little less and cleaner.	Fair amendment	3 weeks.

As to the incidental disagreeable symptoms produced by this drug, we especially find a sensation of burning—sometimes very severe, and of long duration (sometimes several hours) ; it is a symptom exceedingly disagreeable to the patients. Application of cocaine (10 to 15 per cent.) will, although not entirely, ease this burning. This symptom Krause had already mentioned. Rosenberg goes too far in saying that the principal obstacle to the use of lactic acid is its painful application, which cannot be lessened by cocaine. Schrötter, however, is of opinion that, although the application of cocaine is not without pain, yet he has not seen any case in which cocaine did not ease this symptom. Some authors mention spasm of the glottis resulting from the application of lactic acid. The same has occurred to us, although very seldom, as well as in the application of other drugs (for instance, in one case of chronic laryngeal catarrh, which has been under our observation, every brushing with nitrate of silver of 1 to 10 per cent. produced great spasm of glottis). In these cases there undoubtedly exists a kind of idiosyncrasy. We must not forget that a badly performed operation (*viz.*, brushing) may in certain cases produce spasm of the larynx, and, according to Heryng, this especially occurs when (1) the fluid runs into the trachea (in too abundant wetting of the brush) ; (2) we introduce the brush too far under the cords, *viz.*, into the inferior part of the larynx ; (3) we irritate too much the posterior region of the larynx with the handle of the brush.

Krause mentions that after applications of strong solutions of lactic acid (eighty per cent.), there always is a formation of scurf, sometimes very difficult to distinguish from secretion, covering ulcerated or infiltrated surfaces. Schrötter also mentions the formation of a scurf. We have, however, rarely seen this effect, although we have directed great attention to it (for instance, applying pure acid in cases of pharyngeal tuberculosis). Oltuszewski also rarely saw any formation of scurf.

As to the action of lactic acid upon tubercular-degenerated tissues.

According to Krause this action is seen in diminution of infiltrations, clearing of ulcerations and formation of sound granulations, and finally their cicatrization. This author reports that ulcers, situated on the posterior part of the larynx, are most resistant to the effect of lactic acid. Jellinek saw the best results generally in cases of recent small superficial ulcerations, but, in extensive ulcers, lactic acid remains unsuccessful even after some months of application of this remedy. From our own experience we cannot confirm the last statement of Jellinek. We have several times seen cicatrization of extensive ulcerations, especially on the ventricular bands, obtained with lactic acid. Jellinek further reports that lactic acid quickly acts on the soft infiltrations, but slowly on the plastic ones, with which we entirely agree, adding from our own experience that the hard infiltrations require previous scarifications. Lactic acid, afterwards rubbed in, has a much more favourable influence upon the absorption of these infiltrations. Speaking generally, as Heryng justly remarks, lactic acid seems to be more useful in ulcerative than in infiltrative processes. According to Heryng, lactic acid does not act identically on all kinds of ulcers, thus we find craterform ulcers more difficult to treat

and prone to recurrence. But Schrötter very justly remarks, that precise indications for lactic acid are very difficult to state ; extensive ulcers often heal, while superficial ulcers sometimes do not submit to the treatment.

From our own experiments, we should be inclined to suppose that lactic acid had especially a favourable action in cases of ulceration of the false as well as of the true vocal cords, while in ulcerations of the epiglottis and posterior regions this drug is less useful. The same might be said of infiltrations, on which lactic acid seems to have no favourable influence. According to most authors (Heryng, etc.) we cannot regard lactic acid as a specific, as Krause² regards it, when he says that "no tubercular ulcer opposes cicatrization by means of lactic acid" when the general condition is satisfactory, and a suitable technique is employed, adds the author. We entirely endorse Schrötter's opinion, cited above.

After having tried almost all drugs in the Hospital of the Holy Ghost, we are obliged to acknowledge, that of all the remedies lately introduced into the therapeutics of laryngeal tuberculosis, priority must positively be given to lactic acid. We have not seen any wonderful results ourselves, yet very often, more or less distinct amendment, and sometimes cicatrization of ulcers. Almost always this drug diminishes, or causes cessation of the difficult and painful swallowing, as we can convince ourselves from the above cases. Blindermann⁴ mentions that in the ambulatorium of Jurasz, in Heidelberg, although he never saw a case of complete recovery, yet he could remark considerable amendment after several days treatment by lactic acid. I shall not discuss the technique of the application of lactic acid in laryngeal tuberculosis ; no description can equal what we observe for ourselves. I shall only add, that the brushing must be energetically applied ; we must rub lactic acid into the ulcerated place very thoroughly. The wad of the brush (we do not use a hair-brush) is often coloured brown—the result of mixture of lactic acid with bloody secretion. I should, however, like to draw attention to one fact, greatly facilitating the application of lactic acid to the tubercular degenerated epiglottis. We know very well from experience how difficult the local treatment of the epiglottis is, on account of the uncommon yieldingness of this organ—frictions with lactic acid are not easy. Perhaps it is due to this, that affections of the epiglottis appear to be more resistant to lactic acid. But in some cases the larynx is so highly situated, that by means of strong depression of the basis of tongue we can see the whole epiglottis distinctly. In these cases (not rare) application of lactic acid can justly be made without laryngoscopy, and it is these cases in which we have obtained the best results from lactic acid.

Finally, we must mention the application of lactic acid in the form of parenchymatous injections. Heryng was the first who employed this method in the treatment of tubercular infiltrations of the larynx. (1) In cases of mushroom growths on the posterior region ; (2) in cases of fresh infiltrations of the ary-epiglottic folds ; and (3) in cases of recent extensive infiltrations of the epiglottis. By means of Krause's syringe, modified by himself, the author has injected under the mucous membrane at first, strong solutions (thirty per cent.) of lactic acid, to the amount of three to five drops, but on account of the strong inflammatory reaction, he

diminished it to ten per cent. solutions. Of six cases thus treated, he remarked a successful action in one only. Much better results were obtained by George Major,⁷² who employed a twenty to thirty per cent. solution of lactic acid, in doses of five to ten drops, equivalent to three-fourths of a grain in solution. This operation is almost painless, the swellings disappearing after twenty to thirty days, ulcers healing under the application. This author also advises deep penetration, in order to avoid the expectoration of the fluid. We have no experience ourselves with this method. Lactic acid can be also employed in form of inhalations, namely, in solutions of half to two per cent.

(*To be concluded.*)

ON POSITION AND METHODS OF ANÆSTHETISATION IN NASO-PHARYNGEAL OPERATIONS.

By J. FREDK. W. SILK, M.D. (Lond.), &c.,

Anæsthetist to Guy's Hospital, and to the Great Northern Central Hospital, &c.

IN a previous communication to this Journal, I made some remarks upon the choice of anæsthetics in naso-pharyngeal operations. The subject would obviously be incomplete, without some reference to the methods usually adopted, in administering the various anæsthetics alluded to in that article, including, under this head, questions relating to the position of the patient, as well as those concerning the actual inhalation.

POSITION OF THE PATIENT.

This, of course, is determined almost entirely by the surgeon, but the position selected, and, it may be added, the proposed mode of operating, may materially influence the judgment of the administrator, as to the choice of the anæsthetic, and the method to be adopted in its use, and, at the same time, may give him some idea as to the nature of the difficulties which may arise.

RECUMBENT POSITIONS.

(*a*) *Supine*.—If this position is chosen, the shoulders should be well raised, and the head supported comfortably on a pillow. After the primary anæsthetisation, *i.e.*, before the operation is commenced, the pillow beneath the head may be withdrawn, and the patient so arranged that his head may fall over the end of the couch or bed. Although this manœuvre renders the performance of the operation a little more difficult, it is really of great service, especially in children and thin adults, for by a further slight extension of the neck, the naso-pharynx is placed on a lower level than the mouth, and much blood will escape by the nose. The chief advantage claimed for this position is, that the primary narcosis may be more profound, and the patient is, therefore, more completely