Asthma considered specially in relation to nasal disease / by E. Schmiegelow.

Ernest Hart Esq

ASTHMA.

ASTHMA

CONSIDERED SPECIALLY IN RELATION

TO

NASAL DISEASE

BY

E. SCHMIEGELOW, M.D.

CONSULTING PHYSICIAN IN LARYNGOLOGY TO THE MUNICIPAL HOSPITAL, AND DIRECTOR OF THE OTO-LARYNGOLOGICAL DEPARTMENT IN THE POLYCLINIC AT COPENHAGEN

LONDON
H. K. LEWIS, 136 GOWER STREET, W.C.
1890

PRINTED BY
H. K. LEWIS, 136 GOWER STREET
LONDON, W.C.

PREFACE.

This essay is an English edition of a book published in Danish in the spring of this year in Copenhagen.

It must be considered as an attempt to show how far diseases of the nasal cavity may affect asthmatic attacks.

It is thought that Prof. Hack's opinions were in this respect too exaggerated, and ought therefore to be considerably modified, and in treating upon the subject this end has been kept in view.

THE AUTHOR.

Copenhagen.

December, 1889.

CONTENTS.

ASTHMA.

INTRODUCTION.

Asthma is a complaint which is mentioned in the oldest writings, but the name of Asthma was given to all kinds of diseases, if accompanied by difficulty in breathing; this caused a great confusion of ideas, which it took centuries to correct.

According to *Bergson*,* the Bible (Exodus) mentions a disease which must be looked upon as Asthma. According to the same author, *Homer* and *Herodotus* also knew the complaint, and advised those who suffered from Asthma to use warm sand baths. In the works of *Hippocrates* Asthma is mentioned several times, and he gives the name of Asthma to all respiratory difficulties that are accompanied by accelerated breathing. *Celsus* distinguishes between dyspnœa, asthma and orthopnœa; dyspnœa being the milder form of the complaint, orthopnœa the more severe. *Aretæus* gives an exact description of asthmatic attacks, and separates only asthma and dyspnœa, regarding orthopnœa as a symptom of asthma. From this time up to the middle ages *Galen's* opinions were in this case, as everywhere else in medicine, predominant. He knew only dyspnœa, whose subordinates are orthopnœa and apnœa.

It was only towards the end of the 17th century, that *Willisius* established the category of *nervous spastic asthma*,†

* *Bergson*, Das krampfhafte Asthma der Erwachsenen, Nordhausen, 1850.

† See *Ramadge*, Asthma, London, 1835, p. 86.

which had already been indicated by *v. Helmont.** The characteristics of this form of Asthma were, that the patient's lungs were perfectly healthy (*viscera omnia sana, præsertim pulmones*),† and that Asthma, therefore, was now placed as an independent disease, in contrast to earlier authors who looked upon it as a symptom.

Floyer,‡ who himself suffered from asthma for 30 years, wrote a capital work on the subject, he considers a *convulsive contraction of the bronchial tubes* to be the cause of the asthmatic attacks, whereas dyspnœa, which is distinctly separated from asthma, is caused by a compression of the lungs. He makes a sharp distinction between the asthma that has a visible cause, and the one that has no distinct origin, and where no pathological change is to be found. This last, the essential asthma of the present day, he calls *Asthma periodicum flatulentum*, whereas *Willis* has named it, *A. convulsivum et spasmodico-flatulentum* or *A. spasmodicum*. This theory of *Floyer* as regards the bronchial spasms was later on acknowledged by *Cullen*§. *Darwin* in his *Zoonomia* declares that *Asthma convulsivum* has the same character as all other cramps and epilepsies, and that it can originate from nearly all distant parts of the body. Already in former times numerous observations have appeared, which endeavoured to prove that asthma could originate from pathological conditions in other organs. *Willis* and *Hoffmann* mention cases, where the presence of bilious stone has been the cause of asthmatic attacks. *Ruysch* has observed the same thing in cases of renal stone. *Floyer* has seen asthma in women suffering from uterine diseases. *Wainwright* knew a lady who contracted asthma every time she

* See *Floyer*, A treatise of the Asthma, London, 1717, Dedication, p. 5.

† See *Ramadge*, *Ibid*, p. 94.

‡ *Floyer*, *Ibid.*

§ *Cullen*, Practice of Physick, 1777, referred to by *Bree*, Recherches pratiques sur les disordres de la respiration, traduit de l'anglais, 1819, p. 108.

had her menses. It was generally the abdominal viscera and specially the stomach, that was considered to be the reflex origin of asthma.* In accordance with the tendency to schematize after etiological principles, which was predominant, in the last century, Asthma was divided into a multitude of forms such as: asthma humidum, hæmorrhoidale, abdominale, flatulentum, leucorrhoicum, menstruale, spasticum, nocturnum, etc., which served to make the confusion complete.

In the beginning of this century the theory of the purely nervous asthma was partly given up again, on account of the numerous pathological and anatomical examinations, which nearly always found more or less alterations in the lungs of patients who died of asthma. *Bree* raised a series of objections against the spastic nature of asthma, which in part were founded upon false suppositions; this can be explained by the circumstance, that the so-called idiopathic asthma was not a distinctly defined disease, acknowledged by all, but on the contrary amongst other things embraced œdema of the lungs, asthma uræmicum, etc. *Bree* does not actually deny the possibility of the bronchial spasms taking some part in the cause of asthma, but it is only secondary; the primary cause is an exudation in the bronchial tubes, by which the lungs (specially the muscles of respiration) are stimulated to contraction, in order to expel the mucus which they contain.

Bree's theory however lost ground as soon as the process of auscultation had been learnt, as it was thereby proved that an attack of asthma is not preceded by bronchitis, but that it is not till later on during the attack that the rales are heard, (see amongst others *Ramadge*).† *Ramadge* again maintains the nervous character of asthma, and considers a spasm of the trachea and the bronchial tubes to be the cause; in this respect he compares

* *Bree*, Recherches pratiques sur les disordres, etc., 1819, p. 208.

† *Ramadge, l.c.*, 1835, London, p. 64.

asthma to colic of the bowels. *Laennec* acknowledges the spasmodic asthma, but believes his "catarrhe sec" to be the most frequent cause. *Rokitansky** considers emphysema as the palpable origin of the so-called nervous asthma. *Romberg*† on the contrary maintains the independence of the nervous asthma, and describes it as a bronchial cramp, *spasmus bronchialis.* It was especially after the publication of *Bergson's* prize work,‡ that a decided separation was made between the idiopathic nervous asthma, characterized by its periodical attacks, which are separated by perfectly free intervals, and the numerous forms of difficulty in breathing, which appear purely symptomatic in many different complaints of the chest. To *Bergson* the idiopathic nervous asthma is an independent neurosis of the organs of the chest, whose origin is a cramp or spasm which like all other neuroses can be caused by a central or peripheral irritation of the nervous centre.

The majority of the following authors consider asthma to be a bronchial spasm, and as they knew of the existence of the bronchial muscles, have a better ground for their opinion than the older authors whose belief in bronchial spasms was merely hypothetical. The presence of muscles in the fine bronchial tubes has been known only since the beginning of this century through the works of *Reisseisen* and *Sömmering.*§ The power of contraction of these fine muscles has on the one side been confirmed through experiments made by *Prochaska*, *Reisseisen*, *Haller*, *Varnier*, *Treviranus*, *Wedemeyer*, *Williams*, *Longet*, and *Volkmann*, whilst on the contrary *Budd* has vainly attempted to cause any contraction of the bronchial tubes, either by placing the electric current on the surface of the lungs or in the place

* *Rokitansky*, Lehrb. d. path. Anatomie, 1844, II. B., p. 64.

† *Romberg*, Lehrb. d. Nervenkrankh., 2 Aufl., I. B., II., p. 78.

‡ *Bergson*, Das krampf. Asthma der Erwachsenen, Nordhausen, 1850.

§ Ueber die Structur und Verrichting der Lungen, Berlin, 1808.

where the bronchial tubes were cut (see Bergson's work, p. 76, *et seq.*)

As a decided opponent of the theory of bronchial spasms we find *Wintrich*, who like *Budd* could not obtain any contraction of the bronchial tubes by irritation of the stems of the vagus. He meanwhile does not deny the possibility of a spasm in the bronchial muscles, but merely denies its being the cause of the nervous asthma.* He has found by experiments that only one-fifth of the vital tonus of the lungs is due to organic muscular fibres in the bronchial tubes, while the remaining four-fifths depend upon the elastic fibres in the tissue of the lung. A spasm of these muscles can, therefore, only be of small and insignificant influence, and does not give a satisfactory explanation of the nature of asthma, for both the expiratory and inspiratory muscles exceed in strength all the bronchial muscles put together. *Wintrich* on the contrary thinks that asthma can be explained by *a tonic spasm of the diaphragm alone* or combined with the respiratory muscles. It must here be remarked, that *Willis* has already mentioned spasms of the diaphragm as being the cause of asthma, and *Neumann* has expressed the opinion that most cases of asthma might be the result of a spasm of the diaphragm (referred to by *Mehlis*†).

Only a tonic contraction of the diaphragm can explain the deep immovable position it occupies in many cases of nervous asthma. *Wintrich's* opinion was in every respect confirmed by a work of *Bamberger*‡ in which he, on the bases of careful observation and post mortem examination of a case, considers asthma to be caused by a spasm of the diaphragm. *Wintrich's* conception of the case had besides *Bamberger* only a few partizans. *Sée* alone

* *Wintrich*, Virchow's Handb. d. Pathologie, 1854. V.B. Erste Abth., p. 190.

† *Mehlis*, Die Krankh. des Zwerckfells der Mennschen, Eisleben, 1845, p. 81.

‡ *Bamberger*, Ueber Asthma nervosum, Würzb. med. Zeitschr. VI. B., p. 102, Separatabdruck.

in 1865 made himself a spokesman for the same opinion, and *Lehmann** did the same by declaring in a resumé at the end of his book, that asthma was in most cases caused by a spastic affection of the respiratory muscles, in some few cases by their being paralysed, whereas it was doubtful if it was ever caused by a spastic contraction of the bronchial tubes.

Salter in his great work on asthma† decidedly maintains the bronchial spasms, and does not seem to know the newer German writings of that time, at all events he does not mention *Wintrich's* opinion. The bronchial theory received great support from *Biermer's* work,‡ which, keeping close to the experiments of *P. Bert*,§ which confirm the examinations made by *William* and *Longet*, shows that there is no doubt of the possibility of causing contraction of the bronchial muscles through irritation of the vagus. While *Wintrich* holds that the supposed bronchial spasm would not explain the deep position of the diaphragm during the asthmatic attack, and therefore looked upon the spasm of the diaphragm as the essential cause, *Biermer* expressed the opinion that the circumstance of the deep position of the diaphragm must not be taken as a result of the spasm of the diaphragm, but that it is caused by an increased expansion of the lungs, "*eine Lungenblähung*," which is dependent on the spasm of the bronchial tubes. He presumes that the closing of the bronchial tubes, caused by spasm of the organic muscles in the transition of the bronchials to infundibula, is more easily over-come by inspiration than by expiration, as not only infundibula but also the fine bronchial tubes are compressed

* *Lehmann*, Om Pathogenesen af Asthma hos Voxne. Bibl. f. Læger, 1866, pp. 281—346

† *Salter*, On Asthma, its Pathology and Treatment, London, 1859; 2nd edition, 1868.

‡ *Biermer*, Ueber Bronchialasthma, Volkmann's Klin. Vorträge, Nr. 12, 1870.

§ *Paul Bert*, Leçons sur la physiologie comparée de la réspiration, Paris, 1870, ref. by *Biermer*.

by expiration, and so make it still more difficult to evacuate infundibula. In accordance with *Breuer's** work this impediment in breathing, which relates principally to expiration, necessitates a prolongation of expiration, which is clinically supported by the difficult and lengthened expiration during asthmatic attacks.

After *Biermer's* work the theory of bronchial spasm gains more ground, and amongst others is accepted by *Riegel.*† He is most inclined to side with *Biermer*, but does not deny the possibility of a secondary development of spasm of the diaphragm, in this respect agreeing with *Lebert.*‡ But besides the bronchial spasms, *Riegel* ascribes a great part to the fluctionary element. *Weber*§ calls attention to the fact that neither *Wintrich's* diaphragmal spasm nor his bronchial spasm are in themselves sufficient to explain all the symptoms of bronchial asthma, especially as regards the bronchial phenomena. *Weber*, on the contrary, thinks that he has found an explanation of the symptoms of asthma in the fluctionary moments: that is, a filling of the vessels of the mucous membrane of the bronchial tubes caused by vaso-motor influences. He therefore considers a vaso-motor neurosis to be the cause of the attack, by which the vessels of the mucous membrane are abnormally filled and swollen. A swelling of the mucous membrane of the nose has often been directly observed in cases of asthma in which the attack is immediately preceded by an obstruction of the nasal passages, and as the mucous membrane of the bronchials is

* *Breuer*, Die Selbststeuerung der Athmung durch d. N. vagus, Sitzungsberichte d. k. k. Akadem. d. Wissenschaften zu Wien, B. LVIII., Abth. II., Nov. 1868.

† *Riegel*, Krankh. d. Trachea u. d. Bronchien; v. Ziemssen's Handb. IV., 2 Th., 1875.

‡ *Lebert*, Klinik d. Brustkrankh. I B., 2 Hälfte, 1873.

§ *Weber*, Tageblatt der 45 Versammlung Deutsch. Naturforscher u. Aerzte in Leipzig, 1872, s. 159; ref. by Bresgen: Volkm. klin. Vorträge, N. 216.

anatomically very like that of the nose, there is nothing to prevent the supposition that something of the same kind takes place in the bronchial tubes. *Riegel* still further remarks that this theory fully agrees with the results of *Lowén's** experiments, which show that irritation of sensitive nerves causes by reflex action overfilling of the vessels inside the range of the irritated part. *Stoerck*† supports *Weber's* theory as regards the import of fluxion, but sides with *Wintrich* as a believer in the diaphragmal spasm, and is decidedly opposed to *Biermer's* theory of bronchial spasm. Amongst other theories of asthma may be remarked that *Leyden*‡ already in 1871 mentioned that the asthmatic attacks were caused by small oblong octahedral crystals, which mechanically (perhaps also chemically) irritated the peripheral ends of the vagus in the mucous membrane of the bronchials, and hereby caused by reflex action a spasm of the muscles of the small bronchial tubes. Similar crystals had already been observed by *Friedreich*§ and later on by *Zenker*‖ in cases of bronchitis crouposa, *Charcot* and *Forster* also knew them from myxomatous tumours, and *Neumann* found them in leuchæmic blood and marrow. *Meissen*¶ has furthermore found them in nasal mucus of a patient suffering from a cough and " Stocksnupfen " with asthmatic attacks, also in cases of phthisis, and *Ungar* also confirmed *Leyden's* theory of crystals in the sputum of asthmatic patients, but maintains that they are not pathognomonic, but quite accidental.

* *Lowén*, Ueber die Erweiterung von Arterien in Folge einer Nervenerregung. Arb. aus d. physiolog. Anstalt zu Leipzig, 1867, ref. von *Riegel*, *l. c.*

† *Stoerck*, Mittheilungen über Asthma bronchiale, Stuttgart, 1874, p. 14, and following.

‡ *Leyden*, Zur Kenntniss des Asthma bronchiale, Berl. klin. Wochensch., 1871, p. 533.

§ *Friedreich*, Virchow's Archiv, 30te B., 1864.

‖ *Zenker*, Archiv f. klin. Medicin, 18te B., S. 125.

¶ *Meissen*, Ueber das Vorkommen der Leyden'schen Asthmakrystallen, Berl. Klin. Wochensch., 1883. p. 332.

The theory brought forward by *Curschmann* in 1883 has about the same fate. *Curschmann** considers a great many forms of reflex asthma to be caused by catarrhal affection in the finer bronchial tubes, which he named *bronchiolitis exudativa*. A characteristic of this disease is the presence of peculiar spiral threads ($\frac{1}{2}$-1 millimeter thick, and several centimeters long) in the sputum. The threads are casts of the bronchials, and are in direct relation to the asthma, which is caused by them through a secondary bronchial spasm. These spirals of *Curschmann* are meanwhile no more pathognomonic than the crystals of *Charcot* and *Leyden*, as they are also found in cases of fibrinous pneumonia (*Vierordt*, *v. Jacksch*, *Vincenzo*, *Pel*, see *G. Sée*).†

G. Sée in a critical review of previous theories comes to the following conclusions :—Asthma is a neurosis in the medulla oblongata, that is to say in the centre of respiration, caused by an acquired or native elevated reflex irritability in this organ. The cause of the attacks must be sought for in irritations, which originate in pneumogastric nerves or other peripheral nerves. The effect of the reflex exhibits itself in the motory nerves of the inspiratory muscles, specially those of the diaphragm. We have, therefore, before us a permanent neurosis, whose attacks are caused by an irritation especially of the pneumogastric nerves, and which is always concluded by a tetaniform contraction of diaphragm, this theory only (in contrast to the bronchial spasm) can explain the dilatation of the lungs, this, as above remarked, has already been mentioned by *Sée* in 1865. The principal factor in the asthmatic attacks is therefore not (as in the bronchial spasm) a direct motor effect of the pneumogastric

* *Curschmann*, Ueber Bronchiolitis exudativa und ihr Verhältniss zum Asthma, Archiv f. klin. Medicin, 32 B., 1883.

† *G. Sée*, Krankh. der Lunge, III B., Einfache Lungenkrankh., translated from the French, Berlin, 1887.

nerve, only the sensitive pneumogastric fibres take a part in this respect as they lead the irritation up to the noeud vital of the spine, whence the irritation spreads through the nervi phrenici to the diaphragm.

When the trunk of the pneumogastric or the central end of the cut nerve is irritated, the lungs expand from reflex influence through nervi phrenici (*Riegel* and *Edinger*).* This dilatation can therefore take place only when nervi phrenici are intact, which proves that the lungs expand *indirectly* through a spasm of the diaphragm. But besides the tetaniform contraction of the diaphragm, there must also be a reflex dilatation of the vessels in the bronchial mucous membrane in order to explain the expectoration; this *Weber*, as above mentioned, has already called attention to. It must therefore be assumed that an irritation proceeding from the lungs, at the same time extends itself (*a*) to the respiratory centre, from which the tetaniform contraction of the diaphragm originates, and (*b*) to the vaso-motor centre (also situated in the medulla oblongata), whence it spreads to the vaso-dilatorial nerves of the lungs, in other words to the place from which the irritation issues (*Lowén*).

Before we leave the theories of asthma, it must be remarked that *Schmidtborn*† has recently explained the asthmatic attack as being the expression of a *reflex spasm* of the arteries of the lungs, and that this by causing considerable obstacles in the blood circulation in the lungs should explain the pale cyanotic expression of asthmatic people, and also explain the increased activity of the respiratory muscles. This theory, which is supported only by the fact that nitrite of amyl, with

* *Riegel og Edinger*, Experimentelle Untersuchungen zur Lehre vom Asthma, Zeitsch. f. klin. Medicin, V. B. s. 413, ref. by *Schmidtborn*; see also *Holm*, Inspiratorisk Dyspnoe—Forhdl. i det norske medis. Selskab., 1888, p. 83,—Norsk Magaz. f. Læger, Juni, 1888.

† *H. Schmidtborn*, Ueber Asthma nervosum, Volkmann's klin. Vortr., Nr. 328, 1889.

its power to paralyse the vessels, acts favourably on asthma, is very uncertain and hypothetic.

As will be seen by the preceding review of the different theories on Asthma which have appeared in the course of time, it is very difficult to gain a firm position in this question as the different theories stand in distinct opposition to one another. *Sée's* opinion is certainly the most plausible, especially as he accentuates the central seat of the affection in the medulla oblongata as the essential thing, and because he considers the complaint to be a neurosis caused by an increased reflex irritability of the centres of the medulla oblongata. This only makes it possible to explain the incongruity offered by the different clinical features of Asthma, and it gives, both in pathological and anatomical as well as in clinical and therapeutic respects, the key to many problems, the solution of which was impossible under the old supposition that Asthma was the result of a peripheric (lung or vagus) affection. From this point of view it was formerly impossible to give a satisfactory explanation of all the symptoms, and therefore a number of hypotheses were set up which only served to make the comprehension of the real nature of Asthma quite impossible. Several authors such as *John N. Mackenzie* have certainly maintained the necessity of taking the increased irritability of the central nervous organs into consideration as necessary for the comprehension of the state of many asthmatic patients, but it has nowhere been so clearly expressed as by *Sée*, and no one before him has, with this as starting point, given so clear and precise a description of the nature of Asthma.

It is not the intention of this essay to consider all the different forms of nervous asthma, but to speak only of reflex asthma,

and specially that form of reflex asthma that originates in the nose.

The *reflex* or *eccentric* nervous asthma is, in comparison with the *central asthma* (*Bamberger*),* by far the most frequent. *Riegel* distinguishes between the *direct* and *reflex* asthma.

The *direct*, and specially the *central* form is very rare. *Salter*† mentions in his work two cases that might be considered as central asthma. The one case was of a child of 10, who during an acute hydrocephalus had several typical asthmatic attacks; the other case was a man, aged 50, who suffered from epilepsy, and the epileptic attacks alternated with attacks of asthma. *Biermer*‡ thinks that in some cases asthma is caused by a pressure of the swollen tracheo-bronchial glands on the vagus nerve. Taken from *Sée's* point of view these cases must be interpreted as reflex asthma, as the irritation of the vagus passes indirectly (through the medulla oblongata) to the respiratory muscles.

The *indirect reflex* asthma, on the contrary, is far more frequent, and has been known since the time of *Willis*. In the introduction to this essay I have mentioned several examples of this, and towards the end of the last century *Darwin* stated that asthma can originate from every possible part of the human body. It was meanwhile only the abdominal organs that were taken into consideration, and it was specially the digestive disorders against which the older therapeutists directed their causal treatment in cases of asthma. The diet played a great, very often the only part in the treatment at that time (see *Salter*).§ It was only after *Voltolini* had published his experiences of the dependence of asthma upon the nose in many cases, that attention was first called to this point.

* *Bamberger, loc. cit.*, p. 109.

† *Salter, loc. cit.*, pp. 43-44.

‡ *Biermer, loc. cit.*, p. 55.

§ *Salter, loc. cit.*, p. 43.

It is sometimes mentioned in older works, such as *Salter's*,* that asthmatic patients sometimes suffer from nasal polypus, and there are also now and then indications that the author's attention has been called to the fact that several nasal symptoms appear at the same time as the asthmatic attack. According to *J. N. Mackenzie*,† who has given a rather full historical contribution to this question, *Cœlius Aurelianus* mentions that convulsive asthma may be accompanied by an abundant discharge of mucus from the nose and also by epiphora. *Zecchius* (1650) describes an asthma, which he believed to be caused by a cold in the head, the symptoms were headache, discharge from the nose and a slight cough; he treated it only through treatment of the catarrh.

Schneider, *Floyer* and *Josef Frank* also give decided indications of reciprocal relations between asthma and nasal catarrh. In our century similar indications are found in the works of *Bree*, *Trousseau*, *Follin*, *Duplay*, and especially of *Ferber*,‡ who considered the complaint to be the result of a trigeminus neurosis, which *Schadewaldt*§ later on also tried to do. *Voltolini* was therefore not the first who knew of the relationship that could exist between asthma and the nasal diseases, but he was the first who distinctly accentuated this connection, and he thereby gave the impulse, not only of calling the attention of medical men to this relationship, but indirectly to the development of

* *Ibidem*, p. 9.

† *John N. Mackenzie*, A contribution to the pathology and treatment of the respiratory vasomotor neuroses. Transact. of the Americ. Laryngol. Association, 1886, p. 154; and *Ibidem*, 1887, p. 105, The Pathological Nasal Reflex, an historical study.

‡ *Ferber*, Der Niesskrampf u. deren Beziehung zur Migräne, zum Bronchialasthma u. zum Heufieber. Archiv d. Heilkunde, 1869, p. 586, ref. by *J. Mackenzie*.

§ *Schadewaldt*, Die Triegeminusneurosen, Deutsch. med. Wochenschr., Nr 37, 1885.

the part in modern pathology which goes by the name of "NASAL REFLEX NEUROSES."

The question of the relation of asthma to the pathological state of the nose, is to such an extent combined with the relation of other reflex neuroses to the nasal cavities, and is by so many authors mentioned in this connection, that a description of the development of the asthma question in later years necessitates a partial description of all that has been said about nasal reflex neuroses in general.

Voltolini, in his work on "the application of the galvano-cautery,"* p. 246, writes that he has not in any earlier works on asthma, not even *Bergson's*, found any mention that nasal polypus could be the cause of asthma. "Ich habe aber Asthma so oft mit Nasenpolypen complicirt gefunden, dass ich daran nicht zweifle, dass Nasenpolypen oft eine Ursache des Asthma's sind, zumal ich auch die asthmatischen Anfälle nach Entfernung der Polypen habe schwinden sehen." *Voltolini* remarks that not all polypes cause asthma, especially not in youth. If asthma has existed long, so that it has caused emphysema of the lungs, the asthma does not disappear even if the polypes are removed. As regards the way in which the polypes cause the asthmatic attack, *Voltolini* thinks that only two suppositions are possible:— "Die Polypen rufen entweder auf dem Wege des Reflexes das Asthma hervor, oder durch Behinderung der Respiration verändern sie den Chemismus des Athmens und verändern die Textur des Lungengewebes." In support of the first possibility he quotes from *Joh. Müller's* "Physiology," vol. i., p. 274: "dass das System der Athemnerven durch locale Reize in allen Theilen, welche mit Schleimhauten, versehen werden, in krankhafte Thätigkeit zu Erzeugung convulsiwischer Bewegungen gesetzt werden kann." *Voltolini's* experiences were confirmed by

* *Voltolini*, Die Anwendung der Galvanokaustik, Zweite Auflage, 1872, Wien

Hänisch,* who mentions a case of asthma, a lady aged 23, who from the age of 15 to 22 suffered from nasal polypes, for which she had been operated upon several times. After having been exposed to bodily and mental depression, she suffered from asthma, but was cured by extraction of the polypes; afterwards recurrence and cure. *Hänisch* thinks that as not all nasal polypes cause asthma, there must be a certain debility of the whole organisation or at least of the organs of breathing. In the nasal polypes themselves he finds sufficient ground for the weakened state of the organisms and lungs, as the insufficient breathing, the restless sleep, the buccal respiration, etc., must be considered capable of causing the general weakness. He expressed his opinion of the case as follows:—"Die Polypen drücken oder wirken irgendwie reizend auf die Vagusfasern im Nasenrachenraum und in dem locus minoris resistentiæ, in den durch die mangelhafte Athmung in ihrer Ernährung und Funktionsfähigkeit beeinträgtigten Lungen wird der Reflex ausgelöst."

Several communications, both from English and French authors, confirm the correctness of *Voltolini's* experiences. *Schäffer*,† *B. Fränkel*‡ and *Bresgen*§ also affirm the same thing.

Fränkel remarks, as *Weber* also has done, that not only nasal polypes, but a simple chronic nasal catarrh may cause asthma. The relationship was explained in this way: the trigeminus fibres in the mucous membrane of the nose were irritated, and the irritation passed into the pulmonary fibres of the pneumogastric. Trigeminus was the principal factor as being the first irritated

* *Hänisch*, Zur Aetiologie u. Therapie des Asthma bronchiale, Berl. klin. Woch., Nr. 40, 1874, p. 503.

† *Schäffer*, Deutsche med. Wochensch., 1879.

‡ *B. Fränkel*, Berliner klin. Wochenschr., 1881.

§ *Bresgen*, Das Asthma bronchiale, etc., Volkmann's klin. Vorträge, 1882, Nr. 216.

nerve, but olfactorius could also be of importance in this respect in those cases of asthma that were caused by the influence of volatile substances. The result of the reflex was always a bronchial spasm, though *Fränkel* does not deny the possibility of a diaphragmal cramp, but this, he says, is always secondary. In this respect he founds his opinion on the experiments of *Gerlach** and *Horwath*,† who have shown that irritation of the pneumogastric causes contraction of the small and middle-sized bronchial tubes, whilst the trachea also possesses an independent power of contraction.

Up to the present it was only asthma in relation to the nasal diseases that had been studied, but now the question of the dependence of the neuroses on the pathological state of the nose entered upon a new phase, for the late *Wilhelm Hack*,‡ supported by casuistic observations, considered a number of different nervous diseases from the same point of view. *Hack's* principal object was to show that in the swollen cavernous mucous membrane in the foremost end of the inferior turbinated bones, different nervous states of irritation originate, and these reflex neuroses can be caused experimentally, and they disappear entirely (verschwinden durchweg), as soon as the places in question are operatively removed (p. 4). The filling of the cavernous membrane is, according to *Hack*, the essential in the pathogenesis of these reflex neuroses.

Local irritation of the mucous membrane of the nose takes no direct part in respect to etiology, but only indirectly calls

* *Gerlach*, Ueber die Beziehungen der. N. n. Vagi zu den glatten Muskelfasern der Lunge. Pflügers Archiv, XIII., p. 491, 1878.

† *Horwath*, Beiträge zur Physiologie der Respiration, Ueber die Contraktionen der Trachea bei Saügethieren, Pflügers Archiv, XIII, p. 508, 1878.

‡ *Hack*, Wiener med. Wochenschrift, 1882 and 1883, later on published as a book entitled: Ueber eine operative Radical-Behandlung bestimmter Formen von Migräne, Asthma, Heufieber sowie zahlreicher verwandter Erscheinungen, Weisbaden, 1884.

forth the reflex neuroses by causing an excessive filling of the cavernous tissue in the anterior part of the inferior turbinated bones by means of a kind of "nervi erigentes." He accentuates his interpretation most strongly when he says:—"Die Reflexerregbarkeit der Nasenschleimhaut ist abhängig von der Schwellbarkeit bestimmter in dieselbe eingebetteter Schwellorgane. Bei direkter Berührung dieser letzteren füllen sich zuerst die cavernösen Raümen derselben, erst diese Füllung und muthmaaslich die dadurch erzeugte pralle Spannung der Schleimhaut scheint als erregendes Moment für die Nervenendapparate angesehen werden zu müssen; nun erst erfolgen Reflexe." The filling of the cavernous tissue in the foremost ends of the first turbinated bones is *Hack's* alpha and omega in explaining the pathogenesis of the nasal reflexes. As regards the irritants that cause these reflexes, he assumes inflammatory conditions partly in the nose, or more frequently in the throat, to be the cause. But also irritants that affect the sensual nerves, such as strong impressions of light or a strong smell, may cause a filling of the cavernous membrane, and thereby give the impulse to reflex neuroses, which have the nose as a connecting link, and which can be cured by a surgical treatment of the cavernous membrane. Similar effects can issue from the sensitive nerves of the skin, and from the sexual organs both of men and women. He considers the reflex neuroses to be the result of an irritation of the vaso-dilator nerves. In this way he explains neuralgia, epiphora, asthma nervorum, which is not only caused by bronchial spasm, but also by the reflectory swelling of the mucous membrane of the bronchial tubes. *Hack's* principal object in the treatment of these neuroses is the destruction of the cavernous tissue on the anterior part of the inferior turbinated bones; it is the *exclusive rhinosurgical* treatment of these neuroses that he wishes to attain. He does not deny that reflex neuroses may originate from other places than the nose,

but when there are decided nasal affections, such as sneezing and discharge, combined with a neurosis (*e.g.*, asthma), this must be caused by an affection of the nose, which, being the original cause, must be treated first of all.

Even if *Hack*, elated with his new observations, and elated at the possibility of finding in this theory an easy explanation of the pathogenesis of a number of neuroses which had often defied every treatment, even if he, I say, took a too optimistic view of the nose as being the place to which therapeutic treatment might confidently be applied, he ought not to be blamed for this. His great merit was that he called the attention of the medical world to an almost entirely neglected department of pathology, and his object was, as he states in the introduction to his book:—"Mitarbeiter zu gewinnen für ein noch wenig gebautes Feld, dessen Fruchtbarkeit aber schon jetzt als eine bedeutende erkannt werden darf." And that this has been attained is shown by the numerous communications on this subject that have appeared in the following years.

In a lecture given in 1884, *E. Fränkel** describes several cases which confirm *Hack's* observations. He, like *Hack*, calls attention to the fact that already comparatively small alterations of the mucous membrane of the inferior and middle turbinated bones are sufficient to cause violent reflex neuroses. Amongst these asthma must be considered the severest and most frequent, being often so prominent that the nasal symptoms are quite put in the shade by it. Chronic rhinitis is much oftener than nasal polypes the cause of asthma. Amongst thirty-two patients with chronic rhinitis, nearly a third part were asthmatic. In opposition to *Curschmann*, *E. Fränkel* maintains that bronchiolitis is only secondary, and *Biermer's* bronchial-spasm is the primary part of asthma. Like *Hack*, *E. Fränkel*

* *E. Fränkel*, Zur Diagnostik und Therapie gewisser Erkrankungen der mittleren und unteren Nasenmuschlen, Volkmann's klin. Vorträge, Nr. 242.

lays particular stress on the importance of the cavernous tissue (p. 2237) in the origin of the reflex neuroses, and only when this is pathological can the reflex take place.

At about the same time, or rather a little earlier than these works, the question was taken up in America, specially with regard to asthma and hay-fever. *Daly** and *Elsberg*† reported a number of experiences which strengthened the belief in the theory that the reflex neuroses were dependent on certain nasal affections. *Seiler*, *Bosworth*, *Roe* and *Jarvis* expressed themselves to the same purpose. *John N. Mackenzie* stated his opinion of the matter as follows:—"There is a decided sensitive zone in that part of the mucous membrane which covers corpora cavernosa and specially the inferior half of the lower turbinated bone and the erectile body on the septum immediately opposite; the reflexes originate by irritation of this zone." In the Philadelphia Laryngological Association, in the same year, *Sajous* gave some "Notes on Hay-fever" and mentioned some cases belonging to this category which were cured by local treatment of the nose. In 1884 *Sajous*‡ believed that hay-fever is caused by an idiosyncrasy that some people have as regards certain particles of dust, and he mentioned cases where, although there existed no visible abnormal structure of the mucous membrane of the nose, yet the hay-fever was caused by a permanent hyperæsthesia of the mucous membrane. In the discussion which followed, *John N. Mackenzie* proposed instead of saying "idiosyncrasy," to use the expression abnormal excitability of the vasomotor nervous centres. He is in opposition to the theory that pathological conditions in the nose are necessary in order to cause an

* *Daly*, Hay-asthma and chronic naso-pharyng. catarrh, Transact. of the Americ. Laryng. Assoc., 1881, p. 164.

† *Elsberg*, Reflex and other phenomena due to nasal disease; ibidem, 1883, p. 79.

‡ *Sajous*, Hay-fever and its successful treatment, Transact. of the Americ. Laryngol. Associat., 1884, p. 106.

attack, and particularly remarks that there are many cases where the abnormal excitability of the vasomotor centres plays a great etiological part. He seeks the cause in an abnormally augmented capability of erection in the erectile membrane of the nose, specially in the part that lies at the further end of the lower turbinated bone and in the part of the septum opposite to it, where the two sphenopalatine nerves, which contain the vasomotor threads that control the filling of the erectile tissue, spread themselves. The excessive irritability of the cavernous tissue may be directly caused by the constant congestion or by other pathological alterations of the mucous membrane. An exaggerated sensibility of the nervous centres also plays a great part. This may be the result of a constant excitation by intranasal irritants, or it may be caused by an excitation of the whole central nervous system, which in the end leads to a disturbance of the functions of the vasomotor centres; a hyperæsthesia of these last may also be caused by other pathological transformations of the whole organism, or be the result of a reflex irritation from some other part of the body, *e.g.*, where asthmatic attacks are caused by disease in the ovaries. *Mackenzie*, therefore, lays a great stress upon the central nervous complaint, which must always be considered during the treatment, just as eventually diseases of the nose must be treated, and he calls attention specially to that part of the mucous membrane that is supplied from nervus sphenopalatinus.

Hack's theory was already partly modified at the Congress in Copenhagen, August, 1884, where *B. Fränkel*,* who opened the discussion of this question, maintained firstly, that the reflex neuroses could originate from *every* part of the mucous membrane of the nose, whose sensitive nerves were the seat of a heightened state of irritation, and secondly, that swelling of the

* *B. Fränkel*, Compte-rendu de la Section de Laryngologie, p. 32; Congrès périodique international des Sciences médicales, Copenhagen, 1884.

cavernous membrane was not a necessary condition for originating the reflex neuroses. It was remarked in the discussion that followed, specially by *Semon*, that one must never, whilst treating a nasal affection, lose sight of the patient's general state of health, and that it is impossible *à priori* to decide how far one may give any decided promise as to the influence of a local rhinosurgical treatment upon the reflex neurosis. *Hack's* opinions were on the whole cordially received on all sides, he was only accused of being too partial. *Gottstein* alone was rather in opposition to the question, as he considered the nasal reflex neuroses to be very rare, but did not deny the possibility of their existence, for neuroses might naturally just as well originate in the membrane of the nose as in any other mucous membrane or the skin. *Gottstein* further believed, that in most cases a special nervous disposition in the patient ought to be accepted. Foremost amongst the sceptics are those, who with *Magnus** do not deny that the patients feel or think they feel relief, when certain pathological alterations are removed, but yet are of the impression that it all depends upon the imagination.

Amongst the many different writings that appeared in the following years, and which all more or less proved the possibility of influencing neuroses, and amongst them asthma, by local treatment of the nose, only the work of *Schmaltz*,† in which he criticises *Hack's* "Schwellkörpertheori" shall be mentioned here. He corroborates the possibility of curing a reflectory asthma by rhinosurgical treatment, and gives several very fine examples, but does not accept the swelling of the cavernous membrane of the nose as a *conditio sine qua non* for the development of reflex neuroses. To prove the correctness of this supposition, *Hack* must prove that *Kratschmer's* experiments on

* *Magnus*, see *Schmaltz*, Berl. klin. Wochensch., 20th July, 1885, p. 459.

† *Schmaltz*, Berliner klin. Wochenschr., 1885, Nr. 29-32.

animals could not give a positive result after the removal of the erectile body. The abnormal swelling of the cavernous tissue was only a symptom of the heightened irritability of the nasal nerves (trigeminus), and not the expression of a general irritability of the whole nervous system, as had been supposed amongst others by *Herzog*, who, however, had modified* it so far as to consider the pure rhinitis vasomotorica as a result of neurasthenia, whereas he does not deny that a chronic rhinitis may cause reflex neuroses in individuals that are not nervously disposed. When asthma continues after removal of the polypes, *Schmaltz* believes the reason to be that the sensitive mucous membranes have not been treated, and in cases where asthma first appears after removal of the polypes, and disappears again after treatment of the corpora cavernosa, the reason must be sought in the fact that the polypes have only hindered accession to the irritable membrane. It is impossible to draw any prognostic conclusion from the local conditions of the nose, and as *Semon* remarks, one must be very careful in one's prognosis.

On observation of the different contributions that have appeared since *Hack's* first publications as regards this question, it will be found that while most authors at first, like *Hack*, were inclined to lay the chief stress upon the nasal disease, and to consider local treatment as quite sufficient; in later years the opinion has come forward, that asthma depends principally upon a disease in the central nervous system; this is the primary predisposing moment whose presence is necessary, so that a casual irritation which hits some peripheral nerve or other, *e.g.*, the trigeminus threads of the nasal mucous membrane, may be placed in condition to cause the asthmatic attack.

Already in 1883 *Strübing*† had mentioned that the appearance of reflex neuroses was governed by a law. The fact that they

* *Herzog*, Der akute und chronische Nasencatarrh, Graz, 1886.

† *Strübing*, Zur Lehre von Husten, Wiener med. Presse, 1883.

appear in one case and not in another, although there is no difference in the local complaint, is not accidental, but the result of certain decided predestination, as the pathological reflex impressions develop after a given rule.

An increased irritability of the mucous membrane of the nose is not sufficient to explain the appearance of reflex neuroses, for in this case it might be expected that all pathological changes, accompanied by an increased irritability of the nasal membrane, would cause the development of reflex neuroses; experience, however, proves that this is not the case.

An increased reflex irritability of the sympathetic nervous system, specially of the vasomotor centres, has therefore been supposed (*J. N. Mackenzie*).* A similar interpretation has, as above mentioned, also been accepted by *Gottstein*, who believed that in most cases the patient must be of a specially nervous disposition. *Roth*† expresses himself to about the same purpose, but does not deny the presence of neuroses in cases of strong healthy people. *Herzog*‡ and *Beschorner*§ also assume a general nervous disposition, whose treatment is just as necessary as the local nasaltherapy. *Rossbach* expresses himself most distinctly in a preface to *Runge's*‖ work on this question. He says that *Hack's* explanation that the reflex neuroses are alone originated from irritation of the sensitive nerves of the mucous membrane, caused by swelling of the cavernous tissue, is not correct, as there are too many exceptions from this rule. To explain the

* *J. N. Mackenzie*, Trans. of Americ. Laryng. Associat., 1884, p. 113; and Medical Record, 19th July and 18th October, 1884, referred to in Intern. Centralb. f. Laryngologie, II., p. 103–105.

† *Roth*, Zur Diagnose und Therapie der mit Nasenkr. zusammenhängenden Reflexneurosen, Wiener med. Wochens., 1885.

‡ *Herzog*, Der akute und chr. Nasenkatarrh, Gratz, 1886, p. 30.

§ *Beschorner*, Ueber Heufieber und dessen Behandl., Jahresbericht der Gesellsch. f. Natur und Heilhunde zu Dresden, 1885-1886.

‖ *Runge*, Die Nase in ihren Beziehungen zum übrigen Körper, Jena, 1885.

reflexes, one must consider "*eine besondere Beschaffenheit der nervösen Reflexbahnen selbst.*" Only those people contract reflex neurosis combined with nasal complaints whose reflex conductors in the brain and spine are predisposed. "Die *Hack's*chen Kranken müssen eine ähnliche Beschaffenheit des Nervensystems haben wie Neurastheniker und Hysterische, und möglicherweire sind diese Kranken sogar zum Theil neurasthenische oder hysterische Kranke."

Similar views were expressed by *Lublinski** in a discussion on asthma and nasal diseases held in the "Verein f. innere Medicin" at Berlin; he looks for the origin of the reflex in an increased irritation of the nasal nerves. He says that asthma and a nasal complaint can very well appear co-ordinate, but that those cases in which the asthmatic attacks can be stopped by pencilling the mucous membrane with cocaine, decidedly prove its causal dependency on the nasal complaint. The reason why reflex neuroses do not always appear in cases of nasal disease, he, like *Rossbach*, finds in abnormal conditions of the reflectory passages.

In the same discussion both *P. Heymann*† and *Krause* spoke with appreciation of *Hack's* great merits in the whole development of this question, even though they, like *Lublinski* and earlier authors, were rather opposed to his "Schwellkörpertheorie." *Krause*‡ remarked that when the erectile body in the nose swells up, this must be accepted as a direct irritation, and not as a reflex, for *Jolyet*, *Laffont*, *Dastre*, *Morat* and *Vulpian* have by experiments shown that trigeminus contains vasodilatator threads.

* *Lublinski*, Deutsche med. Wochenschr., 1886, Nr. 23 and 24, ref. in Internat. Centralbl. f. Laryngologie, III., p. 475.

† *P. Heymann*, Ueber Folgesymptome von Nasenkrankheiten, Deutsch. med. Woch., 1886, Nr. 28-30, ref. in Int. Cent. f. Laryng., III., p. 475.

‡ *Krause*, Die nasalen Reflexneurosen, insbesondere das nasale Asthma und die experimentelle Trigeminusforschung, Deutsch. med. Wochensch., Nr. 32, 1886, ref. in Int. Cent. f. Laryng., III., p. 479.

*Böcker** warns against the abuse of nasal reflex neuroses, and specially against the propensity to accept everything that cannot be explained, as a nasal reflex neurosis. He is also against *Hack's* theory of corpora cavernosa, and accentuates that one must not be content with treating the nose, but consider the whole state of the organism, which is of great importance. To these men who warn against accepting asthma and other reflex neuroses as the expression of a local nasal complaint which in every case must be treated rhinosurgically, we may add many others, *e.g.*, *Beverley Robinson*,† *Andrew Clark*‡ and *Bishop*.§

The Physiological Reflexes of the Mucous Membrane of the Nose.

Before we begin an examination of the pathological reflexes proceeding from the nose, it is necessary to consider those reflexes which physiologically can originate from the normal mucous membrane, and specially examine whether it is possible to cause a typical asthmatic attack by irritation of the normal membrane.

That the normal mucous membrane, under special circumstances, for instance inhalation of strong irritating vapours or particles of dust, can be the origin of sneezing and epiphora, has

* *Bocker*, Die Beziehungen der erkrankten Schleimhaut der Nase zum Asthma und deren Behandlung, Deutsche med. Wochens., Nr. 26-27, 1886, ref. in Int. Central. f. Laryng., III., p. 478.

† *Beverley Robinson*, A contribution to the study of Hay-fever (so called), Medical News, Philadelph., 17th July, 1886, ref. in Int. Cent. f. Laryng., III., p. 284.

‡ *Andrew Clark*, British Medical Journal, 11th June, 1887.

§ *Bishop*, Journal of American Medical Association, 23rd July, 1887, ref. in Intern. Centralb. f. Laryngol., IV., p. 439.

long been known. In the first case the irritant that affects the sentitive fibres of trigeminus in the mucous membrane is led up to the reflex centre for sneezing, which lies in the medulla oblongata, and from here conveyed to the motor fibres of the expiratory muscles. In the other case it is these same sensitive fibres that convey the irritant to the group of ganglic cells, from which the secretory fibres of ramus lachrymalis trigemini originate.

In 1870 *F. Kratschmer** published a series of experimental works where, for the first time, those reflexes that can be originated from the mucous membrane of the nose were made the subject of methodical examinations. He found that if you irritate the mucous membrane of a rabbit that sits quietly breathing with vapours of chloroform, ether, ammonia, alcohol, etc., the respiration in the expiratory position is stopped for a few seconds, and simultaneously the glottis closes; after that there are a few respiratory movements of a slower rhythm, and a few minutes afterwards there is the same quiet respiration as before the experiment. As regards the influence upon the heart, it suddenly stops, the succeeding pulsations follow very slowly, then gradually quicker, but the regular pulsation is not attained until some time after the respiration has become regular.

Something similar happens if the animal be tickled or pinched in or on the nose, or if the outer nose be cooled with snow, whereas cooling or pinching of other parts of the body does not cause similar alterations in the respiration or the pulsation of the heart.

To prove that these phenomena are a reflex from the mucous membrane of the nose alone, and that neither the throat, the

* *Kratschmer*, Ueber Reflexe von der Nasenschleimhaut auf Athmung und Kreislauf, Sitzungsb. d. mathem. naturv., Classe der Kaiserl. Akademie d. Wissench., LXII., II. Abth., p. 147.

lungs, nor the windpipe took any part, which might be very probable, as the experiment was made by inhalation of irritating vapours, he has made experiments where such a possibility could certainly be excluded, and the result was the same, whether the nerves of the throat (nn. laryngei superiores and inferiores) were cut or not. As regards the question whether trigeminus or olfactorius contain the sensitive cords, *Kratschmer* came to the result (by cutting of the nerves) that olfactorius takes no part in this respect, but that a cutting of both nn. trigemini breaks off every influence, which irritation of the nasal membrane otherwise has over the respiration and pulsation of the heart.

Later experiments by *Gourewitz* and *Luchsinger** have in contrast to *Kratschmer* shown that n. olfactorius, besides n. trigeminus, also plays a part in nasal reflexes. They first severed n. trigeminus and nn. laryngei sup. and inf., and after that blew sulphuret of carbon into the nose of the animal. This made the respiration slow or entirely stopped it in the expiratory position, whereas these phenomena did not appear when olfactorius also was cut.

Kratschmer's experiments have in the principal points quite lately been confirmed by *Sandmann.*† *Sandmann*, however, found that weaker irritations of the nasal membrane do not always cause an expiratory tetanus, but a suspension of the breath, in whatever phase it might be, when the irritation took place. The tickle reflex of the nose is sneezing. *Sandmann* did not discover nasal coughs in rabbits and cats, but he found it in human beings, in whom the cough (*Longet*)‡ can be originated

* *Gourewitz* und *Luchsinger*, Ueber Reflexe vom Olfactorius auf Athmung und Kreislauf, Inaugural Dissert., 1883, ref. by *Runge*, loc. cit., p. 24.

† *Sandmann*, Ueber Athemreflexe von der Nasenschleimh., Verhdl. d. physiol. Gesellsch. zu Berlin, Jahrg. 1886-1887, Nr. 18, vom 15th August, 1887, ref. by *E. Bloch.*

‡ *Longet*, Ueber Nasenhusten, 1884, ref. by *Runge*, loc. cit., p. 26.

from the posterior part of the nose, which is supplied from n. pterygopalatinus, nn. nasal post. and the supra-maxillary branch of trigeminus.

According to *Sandmann* the zones, whose irritation causes respiratory reflexes, are in cats and rabbits generally situated at the anterior end of the lower turbinated bones and on part of the septum opposite to it. In human beings the irritable zone is situated in the anterior end of the inferior and middle turbinated bones and on the septum opposite and in analogous places on the posterior ends. The front zone of irritation is supplied with nerves from ethmoidalis, which belongs to the first branch of trigeminus, the back zone from n. pterygopalatinus, which is an offshoot of the second branch of trigeminus.

*E. Bloch** has repeated the experiments upon human beings and also confirmed *Kratschmer's* results. He did not, however, succeed experimentally in calling forth reflexes of the respiratory muscles during expiration, but only during inspiration, but this was evidently caused by the way the experiments were arranged. If he, for example, lets the vapours of ammonia influence the nasal membrane during expiration, the suspension of the breath does not occur till the inspiration which follows; the reason for this is that the expiratory stream prevents the ammonia vapours from reaching those parts of the mucous membrane that are susceptible to reflexes.

We learn from these experiments that different reflexes can be called forth from the mucous membrane of the nose in its normal condition; but, and that is what interests us as regards the present question, that neither electric, mechanic, thermic, nor chemical irritations have been able to cause artificial attacks of asthma, but only short tonic or clonic contractions of the respiratory muscles. The reason for this negative result as

* *E. Bloch*, Untersuchungen zur Physiologie der Nasenathmung, Zeitschr. f. Ohrenheilk., XVIII., 1888, p. 215.

regards asthma may be that the irritations have not been adequate, but that special irritations (both as regards quantity and quality) of the nasal fibres of trigeminus are necessary so as sufficiently to irritate the asthma centre of the medulla oblongata; or the reason may be a want of predisposition in the central nervous system of the animals experimented upon, so that the irritations of the mucous membrane were too slight to call forth the cramp of the respiratory muscles which causes asthma. Without being able to give any decided proof for either opinion, one may, by analogy with other physiological experiences, be allowed to accept the latter explanation as correct, and to seek the cause of the negative result which all attempts to cause experimental asthmatic attacks from the nose hitherto have given, in the impossibility of causing a sufficiently increased central reflex irritability in animals.

Clinical Experiences as regards the Relationship between Asthma and Diseases in the Cavities of the Nose.

I shall in this section give an account of my personal clinical experience of this subject during the last five years.

Before giving the details of cases, it is necessary to remark that what is mentioned as Asthma in the following cases belongs to the group of symptoms mentioned, amongst others by *Niemeyer* in his "Lehrbuch d. speciellen Pathologie und Therapie," 9th edition, 1874, p. 91. It consists in a sudden difficulty in breathing, which comes in separate attacks, with free intervals between. They sometimes begin suddenly, sometimes are preceded by prodroma, which in the present cases generally originate from the mucous membrane of the nose

(sneezing, etc.), generally they come during the night, sometimes also in the daytime. When they occur at night, the patient wakes up, generally shortly after he has fallen asleep, with a feeling of fear and of pressure across the chest. Breathing becomes difficult, particularly expiration which is considerably lengthened. The patient has to sit up in bed, or in more serious cases to get up, as it is impossible for him to remain in bed, and is sometimes obliged to spend the greater part of the night sitting in a chair until the attack, towards morning, gradually disappears. The attacks often begin with a cough, or at any rate it comes shortly after the attack has begun, and is at first very irritating, dry and tiring, later on looser, and a little white secretion is coughed up, in which *Curschmann's* spiral threads and *Leyden's* crystals are often found.

If one has an opportunity of examining the lungs, it will be found that they are more or less enlarged, but contract again and occupy their natural position, except in cases where the asthma is very old, and where the intervals between the attacks are not quite free; in these cases the continually repeated attacks have caused chronic emphysematic and bronchitic alterations in the lungs; in this respect the cases differ very much. It is not seldom that the attacks occur only at night, and are entirely over by the morning; or the patient feels asthmatic upon getting up in the morning, but is quite well after a few hours have elapsed. Such nocturnal attacks may occur every night for a long time. In other cases there are typical asthmatic attacks, which occur suddenly, for example during the night, last continuously during several days, and in a few days more gradually disappear, but in these cases also the attacks are generally worst at night. These two clinical forms of nervous asthma may vary in many ways, of which the Tables will give several examples.

Besides the typical asthmatic attacks, some patients complain

of a feeling of suffocation or attacks similar to asthma, that is, they complain of a sudden want of breath, generally in the middle of the night, whereas the typical asthmatic attack is not developed. I have accepted these phenomena as an abortive form of asthma, caused perhaps by a quick weak transitory cramp of the respiratory muscles. A passing and momentary closing of the nose, through swelling of the cavernous tissue in the turbinated bones, may cause a momentary feeling of suffocation, but this disappears directly upon drawing a gasping breath, and can therefore hardly be the cause of an uneasy feeling of oppression which often lasts several hours after the patient is awake and has sat up in bed.

It is possible, that in these cases one has to do only with a reflex spasm of the bronchial muscles.

Something similar must also be considered as the cause of those cases in the Tables where there is a continual feeling of oppression on the chest, although there is *perfectly free passage through the nose*, and where the difficulties in breathing disappear the moment that some polypes have been removed. In these cases we must not consider the difficulties in breathing as the result of a deficient respiration through the nose, for the polypes are so small and sit so high up that there is free passage for a sufficient stream of air through the other part of the nasal cavity. We may, on the contrary, considered the sudden disappearance of the heavy oppression on the chest, as the cessation of a spasm, which has been called forth by reflex action from the nasal mucous membrane by the polypes.

These asthmatic attacks must be considered as sub-departments of the real Asthma, and this supposition is authorised by the fact, that several patients have these feelings of oppression during the intervals between their attacks of typical Asthma; the pathological substratum is the same in both cases, there is only a difference in the degree of strength of the spasm.

ASTHMA AND NASAL POLYPES.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
1	1883 Oct. 10.		22 yrs.	Has during a year and a half had nasal symptoms. Has attacks of suffocation shortly after falling asleep at night. A large mucous polype in the right side of the nose growing from the middle part of the middle turbinated bone.	After removal of the polype the attacks of suffocation disappeared.
2	1884		17 yrs.	For a long time nasal catarrh every now and then; wakes up in the middle of the night with asthmatic attacks. Polype in the left side of the nose, proceeding from the middle turbinated bone.	Polypes on the left side removed. Nothing remarked as to the result.
3	March 15	55 yrs.		Has always suffered from coryza. Frequent asthmatic attacks at night, so that he has to sit up in bed. Has formerly had polypes removed which improved the asthma. Has also a tickling cough.	Has several times been completely cured of asthma and the cough, but the symptoms return when the polypes grow out again. Is still under occasional treatment.
4	July 29.	64 yrs.		During 15 years polypes of the nose. Suffers from asthmatic attacks and a dry tickling cough.	After removal of the polypes he was entirely cured. Was well in 1887.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
5	Sep. 5.	25 yrs.		Has from earliest childhood suffered from coryza, 4 years ago, during a cold, a single strong asthmatic attack; 2 years ago he began to get asthmatic attacks at night a few hours after he had fallen asleep. They developed gradually in the course of a quarter of an hour, and would last for several hours. As accidental causes may be mentioned: Heavy meals, walking against the wind. The attacks were stopped by means of iodide of potassium (but only combined with ipecacuanha). Compressed air also gave relief. The attacks are worse in summer, disappear entirely in winter. They are so strong that he cannot stand on the floor. During an attack of otitis media the asthma ceased entirely. There are numerous mucous polypes on both sides. On the left side a narrowness caused by deviation of septum and a bony bridge between septum and the lower turbinated bone.	The asthma disappeared entirely, after removal of the polypes and treatment of the nasal catarrh. It gradually returned during the course of a few months. He was under treatment of Prof. Hack in Freiburg, who, amongst other things, removed the bony bridge between the septum and the inferior turbinated bone. He has since then been well, excepting symptoms of catarrh and beginning asthmatic attacks in the early summer, but a short local treatment of the nose has always been able to stop these attacks entirely. Last treated in the spring of 1888. Has also taken tonics, bodily exercise, and used cold water treatment.
6	Sep. 22.	40 yrs.		Has for 2½ years had obstruction of the nose, six months afterwards asthmatic attacks at night, which begin with strong attacks of coughing, never asthma in the day-time. Local treatment of the nose increases the asthma for 4 or 5 days. Numerous mucous polypes and swelling of the middle and lower turbinated bones on both sides.	Removal of the polypes and galvano-cauterisation of the hypertrophies of the mucous membrane of the lower turbinated bones improved the asthmatic attacks, and at last made them disappear entirely, but they returned after some time had elapsed.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
7	Dec. 22.	42 yrs.		During 8 years coryza and obstruction of the nose, at the same time very strong asthmatic attacks which are worse at night; can last up to 5 hours, and prevent him from working. Numerous mucous polypes in both sides.	After removal of the polypes, the asthma and cough disappeared. The catarrh and polypes have since returned but have again been cured.
8	1885 May 5.		50 yrs.	For 2½ years obstruction of the nose, specially the right side. For 5 years inclined to catarrh accompanied by asthmatic attacks, which are worst during the night, which often has to be spent sitting up in bed. In day-time short of breath. The attacks come about every third week and last a few days. Worst in winter. Compressed air gives a passing relief. Mucous polypes in both sides.	After removal of the polypes from both sides of the nose the asthmatic attacks improved.
9	Feb. 11.	35 yrs.		For 5 to 6 years suffered from obstruction of the nose combined with asthmatic attacks, specially at night, but also in the day-time. Numerous polypes on both sides.	Polypes removed. Result unknown.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
10	Sep. 15.		39 yrs.	Has formerly been well, but has been weakened by pregnancies following very close upon each other, has also nursed the children herself. For three years daily attacks of coryza. Also asthmatic attacks at night, for the last half year also in day-time. They begin 1 hour to 1½ hours after she has fallen asleep, last a few hours and disappear towards morning. At the same time she coughs and brings up white slime with Curschmann's threads. The attacks are independent of the season, but have been more frequent after the last pregnancy. The asthma is worse for a few days after every operative treatment of the nose; even in the free intervals, asthma and rales in the chest can be called forth by operative treatment of the nose. Probing of the polypes on the left side causes a violent cough. Stethoscopic examination gives numerous sibilant rales in the base of the lungs, during the asthmatic attacks also enlargement of the boundary of the lungs.	After removal of the polypes and galvano-caustic treatment of the mucous membrane of the turbinated bones, the asthma disappeared. It returned but was improved by renewed local treatment of the continually returning polypes. Lately a chronic pneumonia of the apex of the lungs has developed and made the symptoms rather indistinct. Saw her last on Oct. 1, 1888, and she had then not been under treatment for 5 months. Both asthma and cough are much better. A slight recurrence of the polypes on the left side at the posterior end of the middle turbinated bone. Touching them with a probe causes a violent tickling cough.
11	Oct. 17.	43 yrs.		Very nervously disposed, and in a very nervous state. Suffers from sudden attacks of fear, accompanied by difficulty in breathing. The attacks are worst when he has a cold in the head. During the attacks the nose is obstructed. Sneezing gives great relief. Large mucous polypes in the left half of the nose, in the right side a swelling of the mucous membrane.	Polypes removed and the mucous membrane treated wtth the galvano-cautery, after which the attacks disappeared. At the same time tonics. Relapse later.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
12	1886 Jan. 20.		40 yrs.	For 10 years catarrh, at the same time asthmatic attacks accompanied by bronchitis. The first few years they came only at night, in the later years also in day-time, but in a less degree. Iodide of potassium relieved the asthma. Both sides filled with mucous polypes.	The polypes were removed from both sides, and the asthma disappeared. Later recurrence.
13	Jan. 22.		19 yrs.	Has from childhood suffered from asthmatic attacks. Three years ago, after the whooping-cough, they became worse, always came at night, lasted two days, returned after 3 to 5 weeks. At the same time whistling and rales in the chest. Coughs and brings up tough slime. Suffers from catarrh, sneezing and obstruction of the nose, does not know if the nasal symptoms are worse during the asthma. Small low rooms cause asthma. It is worst in winter. The smell of fried fish calls forth strong asthmatic attacks which last a few hours. The attacks can be stopped by cocaine tampons. In the right side of the nose several mucous polypes hanging down from the free edge of the middle turbinated bone. Besides this swelling and redness of the mucous membrane, specially of the lower turbinated bone.	The polypes were removed and the chronic rhinitis treated with chromic acid and galvano-cautery. After that she was cured. But every time she has a cold in her head there are small abortive attacks of asthma which soon pass over. Last heard of in 1888, when the result seemed to be good and stationary.
14	March 15	69 yrs.		Has for 3 weeks suffered from difficulty in respiration, which showed itself in such a way, that just as he was falling asleep, he would start up and gasp for breath. A large mucous polype hanging down from the middle turbinated bone.	Polypes removed. Result unknown.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
15	July 19.	29 yrs.		Treated in the second division of the town hospital for bronchitis and emphysema. Has for several years had intermittent obstruction of the nose and nasal catarrh. At the same time asthmatic attacks, worst at night. Numerous mucous polypes of the nose and hypertrophy of the cavernous tissue on the inferior turbinated bones.	After removal of the polypes and the hypertrophied mucous membrane on the lower turbinated bone, the asthma disappeared. Two months after the asthma and polypes returned.
16	July 16.	70 yrs.		Has always suffered from catarrh. Operated for nasal polypes 15, 10 and 4 years ago. Suffers from tickling cough and difficulty in breathing, specially in a reclining position and towards morning. Also bronchitis. Numerous nasal polypes.	Polypes removed, during which treatment the cough and difficulty in breathing grew worse. Left for home shortly after. Result unknown.
17	Sep. 21.	41 yrs.		Has from childhood suffered from chronic catarrh. For the last year asthmatic attacks at night, combined with tickling cough. He has to walk up and down the room at night. The asthma is made worse by every operative treatment of the nose and by insufflation of nitrate of silver. Numerous mucous polypes.	Removal. Later recurrence of polypes and acute attacks of coryza. At the same time asthma which improved on removal of the polypes and treatment of the diffuse irritation of the mucous membrane with nitrate of silver and chromic acid. Still now and then under treatment.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
18	Oct. 12.		40 yrs.	Has for 1½ years had rhinitis combined with intermediate attacks of asthma, specially in a reclining position; cannot lie horizontally. Has for several years suffered from chronic bronchitis and diffuse rales in the chest. Between the attacks shortness of breath. The attacks come both by day and night. Mucous polypes and swelling of the mucous membrane.	Polypes removed. The mucous membrane treated with chromic acid and galvano-cautery. Cure, but with later recurrence and further treatment. At the same moment that a polype was removed on the left side a continual and very disagreeable pressure on the epigastrium disappeared.
19	Nov. 23.		39 yrs.	For 5 to 6 years chronic catarrh, at the same time continued shortness of breath, sometimes asthmatic attacks which come regularly either at 8 in the evening or 4 in the morning. Accompanied by coughing, expectoration of tough white slime, which gives relief. Sneezing also relieves the breathing. A year ago a surgeon removed some nasal polypes, which gave passing relief to the asthma. The asthma always begins with a violent cold in the head. In both halves of the nose petiolated polypes, which proceed from the middle turbinated bone and partly fill the nose.	After removal of polypes the asthma entirely disappeared, returned after a catarrh, and was again cured. Nov. 16, 1887. Recurrence. Removal of small polypal remains. Has been well since, but when he catches cold he has small passing attacks of asthma. Jan. 1, 1889. No polypes. Free from catarrh and asthma.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
20	1887 March 16		35 yrs.	Catarrh for 10 years, at the same time violent asthmatic attacks accompanied by coughing and sneezing cramp. Can neither move nor lie down during the attacks, but sits helpless in a chair. The attacks last as long as six weeks. In the intervals she is all right in day-time, but has symptoms of asthma at night. During the attacks the nose is obstructed and she sneezes very much. During the strong attacks the asthma is equally bad day and night. She is very weak. Stethoscopic examination gives normal result between the attacks. In both sides of the nose numerous polypes.	Removal. At the same time tonics. The asthma disappeared. On account of recurrence about 6 months after, she was again operated on for polypes, and the mucous membrane treated with chromic acid. After that good result.
21	April 6.		25 yrs.	Has for many years had catarrh; 5 to 6 years ago a polype was removed from the left side. Wakes up at night on account of asthmatic attacks, has to sit up in bed. In both sides mucous polypes from the regions about the middle turbinated bone.	Removed. Galvano-cauterisation of the turbinated bones. May 2, 1887. The asthmatic attacks have nearly disappeared. Not heard of since.
22	April 16.	53 yrs.		Catarrh from childhood. Polypes removed 4 years ago. For 7 to 8 years suffered from shortness of breath and asthma at night, so that he has to sit up in bed. Does not cough. Numerous polypes on both sides.	After removal of polypes the asthmatic attacks entirely disappeared. Was well in the autumn of 1888.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
23	May 18.	65 yrs.		Treated for asthma with violent attacks 2½ years ago in the town hospital. Was operated on for polypes, which cured the asthma. Has been well until lately when the nose was obstructed and asthma returned. The attacks are worst at night, some shortness of breath in daytime. Polypes in the neighbourhood of both turbinated bones.	Removal of polypes. 8 days after beginning the treatment the asthmatic attacks were still the same. Not heard of since.
24	June 16.	44 yrs.		Catarrh for 12 to 14 years; sneezes very much, has asthmatic attacks at night, has to sit up in bed, sometimes even to walk up and down the room. The attacks begin about an hour after he has fallen asleep. At the same time he coughs. The attacks are particularly strong when he has a cold. Smoking with saltpetre gives relief. Quantities of mucous polypes in the nose.	Removed. Galvano-cauterisation of the swollen lower turbinated bone. Cure. He has reminders of asthma when he catches cold or has been drinking late at night. Saw him a year after treatment.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
25	June 22.	42 yrs.		For 11 years violent asthmatic attacks at night about an hour after falling asleep, has to get up, they last from 3 to 4 hours. Quite well in day-time. The attacks are very violent. The attacks sometimes begin with catarrh and profuse discharge, but the nasal symptoms are on the whole insignificant. The attacks come as a rule in October to February, and April to September, and are very violent, he has to catch hold of the furniture for support. He himself thinks they are of nervous origin. When he has been to Eaux Bonnes the following winter generally goes better, why he does not know. A stop at Mariensbad or any other place has not the same effect. Overfeeding and constipation make the asthma worse. Smoking several times a day with saltpetre paper prevents the violent attacks. He has a hypertrophic catarrh and several polypes, the size of cherries, in the neighbourhood of the middle turbinated bones.	Removal of polypes. Galvano-cauterisation of turbinated bones. The treatment was purely experimental. No improvement. The asthma was just the same in January, 1889.
26	Nov. 28.		46 yrs.	Strong catarrh for the last few years, frequent obstruction, specially at night, in a reclining position, accompanied by asthmatic attacks, rare in daytime. Has to sit up in bed, sometimes to walk about the room. Very nervous, has 12 children, for the last few years great loss of blood per vaginam. Mucous polypes and cystic middle turbinated bones on both sides.	Removal. Cure. Recurrence later, and again treated with good result.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
27	1888. Feb. 16.		58 yrs.	Catarrh for 1 year. When her nose is obstructed she has great difficulty in breathing as if a heavy weight lay on her chest, can lie only on her right side, for then there is best passage of air through the nose. Polypal hypertrophied mucous membrane of middle and inferior turbinated bones. A large mucous polype in the upper and posterior part of the left side.	After removal of polypes the difficulty in breathing was greatly relieved, and the weight on the chest disappeared at the same moment that a large polype in the left side was removed; it must be remarked that the nose was not obstructed beforehand.
28	May 11.	52 yrs.		Catarrh for the last year, obstruction, especially of the right side. During the last three months asthmatic attacks together with strong attacks of bronchitis. Asthma both day and night. In the left side, particularly towards the back of the nose, numerous mucous polypes.	Removal. The asthma disappeared. The result was, so to say, immediate after removal of the polypes. He had a pleasant feeling of relief across the chest when the polypes were removed. $4\frac{1}{2}$ months after he was still quite well.
29	May 29.	42 yrs.		For about 5 years coughing and asthmatic attacks at night a few hours after going to bed, has to sit up in bed. The asthma is worst when he has a cold in his head. Considerable inflammation of the lower turbinated bones. Polypal degeneration of the lower turbinated bones.	Removal. Left for home 3 days afterwards.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
30	July 1.	57 yrs.		28 years ago, after a strong attack of bronchitis, he had asthmatic attacks which have since returned with catarrh. For the last 12 years he has been very much inclined to nasal catarrh, which generally ends in asthma. The asthma is worst at night and towards morning. Smoking with stramonium, saltpetre and lobelia gives relief. He always contracts asthma when walking in a strong wind, has tried Waldenburg without any result. Constipation makes the asthma worse, aperients give relief. Last summer was very bad for him, the winter before good. Diffuse rales in the right lung, otherwise nothing abnormal. Both sides of the nose filled with numerous polypes.	In the course of 6 days all the polypes were removed, but the asthma was not improved. He left for home directly after. According to information from the patient in 1889, the removal of the polypes has had no influence at all upon the asthma.
31	Aug. 8.	38 yrs.		Very nervous and nervously disposed, suffers from sleeplessness. For 1 year and a half, chronic catarrh and obstruction of the nose on the slightest change of temperature. Shortly after the beginning of the catarrh he had a severe bronchitis with asthmatic attacks which lasted three months. Went to Italy where he had another attack of bronchitis and asthma. He has never been quite free from asthma since. It is worst at night, sometimes also very bad in daytime. During the attacks the nose is obstructed, and there is an abundant watery discharge, he has to sit up in bed. Sneezing relieves the asthma. Removal of polypes from the nose relieves the attacks but the asthma returns after a few months. Compressed air gives relief. The asthma is also improved by cocainisation of the nose and faradisation of nn. vagi and phrenici. The outlines of the lungs are extended, no rales, at present no asthma. In both halves of the nose, mucous polypes near the middle turbinated bones, tremendous swelling of the erectile body, septum and the turbinated bones are grown together.	The treatment was interrupted before the bony bridge was removed, and before this was done the polypes which lay behind could not be entirely removed. Jan. 15, 1889.—Has not been under treatment since the beginning of Sept. 1888, and since then been well as regards asthma; he has lately, however, had attacks of catarrh at night, and the asthmatic attacks have at the same time begun to return. It must be remarked that this important improvement of the asthmatic attacks has had no influence upon his general nervous state, which is worse if anything, especially as regards sleeplessness. In March, 1889, he was declared cured for catarrh and asthma.

ASTHMA AND CHRONIC RHINITIS.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
32	1883. July 28.		25 yrs.	Violent asthmatic attacks after syringing the nose with a lotion of sublimate (1 pro mille). The attack lasted for several hours. Was very nervous. Suffered habitually from violent attacks of catarrh with sneezing and profuse discharge.	
33	1884. June 26.		18 yrs.	Has sometimes at night a feeling of suffocation, combined with obstruction of the nose and swelling and redness of the outer nose. Most frequent during menstruation. Very nervous. Inferior turbinated bones very swollen.	Was cured by insufflations of nitrate of silver in the nose, together with strengthening diet.
34	Nov. 16.		40 yrs.	For 5 years typical attacks of catarrh (hay fever) and asthma. 8 to 10 attacks every year, entirely free intervals. During the attacks, lower turbinated bones so swollen, that they close up the nose. Touching with a probe causes violent sneezing, cauterisation of a small polype on the foremost end of the left middle turbinated bone causes violent attacks of coughing. The attacks end with a capillary bronchitis.	After repeated cauterisation of the mucous membrane of the turbinated bone with chromic acid, she was definitely cured. Was well in 1886.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
35	Nov. 21.	19 yrs.		At the age of 7, he woke up suddenly one night with a violent asthmatic attack. Similar attacks several times a year. Worst in winter. The attacks begin with catarrh and obstruction of the nose. When at home in the country, the attacks are much worse than in town. When he has the attacks he is generally also short of breath in daytime. Considerable hypertrophies of the mucous membrane of the lower turbinated bones.	Repeated cauterisations with chromic acid cured the asthma completely. Saw him in 1889.
36	Dec. 10.	19 yrs.		Has for 8 years suffered from asthmatic attacks which come specially in winter, and always in connection with a catarrh which is the primary cause. They come every 3 to 4 weeks and generally lasts from 2 to 4 days. In summer, he is sometimes free for several months. Has tried compressed air, which gave relief at the time, but afterwards the attacks were worse; during the attacks Waldenburg's apparatus gave relief. Between the attacks there are a few diffuse rales in the lungs.	After treatment of the swollen turbinated bones with chromic acid and galvano-cautery he was cured, but the treatment had to be repeated several times as the asthma at first was inclined to return.
37	1888.	28 yrs.		During a treatment for epistaxis, caused by enlarged vessels of septum nasi, the place was cauterized with chromic acid, which caused violent attacks of asthma particularly at night. The asthmatic attacks disappeared a few days after when the reaction was over.	

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
38	March 2.	27 yrs.		Feels asthmatic and short of breath every time he has an acute nasal catarrh. Suffers very much from one-sided headache which changes from one side to the other, and also from a tickling cough.	The attacks disappeared after treatment of the swollen and irritated turbinated bones with chromic acid.
39	Sept. 29.	45 yrs.		For half a year asthmatic attacks at night and shortness of breath in the morning after getting up. Violent tickling cough and catarrh for several years combined with frontal headache. Has been treated for many years by specialists for nervous diseases.	After galvano-cauterisation of the swollen turbinated bones, the asthma and the nervous symptoms disappeared.
40	Oct. 3.	31 yrs.		7 years ago a first attack of asthma after a tiring run, in the following winters similar attacks. 3 years ago after continued fever, typical attacks of asthma every night between 3 and 5 o'clock, in the daytime an indefinite feeling of oppression. Hard bodily and mental work relieved the attacks, and smoking with saltpetre paper and internal use of iodide of potassium. Worse during attacks of bronchitis. For the last year he has felt a decided connection between the nose and the asthmatic attacks which begin with sneezing and watery discharge. During the attacks, which now come in the morning after the patient was up, Curschmann's threads were coughed up. Polyuri was combined with the asthma and obstruction of the nose. Once or twice the introduction of a tampon of cotton wool into the nose caused a passing difficulty in breathing.	After local treatment of the swollen lower turbinated bones with chromic acid and galvano-cautery, the nasal symptoms disappeared, but the asthma which seemed to be better directly after the treatment, has, according to a statement made in 1889, not improved since. At the beginning of the treatment, the asthmatic attacks were less violent.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
41	Oct. 5.	12 yrs.		From earliest childhood inclined to bronchitis. For the last 1½ years continual shortness of breath, increasing to typical asthmatic attacks, which come with an interval of a few days, and only at night a few hours after he has gone to bed, generally with preliminary symptoms during the day before. The attacks are violent, accompanied by violent coughing and expectoration of tough slime, sometimes also by vomiting. During the attacks diffuse rales in both lungs, not so much between the attacks. These are relieved by iodide of potassium, faradisation of the pneumogastric nerves likewise cocainisation, by use of which he has sometimes been able to interrupt the attack. The lower and middle turbinated bones very much swollen. Very nervous and excitable.	After thorough treatment of the swollen turbinated bones the asthma improved and partly disappeared, but returned again several times. According to his brother, who is a physician, and who wrote to me on Jan. 13, 1889, the boy's condition is much better than before, but he still often has to smoke saltpetre to prevent the attacks. The violent attacks are now very rare, and the asthma principally appears as a mild dyspnœa, which does not interfere with his daily occupations; it is never, as formerly, accompanied by expectoration of slime. He uses cocaine on tampons of cotton-wool, especially in the morning when he wakes up with dyspnœa and has to be well before going to school. Psychical effects are of great importance. Sometimes he gets an erysipelatic redness and swelling of the outer nose, but this disappears in the course of a few days. Bromide of potassium in an infusion of ipecacuanha relieves his asthma.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
42	Nov. 19.	53 yrs.		After many years inclination to catarrh, he suddenly, about three months ago, woke up one night with an asthmatic attack and expiratory difficulty in breathing; had to get out of bed for a couple of hours. Used iodide of potassium with good result. No attack since. The catarrh was not particularly strong during the attack.	
43	Dec. 14.	50 yrs.		Has for several years suffered from obstruction of the nose combined with supra-orbital neuralgia and asthmatic attacks, which often disturbed his rest at night.	After treatment of the greatly swollen turbinated bones with chromic acid the asthmatic attacks disappeared. A later attack necessitated renewed treatment.
44	Dec. 16.	45 yrs.		A fortnight ago a violent nasal catarrh, at the same time nightly asthmatic attacks, very violent and typical, has to walk up and down his room for 4 hours as he cannot endure a horizontal position. At first dryness of the throat, later on watery discharge and sneezing. Wakes up all right in the morning, slight feeling of oppression during the day. Pencilling of the mucous membrane of the nose with a 10 per cent. solution of cocaine interrupts a strong asthmatic attack. Blowing of lapis powder into the nose causes a violent asthmatic attack. These are made worse by local treatment of the nose. The inferior turbinated bones very much swollen, they touch the septum. No bronchitic phenomena between the attacks.	After local treatment of the mucous membrane of the nose with the galvano-cautery he was cured for asthma. Was well in the autumn of 1888.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
45	Dec. 21.	52 yrs.		Has been treated for emphysema and bronchitis in the town hospital. Has for the last few years had nightly asthmatic attacks during the winter, wakes up with a cough shortly after going to sleep, gets asthma, and has to sit up in bed. After two hours the attacks generally leave off, sneezes a good deal during the attacks, nose obstructed. Neither Leyden's crystals nor Curschmann's threads in the expectorations.	The strongly hyperplastic rhinitis is treated with the galvano-cautery. No result observed.
46	1886 Jan. 18.	44 yrs.		Has for several years had asthmatic attacks, which at first came only at night, later on also in day-time, but they were still worst at night, accompanied by coughing and tough expectoration. The nose is obstructed. Sneezing relieves the asthma. The mucous membrane of the turbinated bones is hypertrophied.	Treatment of the mucous membrane of the nose with chromic acid, after which the asthma disappeared.
47	Jan. 27.		43 yrs.	Catarrh for 1 year. For half a year nightly asthma, not every night but only when she, during the day, has been exposed to cold air. Sneezing relieves the asthma. Large swollen lower and middle turbinated bones.	Treated with chromic acid and insufflation with nitrate of silver, after which the asthma disappeared. Later recurrence again treated with success.
48	May 18.	35 yrs.		He is very nervous. For about 10 days, after a bad cold with nasal catarrh, violent attacks of coughing and attacks of want of breath, accompanied by a feeling of oppression and fear. The nose is entirely closed by the swollen lower turbinated bones.	Local treatment of the turbinated bones, together with general tonics. Cure. Was well in 1889.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
49	June 12.		34 yrs.	For a year and a half oppression on the chest, combined with difficulty in breathing when the nose is obstructed. The nose is obstructed when she smells fresh paint, varnish, or is in a circus (inhalation of dust). At the same time she has a feeling of pressure across the eyes and the bridge of the nose. Rather nervous.	Tonics. Cauterisation of the swollen turbinated bones with chromic acid. Cure. Was well in the autumn of 1888.
50	June 16.		40 yrs.	For 1 year strong catarrh. Asthmatic attacks at night, which occur between 3 and 4 o'clock; cannot lie in bed. At the same time an exhausting cough with a little expectoration. Iodide of potassium gives relief. Galvano-cauterisation of the right middle turbinated bone causes a violent cough, after that momentary relief of the shortness of breath and pressure on the chest. Insufflation of nitrate of silver can at any time of the day cause typical asthmatic attacks with capillary bronchitic symptoms.	Entirely cured by treatment of the mucous hypertrophies on the lower and middle turbinated bones with chromic acid and galvano-cauterisation. Every time the catarrh returned there were typical asthmatic attacks. Jan. 1, 1888. Has, since treatment in July, 1887, been entirely free from catarrh and asthma.
51	July 5.	39 yrs.		Suffers from bronchitis with strong asthmatic attacks, which begin with catarrh and a cough; the nose is then obstructed. Is worse at night, has to get out of bed. Diffuse sibilant rales in the lungs. After pencilling of the nose with menthol the respiratory difficulties were greatly relieved.	He was cured after treatment of the greatly swollen turbinated bones with galvano-cauterisation, and the propensity to catarrh disappeared. Recurrence later.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
52	Sept. 1.		48 yrs.	Is very nervously predisposed, suffers from epilepsy now and then, for 3 to 4 years propensity to catarrh, at the same time asthmatic attacks, which are worst at night but also come in daytime. The smell of hay causes asthmatic attacks. Swollen turbinated bones, their size differs a good deal.	Great relief from rhino-surgical treatment; after a bad cold recurrence, and she has according to information, November 29, 1888, now continual catarrhs and bronchitis, but is not at present willing to begin a renewed treatment.
53	Nov. 9.		12 yrs.	For 8 years asthmatic attacks at night, especially towards morning. Generally begin between 1 and 2 o'clock at night. Wheezing respiration accompanied by piping rales, they sometimes last for several days; sudden attacks of sneezing, with watery discharge. Rales in the lungs. During the attacks the lungs are abnormally expanded, between the attacks normal. The asthma improved when in Copenhagen, and by use of compressed air and saltpetre paper. Iodide of potassium gives no result. The lower turbinated bones are swollen and altered in size.	Galvano-cauterisation of the right lower turbinated bone. Chromic acid on the left lower turbinated bone. According to information, January 1, 1889, she has been decidedly better after the rhino-surgical treatment, the attacks are much shorter and milder.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
54	Sept. 17.	23 yrs.		Treated in the town hospital for bronchitis and emphysema. Has for several years suffered from asthmatic attacks; at first once or twice a year, now oftener. The attacks begin with catarrh and sneezing cramp; generally come at night, and disappear in the course of the forenoon; he is well in day-time, sometimes has to walk up and down the room at night. Hypertrophy of both middle and inferior turbinated bones, the nose almost completely obstructed.	After galvano-caustic treatment both asthma and catarrh ceased. Whilst formerly he generally had one attack a week, he had when last heard of not had any attack for a month and half.
55	Dec. 17.	27 yrs.		For the last 4 years he has been unable to lie on his right side without getting an attack of asthma of several hours' duration. Has sometimes to rise and stand at an open window to get his breath. During the attacks both sides of the nose are obstructed. Is best in low lands. Has been treated by several neurologists abroad, amongst others by Charcot, without results. Has once before been cauterised with chromic acid on lower turbinated bones with a good result for some time. When he is on his right side, he has violent pricking pains in the right side of his chest. Normal stethoscopic.	Great improvement, nearly entire disappearance of the attacks after galvano-cauterisation of the greatly swollen lower turbinated bones. The pain in the chest disappeared after galvano-cauterisation of the right concha infima.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
56	1887 Feb. 10.	48 yrs.		For 20 years he has once every year, and always about the 14th of June, a very violent asthmatic attack, which begins with catarrh, sneezing and epiphora. The attacks are so violent, that he sits helpless in a chair day and night, incapable of moving. The nose is never obstructed, but there is profuse discharges; has to keep indoors 5 to 6 weeks from 14th of June, to the end of July. The attack is always sure to begin when he is in the vicinity of hay. Inhalation of dust and strong sunshine causes sneezing in his asthmatic period.	After local treatment of the irritated and swollen mucous membrane of the nose, I did not succeed in preventing the attack the first year, the reason for this being perhaps, that the local treatment of the nose was begun at the end of May, so that the reaction was not over by the time the attack began (the night from 13th to 14th of June). *But the next year* (1888), *the attack for the first time in 20 years, did not come.*
57	Feb. 28.		18 yrs.	For about the last year her nose is always obstructed when she is in a horizontal position, at the same time she has a nervous feeling of oppression, so that she has to sit up in bed. There is no typical asthma.	After the swelling of the lower turbinated bones had been reduced with galvano-cauterisation, she was cured.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
58	May 18.	42 yrs.		Catarrh for a long time. During the last year also nocturnal asthma, which begins when he has slept one or two hours. Has sometimes to sit up in bed. Sneezes very violently, profuse watery discharge.	After treatment of the mucous membrane of the turbinated bones with chromic acid he was cured. June 23, 1888. Has been well and nearly free from asthma, 6 weeks ago catarrh and the asthma returned; again cured by cauterisation with chromic acid.
59	June 15.		19 yrs.	Since the age of 10 years, asthmatic attacks, which come when she catches cold; sometimes last from 3 to 4 days; generally not so long. Together with the asthma, attacks of coughing and expectoration of tough slime. Worst in summer, sneezing relieves the asthma. Inhalation of "asthma powder" gives relief. Diffuse piping rales in the base of both lungs, the contours of the lungs are expanded.	Seen only once.
60	July 8.	32 yrs.		From childhood disposed to catarrh. From the 14th to 15th year violent attacks of asthma at night, sometimes also in daytime. The attacks have now disappeared, except when he has a cold in his head when he suffers from asthmatic attacks which lasts 3 to 8 days so that it interferes with his work.	After removal of the greatly hypertrophied mucous membranes of the inferior turbinated bones by means of a cold snare, the catarrh and also the asthma disappeared. Was well in 1889.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
61	June 26.	21 yrs.		Has from the age of 2—3 years suffered from asthmatic attacks, which come specially at night. Strong attacks with intervals of several months, and during these intervals symptoms of lighter attacks. Coughing and tough expectoration. During the attacks the lungs are enlarged, between the attacks pretty nearly normal. Diffuse sibilant rales in both lungs. The attacks are worst when he has a cold, and always begin with nasal catarrh. Sneezing, iodide of potassium and saltpetre paper give relief; indigestion and small rooms bring on the attack. Faradisation of nn. vagi and pencilling of the throat with cocaine relieve the asthmatic attacks.	In spite of several months local treatment of the nose, which reduced the swelling and irritation of the mucous membrane of the nose and throat, there was no immediate improvement. Prescribed tonics, cold washings, gymnastics, etc. The 11th January, 1889, he stated that the attacks had been much milder, they come in the morning when he gets up, and can be stopped by using iodide and saltpetre paper. He has had several very bad colds without getting asthmatic attacks, and that was formerly impossible.
62	Sep. 30.		28 yrs.	During 4 to 5 years nasal catarrh combined with nocturnal asthma, has to sit up in bed to get her breath. Short of breath in day-time, also if she exerts herself physically. These attacks come only when she has a strong nasal catarrh with epiphora and sneezing cramps.	The catarrh disappeared after local treatment with chromic acid and insufflation of nitrate of silver. A small polype was removed from the right middle turbinated bone. According to a statement (January 1st, 1889), she has been well since the treatment, and has had neither asthma nor catarrh.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
63	Oct. 3.		15½ yrs.	Catarrh for 5 years. During the last two years at the same time asthmatic attacks at night, has to sit up in bed for ½ to 2 hours to get her breath. Coughs up tough white slime. During the last few months asthmatic attacks both day and night. Worst in winter. Smoking with saltpetre gives relief.	The large swelling on the inferior turbinated bones treated with chromic acid. According to statement, Jan. 10, 1889, she has been much better since the treatment; she still catches cold easily, but the asthmatic attacks are not as violent as formerly; she can walk more than 4 miles without being overfatigued.
64	Oct. 6.		52 yrs.	During 8 years, catarrh, which comes in attacks. During these she has violent asthmatic attacks at night, so that she sometimes has to spend the night in an arm chair. Cannot lie down. Worst in winter.	After treatment of the mucous membrane of the nose (which was red and swollen) with chromic acid, and removal of a small polype from the right middle turbinated bone, she was cured. According to information in 1888 she is still well.
65	Nov. 7.	31 yrs.		As a child asthmatic attacks at night, which disappeared as he grew up. Every time he catches cold he has heaving breath, lengthened expiration and sonorous piping rales in the chest; the nights are now free.	After removal of an obstructing prominence from the septum by means of the galvano-cautery, and the swelling of the mucous membrane was reduced, he was much better. According to information in 1888 he has been better since.

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
66	1888. Jan. 8.		22 yrs.	Asthma from the age of 5 years, only free from her 12 to 13 years. The attacks were worse before than after the age of puberty; they are worst in the periods of menstruation, come suddenly both by day and night; she sometimes has to spend the night sitting up in bed or on a chair. During the attacks violent coughing generally combined with violent sneezing, obstruction of the nose, and piping and whistling sounds in the chest. Strong attacks of sneezing give relief to the asthma. The attacks are brought on by walking against the wind, and by psychical influence such as joy or grief. She is very slightly built, nervous, cries easily. Stethoscopy normal. Small swelling and redness of turbinated bones.	An experimental local treatment combined with use of tonics has no effect npon the asthma.
67	May 8.	53 yrs.		Inclination to catarrh and asthma at nights, especially in his youth. The patient, who was a chemist, could not have anything to do with ipecacuanha, which always caused catarrh and asthma, and therefore always had to let someone else make up the ipecacuanha prescriptions. During a stay of several years in the tropics he had not suffered from asthma. Great swelling and redness of the mucous membrane of the nose.	

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
68	June 20.	30 yrs.		Has from his 13th to 25th year suffered from typical asthmatic attacks, specially at night. Since the summer of 1887 asthma has returned, coming generally between 2 and 6 at night. As bringing on the attacks he mentions (1) an overfilled stomach, (2) sexual indulgence, (3) strong nasal catarrh. The patient, who is intelligent and has carefully observed his own symptoms, says he is sure that the asthmatic attacks do not originate entirely from the nose, for in his childhood he has had asthma without catarrh, but he believes the catarrh to be an important factor in bringing on the asthma.	Was not treated for asthma.
69	July 2.	34 yrs.		Now and then obstruction of the nose, combined with a feeling of suffocation; pressure across the chest and a nervous feeling, this is only in a reclining position and always accompanied by obstruction of the nose, in which there is a large chronic swelling of the mucous membrane.	Seen only once.
70	July 28.		24 yrs.	After a delivery she had violent asthmatic attacks with sonorous rales in the chest and difficult breathing. The attacks are worst at night, and she sometimes has to sit up in bed. At the same time catarrh and sneezing. Very nervous and anæmic, especially after the last delivery, which took place a fortnight before the asthma got worse. Similar attacks during a pregnancy 3 years ago, but they were not so strong during her last pregnancy.	

No.	Date.	Male.	Female.	Symptoms.	Treatment and its Results.
71	Oct. 10.	21 yrs.		As a child occasional asthmatic attacks. Well from the age of 10 to 13 years, when he fell into the water and caught a violent cold, catarrh and cough, during which asthma developed little by little, and again decreased in the course of a week. Since then often asthma, always brought on by a cold, generally begins at night, he wakes up towards morning and is ill. The attacks last a few days and nights, but are worst at night, disappear gradually. Violent catarrh. During the attacks the left side of the nose is entirely obstructed. Three years ago he was treated with chromic acid and galvano-cauterisation of the nose, after that he was free from asthma for a year, but then it gradually came on again. Has used compressed air for a month, it gave momentary relief, smoking with saltpetre paper also relieves the attacks. During the attacks the borders of the lungs reach the 11th and 12th rib in the back, and there are numerous diffuse rales. Between the attacks fewer rales and the lungs reach only to the 9th and 10th rib. Cocainisation of the left side greatly improves the attacks. The right side of the nose is passable, large swelling of the lower turbinated bone. Left side obstructed by a large firm connection between the septum and the lower turbinated bone.	Successive burning and cutting through of the bony connection on the left side. June 4th, 1889.—He has now a free passage through the nose. The asthmatic attacks came very seldom and are milder and shorter than formerly. Uses tonics, cold water cure, etc.

My material comprises 294 cases of chronic rhinitis and 75 cases of nasal polypes amongst my private patients, and besides these 220 cases of chronic rhinitis and 64 cases of nasal polypes from the clinic at the town hospital, total, 514 chronic rhinitis, and 139 nasal polypes.

Amongst 514 patients treated for chronic rhinitis, 40 had asthmatic attacks (about 8 per cent.).

Amongst 139 cases with nasal polypes 31 had asthma, about 22 per cent., in all 71 cases of asthma.

If we examine more minutely how often the real asthmatic attacks appear, we find that of 71 patients 60 had typical asthmatic attacks, whilst the remaining 11 had only asthmatic symptoms. These statistic reckonings do not, however, always give a correct result for the frequency with which nasal affections are accompanied by asthma, which is best illustrated by the following facts. If the material for examination of the frequency of asthma combined with nasal complaints be taken from my private practice alone, it will be found that of 294 patients with chronic rhinitis 34 were asthmatic, that is about 12 per cent., and of 75 patients with nasal polypes 22 were asthmatic (about 30 per cent.), whilst among 220 cases of chronic rhinitis treated at the public clinic there were only 6 (about 3 per cent.) asthmatic patients, and among 64 cases of nasal polypes only 7 patients had asthma (about 11 per cent.). The following table gives a good view of the proportion:—

	Nasal Polypes.	Of these with Asthma.	Chronic Rhinitis.	Of these with Asthma.
Private Patients	75	about 30 per cent.	294	about 12 per cent.
Public Patients .	64	about 11 per cent.	220	about 3 per cent.
Together . . .	139	about 22 per cent.	514	about 8 per cent.

It will be observed that asthma appears more frequently amongst the private than amongst the public patients. The reason for this may be presumed to be, not only that the conditions for the development of asthma, such as a specially nervous state, are more frequently found amongst the upper classes, but rather that the upper classes more easily seek medical help if their state of health be in any way affected. It is therefore quite natural that the upper classes first reap the benefit of the knowledge of the beneficent result which a rhino-surgical treatment may have in cases of asthma, whilst the lower classes of society do not seek help for their asthma before it has grown so violent that not only their night's rest, but also their daily occupation is disturbed, and even then they generally go to one of the medical departments of some hospital.

Asthma and Chronic Rhinitis.

Asthma appears, as above shown, 40 times amongst 514 patients (25 cases were men, 15 women). With regard to the two sexes the proportion was as follows:—

Of 238 men 25 had asthma, about 10 per cent.
Of 276 women 15 had asthma, about 6 per cent.

Of 514 patients 40 had asthma, about 8 per cent.

in other words the male patients were more disposed to asthma than the female ones. The numbers are, however, too small to draw decided conclusions from, as a great deal may be merely accidental.

In 6 cases there were only "asthmatic-like attacks," in the remaining 34 cases the attacks were typically asthmatic.

These "asthmatic-like attacks" were partly "a feeling of suffocation" now and then at night (No. 33), partly "shortness

of breath" and an "asthmatic sensation" with every attack of catarrh (No. 38). In one case (No. 48) where the patient was a very nervous man, aged 35, the symptoms were "violent attacks of want of breath," accompanied by a feeling of oppression and fear after every attack of catarrh. It must be added that in this case the symptoms may have been attacks of spasms of the glottis.

In 3 cases (No. 49, 57, 69) the symptoms were a strong pressure across the chest, combined with difficulty in breathing. The nose was also obstructed, in two of the three cases (a woman aged 18 and a man aged 34), always when the patients were lying down, and they had, therefore, to sit up in bed or walk up and down the room.

Four of these six cases were cured, after the more or less swollen turbinated bones had been reduced by appropriate treatment, tonics were also ordered in cases where the patient's general nervous state demanded it. In one case nothing is known as to the result of the treatment, one case was not treated at all, as the patient came only once to the clinic.

As regards the remaining 34 patients that had typical asthma we shall first examine their different ages. Two were 12 and two were 53 years old, the rest were pretty equally distributed between these two ages. It is, however, generally the case that the asthma has appeared for a shorter or longer time before the patient came under treatment.

In 2 cases only (No. 32 and 37) the asthma was accidentally developed whilst the patient was being treated. In one case, a very nervous and timorous lady, a typical asthmatic attack was brought on by syringing the nose with a 1 per cent. solution of sublimate, the asthma disappeared after a few hours. In the other case (a working man at a chemical laboratory) there were asthmatic attacks for a few days immediately following a cauterisation of the septum nasi with chromic acid.

In this last case the asthma disappeared as soon as the reaction after cauterisation of the nose was over.

In the remaining 32 cases it is interesting to see that the asthma in 12 cases (No. 35, 36, 41, 53, 59, 60, 61, 63, 65, 66, 68, 71) dated from childhood, had continued through the age of puberty and up to maturity, defying every treatment, sometimes with longer or shorter remissions or intermissions. As regards the duration of the asthma, reckoned up to the time when the patients came under treatment, it varied from 2 weeks to about 20 years. Not a few had suffered from the disease for from 5 to 10 years, and many from 3 months to 5 years.

In many cases the asthma came with intervals, so that in its worst period, which varies from a few days to 6 weeks, it was very violent, both day and night, but the nights always worst. The asthmatic attack, which in these cases was always accompanied by, and generally began with, catarrh and sneezing, nearly always began mildly, increased rapidly, and then had a decided period of decreasing. This kind of asthma was found in 11 cases (No. 34, 51, 52, 53, 56, 60, 61, 63, 66, 46). The frequency of the attacks vary from about 10 a year to one single attack every year (No. 56).

This last attack is very typical on account of its perfectly rythmetical return; for the attack had always begun regularly about the 14th of June.

Journal, No. 56. The patient was a man, aged 48, who in July, 1865, for the first time had a violent asthmatic attack, which in the following 20 years returned every year about the 14th of June. He suffered, during this period, from catarrh, sneezing, and epiphora, and says he could not bear being near hay, for then the nasal symptoms developed intensely in the course of a few minutes, and he also experienced some difficulty in breathing. About the 14th of June he got his asthmatic attack which was so violent that he sat helpless in a chair day and

night without being able to move. Very little expectoration, but a violent feeling of pressure on the chest. After about 6 days the attack ceases, but he is then so exhausted that he is entirely knocked up for the rest of the summer. He can experimentally cause sneezing in the period from the 14th of June to the end of July by merely raking up the earth with a stick. Dust and strong sunshine have the same effect, so that he cannot go out till evening, when the sun is nearly down. During the attack profuse discharge from the nose and violent sneezing. Has to keep indoors from the 14th of June to the end of July, he then begins to feel better and can go out. He is strongly built, well fed, rather pale. Free passage through both nostrils. Symptoms of a chronic rhinitis with hypertrophy of the mucous membrane, specially on the turbinated bones. A local treatment of the nose in the spring of 1887 did not prevent the attack that summer, but that was probably through my carelessness, as the treatment was continued till the beginning of June, so that the reaction was not quite over by the time that the asthmatic attack was due. He was not under treatment during the following year, and in 1888 he was, to his great delight, free from asthma for the first time in 20 years. On the 27th of June he had a slight symptom of approaching asthma, but it was soon over; has since been well, can bear the smell of hay, dust, sunshine, etc., without any inconvenience whatever.

The asthmatic attacks were generally confined to the night, or with a slight feeling of oppression during the forenoon. This was the case with 17 patients (No. 35, 39, 40, 41, 42, 43, 44, 45, 47, 50, 54, 55, 58, 60, 64, 67, 70). In most cases the asthma began directly after they had fallen asleep, in some not till towards morning, was often accompanied by profuse catarrh and obstruction of the nose, and was often so violent that the patients not only had to sit up in bed and gasp for breath, but

had to walk up and down the floor for several hours, or even spend the night on a chair as a horizontal position was insufferable. In one or two cases asthmatic attacks could be experimentally caused during daytime. One patient (No. 44), a man aged 45, had a violent asthmatic attack every time nitrate of silver was blown into his nose, and every local treatment of the nasal mucous membrane of this patient made the asthma worse, this circumstance has also been observed in other cases. One patient (No. 67), a chemist, stated that in his youth he had an asthmatic attack every time he smelt ipecacuanha, so that he could not make up the ipecacuanha prescriptions.

In one case (No. 65), the asthma came only in the daytime. With this patient, an engineer, aged 31, it began as a decidedly nocturnal type of asthma, now the nights are free. A similar change in the appearance of asthma has been observed in several other patients, *e.g.*, in case No. 40, where the asthma at first came between 3 and 5 in the morning, afterwards not until some time after the patient had risen.

Asthma in Connection with Nasal Polypes

Was, as above stated, present in 31 of 139 cases (19 men, 12 women). As regards the difference of sex the proportion was as follows:—

Of 76 men 19 were asthmatic = 25 per cent.
Of 63 women 12 were asthmatic = 19 per cent.

together 139 of these 31 were asthmatic = 22 per cent.

Here as in the case of chronic rhinitis the men seem more disposed to asthma than the women, but it must be admitted that the liability to faults in the percentage is greater here because of the smaller number of cases, so that we must be very careful in drawing conclusions.

There were 5 cases of asthma-like attacks. One patient (No. 1) a woman aged 22, had sudden attacks of suffocation at night shortly after going to bed. Another very nervous patient (No. 11) had sudden attacks of fear accompanied by great difficulty in breathing, which was worst when he had a nasal catarrh; during the attacks his nose was obstructed. One patient (No. 16), a man aged 70, who had suffered from polypes for at least 15 years, complained only of shortness of breath, specially when lying down and towards morning. A lady, aged 58 (No. 27), had great difficulty in breathing when her nose was obstructed, and felt a heavy weight across the chest, she could lie only on her right side as she then had best passage through the nose, at the moment a polype was removed from the left side of the nose, the oppression across the chest disappeared, although the passage through the nose had not been obstructed immediately before removal of the polype. Lastly, a man, aged 69 (No. 14), had difficulty in breathing, so that just when falling asleep he had to start up in bed and gasp for breath. The two remaining cases were typically asthmatic. As regards age, there is a great difference between these patients and those suffering from asthmatic rhinitis. Amongst the rhinitic patients, asthma appeared during childhood in 12 cases, whilst with one single exception, it always began at maturity in cases of patients suffering from polypes. The polypal patients' ages vary from 19 to 70 years. The duration of the asthma before being treated varies from 3 months to 20 years.

As regards the manner in which asthma showed itself in these different cases, there were some where it appeared as a periodical, strong, continuing difficulty in breathing both day and night, the attack lasted from several days to 6 weeks, increasing and decreasing slowly. This was the case with 5 patients (No. 8, 10, 15, 20, 31). In case No. 8 (a lady aged 50), the attacks came every 3 weeks and lasted a few days;

whilst in case No. 20 (a peasant girl aged 35), the attacks lasted 6 weeks, and were so strong that she had to sit helpless in a chair day and night, as she could neither walk nor lie down. In case No. 10 the attacks began as typical nightly asthma, but later on continued also in daytime. As a rule, the asthma in all these cases exacerbated strongly at night.

In most cases, namely 16, (No. 2, 3, 5, 6, 7, 13, 17, 19, 21, 22, 23, 24, 25, 26, 29, 30), the asthma came on only at night, or in some exceptional cases there remained a slight feeling of oppression during the day, or a solitary attack might be brought on during the day-time. In case No. 13 (a girl aged 19), a violent asthmatic attack of several hours' duration could be caused by the smell of fried fish, and in No. 17 (a man aged 41) insufflation of nitrate of silver or rhino-surgical treatment caused attacks in the day-time, The attacks generally came regularly a few hours after the patient had gone to sleep, or at certain times in the day, as in case No. 19 (a seamstress, aged 39), at 8 in the evening or 4 in the morning. In some cases they came at certain times of the year, generally autumn and winter, whilst in other cases (No. 5) they were worst in summer, disappearing entirely in the winter.

In 4 cases (No. 9, 12, 18, 28) the attacks did not come at any settled time, but could come both by day or night. Some patients began with typical attacks at night, and later on during the disease suffered from them also in day-time (No. 12).

In one case (No. 4) nothing was remarked as to the manner in which the asthma manifested itself.

Before going on to the treatment of these cases and their prognosis, we must necessarily first consider the question as to how the connection between asthma and the nasal disease ought to be regarded. Asthma, which must be considered as a reflex-neurosis, has according to *Strübing*, the same peculiarity as all

other reflex neuroses, its appearance is bound by certain laws. The circumstance of an increased irritability of the mucous membrane of the nose, is not alone sufficient to explain the contemporary appearance of the asthmatic attacks, and the fact that some nasal patients have them and others not, must not be considered accidental. The local nasal disease has in this respect no decided part. *Hack* was, as before mentioned, at first inclined to give a hypertrophy of the cavernous mucous membrane, specially on the anterior part of the lower turbinated bone, a decided, partly exclusive, influence in the origination of asthma, and in accordance with this idea he considered a treatment directed exclusively towards this point, as sufficient to cure the patients of their complaint. Since that time it has been proved, that any part of the mucous membrane, whether it be on the lower or middle turbinated bone or on the septum, whether it be in the front or back part of the nasal cavity, can cause asthmatic attacks, and that these complaints not only exist in cases of chronic and acute rhinitis, with hypertrophies of the mucous membranes and polypal formations, but that some authors, such as *Bosworth*, have also found asthma in cases of atrophic rhinitis.

It has therefore been supposed that in cases where a disease in the nasal cavity causes asthma, the reflex irritability of the central nervous system must at the same time have been increased.

J. N. Mackenzie, who, as before mentioned, in 1884, drew attention to this fact, considered the sympathetic nervous system, and especially the vasomotor centres, to be that part of the central nervous system that was most affected. But after its having been shown, specially by *Sée's* works, that the vasodilator phenomena take only a secondary part in the asthmatic attack, and that the tetanic cramp of the respiratory muscles, and specially the diaphragm, must be considered as the essential

point, it is more natural, in accordance with *Sée*, to place the position of the central neurosis in the respiratory centre of the medulla oblongata, and to consider the heightened reflex irritability of this centre as the primary cause of asthma.

It is therefore necessary to give up the opinion, first set forth by *Hack*, that many reflex neuroses, *in casu* asthma, are the result of a local nasal disease, the cure of which would *eo ipso* cause the disappearance of the reflex neuroses.

It is only where there is an alteration in the functional nervous system that peripheral irritants, which originate in the mucous membrane of the nose, can cause reflex neuroses. If one accepts an increased reflex irritability of the central ganglic cells as a necessary condition, there is *a priori* nothing which contradicts the possibility that irritants, which under these conditions affect the terminal organs of no matter which of the peripheral nerves, may cause the same reflex neurosis (whether it be asthma, headache, cough or anything similar); and in reality we see these reflex neuroses accompanying the most various complaints. Asthma, for instance, can accompany different diseases of the lungs, diseases of the diaphragm, pericarditis, aorta aneurysms, contraction and calcination of aorta, the arteries of the lungs, the valves of the heart, the coronar arteries, in cases of organic heart disease, of concretion of the ribs and pleura, chronic affections of the stomach and bowels; of stone in the gall bladder, nephritis, oophoritis, metritis, etc. In very few cases does the reflex irritability obtain such an enormous degree, that any irritant whatever which touches one of the sensitive nerves, *e.g.*, a cold breath of wind on the skin, is sufficient to cause asthma. *Salter* (*loc. cit.* p. 41) gives one such case where a refrigeration of the instep brought on the asthmatic attack. These excessive degrees are generally found only in severer forms of hysteria, and in the above Table of cases there are several examples of it.

As a rule, however, the central state of irritation is so slight that irritants which affect nerves in a normal functionary state cannot cause any pathological reflex. In these cases it is necessary, in order to cause the reflex, that the state of irritation and conducting power of one or several nerves be heightened by an affection of their termination, and the reflex can then originate from an irritation of these nerves. When asthma, therefore, is originated from a diseased mucous membrane of the nose, this is caused partly by an increased reflex irritability of the respiratory centre of medulla oblongata, partly by an increased conducting power for sensitive impressions in the nasal fibres of trigeminus.

By keeping in mind *Strübing's* theory of reflexes, which has been closely examined by *Dos** amongst others, and also by using *Sée's* conception of asthma as the starting-point for an examination of the connection between nasal diseases and asthma, we shall be able to explain very plausibly the apparent incongruity which manifests itself in the mutual clinical appearance of asthma and nasal disease. It will, therefore, not seem strange to us that a rhino-surgical treatment in one case cures asthma entirely, whilst in another case, though there are exactly the same nasal symptoms, the asthma continues undisturbed in spite of any local treatment of the nose. The fact is, that there are cases of asthma, where the patient accidentally has a nasal complaint at the same time, but where therefore this complaint has no influence whatever upon the asthma, which is perhaps caused by bronchitis or some other affection. These patients remain asthmatic after the nose is cured. *Sée*, who has had similar experience, asks in a half mocking tone, if an asthmatic patient may not be permitted to have a neoplasm in his nose besides having a neurosis of the lungs? He certainly may! But *Sée* goes too far in his attempts to condemn *Hack's* theory, and does not seem to believe much in local treatment of the nose in

* *Dos*, Zur Lehre vom Husten, Monatsch. f. Ohrenh., 1887, p. 192.

cases of asthma; he only mentions quite briefly* that an irritation of nervus trigeminus in the nasal cavity may amongst other things also be the cause of asthmatic attacks; for *Sée* the chronic bronchitis, and the nervous irritations to which it exposes the pneumogastric nerve, is the principal factor in causing the asthmatic attack.

Experience shows, however, that even in cases where asthma is from the beginning caused by a capillary bronchitis, the presence of a chronic nasal complaint is generally not quite insignificant, as asthma is often made worse by acute exacerbation of the nasal disease, and a local treatment of the same often greatly improves the asthmatic attacks. The reason for the increase of asthma in these cases is partly a direct result of the surplus of irritations which the asthma centre in medulla oblongata receives from the mucous membrane of the nose, partly an indirect result of the exacerbation of the chronic bronchitis which accompanies acute or chronic phenomena of irritation of the nasal mucous membrane, and which must be explained as vaso-dilator reflexes to the mucous membrane of the bronchial tubes. Both *Sommerbroth*† and *L. Götze*‡ have seen chronic bronchitis, that defied every other treatment, disappear after a local treatment of a chronic rhinitis, and similar experience has been made by many others. It is in this indirect way that I explain the influence which a local treatment of the nasal complaint has had upon several patients in the above Table of cases. In several cases there was a remaining improvement or perfect cure, in others the result was practically nil.

It is, further, easy to explain why the treatment of the nasal disease in a case of asthma, which having begun with decided nasal symptoms has lasted many years causing the development

* *Sée, loc. cit.*, p. 49.

† *Sommerbroth*, Berl. klin. Wochensh., 1884, No. 10.

‡ *L. Götze*, Monatsch. f. Ohrenh., No. 9 and 10, 1884.

of a chronic bronchitis, has relatively no effect as long the chronic bronchitis is not cured at the same time. Case No. 34 and No. 44 are very good illustrations of this when compared together. The one case is a man, aged 57, who for 12 years suffered from asthma which always began with nasal catarrh, with a continual chronic bronchitis between the attacks; the other case is a man, aged 45, who after a cold in the head got a violent attack of asthma, which had lasted only 2 weeks before he came under treatment. Whilst in the first case the removal of a quantity of nasal polypes had no effect at all upon the asthma, in the second case asthma was entirely cured by treatment of the nasal catarrh. If the patient in the second case had been left to his own devices, the result would probably have been, that the asthmatic attacks would have been more frequently repeated, the bronchial catarrh would by degrees have become chronic, with exacerbations during the attacks beginning with certain preliminary symptoms arising from the mucous membrane. After several years there would have been found chronic alterations in the nose, possibly polypal formations, but a prompt result from a local rhino-surgical treatment alone would hardly have been attainable, as the excessive irritability of the bronchial mucous membrane, secondarily developed in the course of time, would be sufficient to cause an asthmatic attack, and to make the nasal treatment as illusory as in the first case mentioned.

We shall now examine more closely the result of the treatment of the above mentioned cases. Of the 71 cases observed, we shall leave out those in which there were no real but only asthma-like attacks. We must further omit those cases in which asthma was caused accidentally through treatment of the mucous membrane with chromic acid or sublimate (No. 31 and 37). Cases No. 42, 59, 67, 68 and 70, have also to be left out as they were not treated at all.

There remain 56 cases. Of these there are six where only a few observations are noted down just after the treatment, but all further information as to the result is wanting.

Amongst the remaining 50 patients				32	cases were cured.
,,	,,	,,	,,	11	,, improved.
,,	,,	,,	,,	7	,, gave no result whatever.

It must be remarked that to the "cures" are reckoned not only those cases where the cure has been definite, that is to say, continues after a long time had elapsed; but also those cases where the nasal treatment had been accompanied by a cure for a longer or shorter time, but where the asthma returned. In all these cases the recurrence of the asthma was caused by a recurrence of the local nasal complaint, and a renewed local treatment cured the asthma again. Several of these recurring asthmas have at last been definitely cured, others are still under treatment with longer or shorter intervals. A similar conception of the word "cure" has been accepted by *P. Heymann** amongst others, and seems to be fully authorised as every recurrence is in fact a new illness.

Amongst the 32 patients put down as cured there was recurrence in no less than 17 cases. As the different authors have a different way of judging the results of the treatment, and some of them put down recurrences amongst the cases that are not cured it is easy to understand the great incongruity in the results reached by the different authors. *W. Lublinski*,† who amongst 500 patients‡ with asthma found 143 with pathological alterations of the nose, cured 27 and improved 13 by local treatment of the nose, although 53 per cent. were very old cases.

* *Heymann, loc. cit.*

† *W. Lublinski*, l. c.

‡ It must be remarked that the 500 cases were collected during nine-and-a half years, whilst he had only examined their noses during the last three-and-a half years.

Heymann, on the contrary, saw 53 cases, cured 29 and improved 14, only in 10 cases there was no result. It will be observed that my results agree very well with those of *Heymann*.

What is said about the word "cure" refers also to "improvement," for in 6 of the 11 cases there was recurrence. The cause of these recurrences lay partly in a return of the nasal complaint, partly in other accidental circumstances, quite independent of the nasal affection, but which often make a correct judgment of the importance of rhino-surgery as regards asthma very difficult.

In this respect case No. 40 is very illustrative. The patient was a colleague, aged 31, in whom the central bulbar neurosis had developed during a continued fever 3 years ago, for although he had formerly on several occasions had short passing attacks of asthma, they did not become typical till after his continued fever. For the last year he had also had a chronic rhinitis, and he observed a decided connection between the nasal complaint and the asthma, as the attacks began with sneezing and watery discharge. The chronic rhinitis was locally treated and cured, which improved the asthma for some time, but shortly afterwards the original cause (probably a slight chronic bronchitis with small exacerbations) began again, and in this case the rhino-surgical treatment had no lasting influence upon the asthma, although a passing improvement cannot be denied.

As regards those cases that were *not cured*, the reason why the local treatment of the nose had no effect upon the asthma may be, either that the nasal complaint was an entirely *accidental complication*, and that the asthma originated from some other part of the body, or that the disease had existed so long (case No. 30) that *chronic bronchitis*, and perhaps slight emphysema of the lungs, had developed, and from this the asthmatic attacks could receive new impulses even after the nasal complaint was

cured. Lastly, the cause may be that the local treatment of the nose has been too short to entirely get the better of the irritative state of the mucous membrane, so that it has continued to give fresh impulse to the asthmatic centre.

As regards this last point, I cannot strongly enough accentuate, that before the nose is *cured* it is impossible to draw any decided conclusions as to the effect which an eventual treatment of the nose may have upon the asthma. A want of consideration of this important point has many times been fatal to the correct judgment of the connection between the nose and the asthmatic attack. Sometimes the treatment has been given up too soon, before the irritative phenomena in the nose had entirely disappeared, and sometimes only the local treatment of the nose has been considered, and it has been forgotten that asthma, being an expression of a complaint of the central nervous system, as a rule also requires a general strengthening treatment. Many medical men have on this account been disappointed in their sanguine hopes, which were partly caused by the enthusiastic accounts which appeared as soon as this question was taken up, and they have in turn gone to the other extreme and placed themselves entirely in opposition to the question.

It is evident, however, that where asthmatic attacks are connected with and accompanied by irritative phenomena of the nose, one must first entirely eliminate this moment before being able to draw any conclusion. To bring the mucous membrane back to its normal state, when it for years has been the seat of a chronic inflammation, when it is covered all over by a luxuriant growth of mucous polypes, and every part, so to say, contains a possibility of producing new ones as soon as the old ones have been removed, is unfortunately in most cases more easily said than done. To bring such a mucous membrane to its normal state again is sometimes a *pium desiderium* which is wrecked upon the patient's impatience. But before this has been

achieved, it is incorrect to draw any conclusion as to the effect of the treatment upon the asthmatic attacks.

That patiently continued treatment can give a very good result is shown several times in the Tables of Cases, especially by case No. 5:—A man, aged 25, had from childhood suffered from catarrh, and two years ago he began to get typical asthmatic attacks which came at night. After clearing out the nasal cavity as much as possible by removal of polypes the asthma disappeared, but returned after a few months and could not be cured in spite of repeated extraction of polypes. As he was going abroad I sent him to *Hack* in *Freiburg* who, amongst other things, removed a bony connection between the septum and the lower turbinated bone so that he could get at and remove some polypes hidden behind this bony connection, besides this the swollen and irritated mucous membrane was treated with the galvano-cautery. The result was that the patient was entirely freed from asthma and catarrh. During the following years he had towards summer slight symptoms of catarrh and asthma, and also slight obstruction of the nose, but after the greatly hypertrophied ends of the lower turbinated bones had been removed and the rest of the mucous membrane treated, he has been well during the last few years and has had neither asthma nor catarrh.

A mere removal of the obstructing polypes is insufficient, and sometimes even makes the asthma worse, for the local irritation is increased when removal of the polypes exposes larger parts of the mucous membrane to the influence of changes in temperature or particles of dust. This fact is as old as the whole question of nasal reflexes. The polypes are in themselves insensible, but the great thing is, besides removing the polypes and preventing their reproduction, also gradually to replace the old mucous membrane with its immensely increased sensitiveness by a less sensitive membrane.

The difficulty of effecting a cure lies in many cases, as in the one just mentioned, in the fact, that there is an *osseous connection* between the septum and the lateral wall, generally the lower turbinated bone, and these connections (as observed by *Hack*), during the different degree of fulness of the membrane, partly originate local phenomena of irritation, partly prevent a radical treatment of those parts that lie behind the connection. In 3 cases (No. 5, 31, and 71) there were such osseous connections, and in all cases the treatment was both long and difficult, but gave good results in so far that No. 5 was cured, whilst No. 31 and 71, which are still under treatment, have been greatly improved. In all three cases the asthmatic attacks were very violent.

There is one question which quite naturally comes to the front, whilst considering all these asthmatic patients: *why did these people get asthma?* or in other words: *what has caused the primary functional change in the central nervous system?*

On one point we can soon agree, namely, that we seldom have to do with patients where all the central nervous cords are in a state of increased reflex irritability, such as is the case with nervous, hysterical or neurasthenic persons. I have only in 7 out of 71 cases felt justified in noting down that they suffered from general nervousness and partially were hereditarily so disposed. In deciding this question it must, however, always be remembered that asthmatic patients who perhaps for many years have had only a few hours sleep at night, and spent the rest of the night on a chair gasping for breath, may very easily show symptoms of a general nervousness, and it is therefore sometimes very difficult in this respect to distinguish between *post* and *propter*.

In a whole number of cases (61 cases), the central bulbar neurosis expressed itself without any general nervousness whatever. The explanation of how the exaggerated reflex irritability of the

asthma centre originated, is in these cases much more difficult. In a few of them a *preceding serious illness*, such as continued fever, loss of blood per vaginam, a recent pregnancy in connection with the period of lactation, can be mentioned as direct predisposing circumstances, as experience proves that a certain sensitiveness of the central nervous system has been known to develop after such weakening factors. This explanation can, however, only be applied in very few cases in the preceding Table.

As regards the greater number of cases, the pathological reflex activity of the respiratory centre must be supposed to have originated in a different manner. It will be found in these cases, that asthma has developed after a catarrh of long, sometime several years' duration. During this time the patients have suffered from violent fits of sneezing, that is to say cramps of the respiratory, specially of the expiratory, muscles, cramps that are caused by powerful irritants, which, proceeding from the mucous membrane of the nose, have affected the respiratory centre of the medulla oblongata. If this be continued for a long time, one will be able to understand, that the medulla oblongata may receive so many irritants, that the conditions for an asthmatic attack, that is to say the pathologically increased reflex irritability of the respiratory centre, may at last have been effected.

A special predisposition to asthma must, however, be assumed in these cases, as it is otherwise impossible to understand why one patient should get asthma, the other not, though they have both for many years had an apparently equally violent and irritative nasal affection; this disposition may be either acquired or inherited; there are families where many or nearly all the members suffer from asthma. The fact alone that one has bronchitis, the other not, is of no importance, as one may find violent nasal complaints of very long duration combined with bronchitis without a trace of asthma.

Before we pass over to the treatment it is necessary first to examine :—

What are the Symptoms that imply a connection between the Asthmatic Attacks and Diseases of the Nasal Cavity?

The answer to this question is in practical respects of great importance, for it is only in cases where one has a decided hold in regard to the connection between the asthma and the nasal affection, that one can think of applying a rhino-surgical treatment.

We shall now, keeping this in mind, examine the above Table of cases, and elicit the facts that point towards a more or less decided connection between asthma and the nasal complaint.

1. *Asthma returns when the nasal disease gets worse, and is improved or cured by a renewed local treatment.* The asthma either returns with full strength, or it only comes as a slight asthmatic attack between every acute attack of catarrh. This happened in 23 of the above mentioned cases (No. 3, 5, 6, 8, 10, 12, 13, 15, 17, 19, 20, 23, 26, 31, 36, 43, 47, 50, 52, 58, 60, 65, 71). As regards case 31, the patient was a very nervous man, aged 38, it must be specially remarked, that improvement of the asthma accompanied a considerable improvement of the local nasal complaint, and (this is specially interesting) at the same time his general nervous sufferings, especially sleeplessness, rachialgia, etc., grew much worse.

2. *Local treatment of the mucous membrane of the nose aggravates the asthmatic attacks.*—This was the case with seven patients (No. 6, 10, 17, 32, 37, 44, 50). This was particularly interesting in those cases where asthmatic attacks could be caused experimentally in the otherwise entirely free periods. Such was the case with No. 10, a lady, aged 39, with numerous nasal

polypes, whose asthma was not only worse a few days after every operative treatment, but could also be caused artificially during her entirely free periods. Not only direct operative treatment of the nose, but also insufflation of a mixture of pulverised nitrate of silver and amylum could in three cases (No. 17, 44, 50) cause almost instantaneous asthmatic attacks, with whistling and piping in the chest, difficulty in breathing, and prolonged expiration. In two cases (No. 32 and 37), where the patients had not suffered from asthma, but only from local nasal affections, the one had a strong asthmatic attack after syringing the nose with a solution of 1 *pro mille* sublimate water, and the other after galvano-cauterising the cartilaginous septum. Whilst the attack in the first case lasted only about three hours, in the last it continued for several days with violent exacerbations during the night and remissions in daytime, and it disappeared gradually together with the local phenomena of reaction in the nose.

3. *The smell or inhalation of certain substances can in some cases cause asthma.*—A girl (No. 13), aged 19, had passing attacks of violent asthma on smelling fried fish. In another case (No. 49) the smell of fresh paint, varnish, or the inhalation of dust in a circus caused similar attacks. Two patients (No. 52 and 56) could not smell hay without contracting asthma. It must be remarked that whilst in the one case, a very nervous lady, the smell of hay could cause asthma at any time, this was the case with the other patient only about the 14th of July, at which time he had without exception had an asthmatic attack during the last 20 years. In this case not only irritations from mucous membrane, but also from retina seem capable of causing asthma, for the patient stated that he could bring on an attack at the time of year when his attacks always came, by exposing himself to sunshine, and for this reason he went out only in the evening. In one case (No. 67), the inhalation of ipecacuanha was suffi-

cient to bring on an attack, and the patient, who was a chemist, had therefore to let others make up the ipecacuanha prescriptions. This effect of ipecacuanha on certain people is an old well known fact, which is mentioned by many early writers on asthma; and in literature there are mentioned examples of many different things which have caused asthmatic attacks. Trousseau relates of himself that he had asthma every time he was in a room where there were violets; *Itzigson** knew a merchant who got asthma every time he smelt coffee, and another got it when he worked in citron wood. That many people get typical asthmatic attacks when they smell roses, so that the disease they suffer from is called rose fever, is also a well known fact. Just as the smell of certain substances in these cases causes an irritation of the terminal organs of olfactories and so cause a reflectory asthmatic attack, there are in literature numerous examples that the inhalation of certain particles are sufficient to irritate a pathologically altered mucous membrane, and thereby cause asthma. This has been proved with regard to a number of complaints that go by the name of hay fever, and of which the greater part have decided asthmatic symptoms, and *Blackley*† has shown experimentally that inhalation of dust that contains the pollen grain of certain grasses is capable of causing asthmatic attacks.

In his work, p. 93, he mentions a number of plants whose pollen dust could cause asthma. Schmaltz‡ mentions a hospital nurse who got asthma every time she made plaster bandages, and many others have observed asthma that has been caused by dust that had nothing whatever to do with pollen seeds, so that though the pollen theory may be of etiological worth as regards

* *Itzigson*, Ref. by Riegel: Ziems. Handb. IV.; 2. Th., 1875.

† *Blackley*, "Hay Fever, its causes, treatment, and effective prevention," 2nd Edit., London, 1880.

‡ *Schmaltz*, Berl. kl. Wochenschr., 1885, No. 29-32.

certain forms of hay fever, there is no doubt that the so-called hay asthma has in many cases no connection whatever with the flowering season of the different kinds of grass, but can be caused at any time of the year and by any accidental irritant which affects the mucous membrane, so that the name hay asthma or hay fever ought to be done away with.

4. *The attacks could in five cases* (13, 41, 44, 51, 71) *be stopped or relieved by introducing tampons with cocaine or menthol into the nose.*—Menthol, which *Rosenberg* recommends instead of cocaine,* as like cocaine, it has a depressing action on the sensitiveness and collapsing of the cavernous membrane of the mucous lining, was applied in only one case (No. 51). I first used it in a strong solution of spirits (20 to 50 per cent.), but on account of local and irritative phenomena, I later used a 20 per cent. solution in oleum olivarium, which, as also remarked by *Rosenberg*, irritates much less. In a later article *Rosenberg*† recommends gelatine bougies with menthol (one centigramme in each bougie), which the patients themselves can introduce, and so eventually prevent attacks at times when it would be impossible, or at least difficult, to go to a physician to get their nasal mucous membrane anæsthetised. He states amongst other things that he has in this manner cured asthma that had existed for twelve years.

The fact that in menthol, and still more in cocaine, we have a remedy, which in certain cases can stop an asthmatic attack merely by anæsthetisation of the mucous membrane, is one of the principal proofs that there are cases of asthma that are dependent upon pathological irritative conditions of the mucous membrane of the nose. Already in 1885, *B. Fränkel*‡ remarked

* *Rosenberg*. Berl. kl. Wochenschr., p. 449, 1885.

† *Rosenberg*, Zur Bezeitigung der von der Nase ausgelösten Reflexneurosen durch Menthol, Berl. klin. Wochenschr., p. 788, 1885.

‡ *B. Fränkel*, Berl. kl. Wochenschr., p. 78, 1885.

in Berl. med. Gesellschaft: "Dass die Lehre von den Reflexneurosen der Nasenhöhle durch das Cocain in ein durchaus neues Stadium getreten ist, denn durch das sind wir zunächst im Stande mit der Sicherheit eines physiologischen Experimentes nachzuweisen, ob eine Reflexneurose von der Schleimhaut ausgelöst wird oder nicht" It is of course not possible to make the experiment in all those cases of asthma where other reasons make it probable that the asthmatic attack is dependent upon inflammation of the mucous membrane, for the proof is certain only under supposition of a careful and complete anæsthetisation and this can only be deficiently done by the patients themselves, whilst the physician seldom has the opportunity of cocainising the nose during the asthmatic attacks, as these generally come at night. It is seldom that an experiment is as clear as in case No. 44, where the most vtiolent attacks could be stopped by introduction into the nose of 10 per cent. cocaine tampons, and where the result was so to say instantaneous.

5. *A local treatment of the nose gives instantaneous relief to the respiration.*—This happened in four cases. In case 18 a continual and very unpleasant pressure on the epigastrium disappeared at the moment a polype was removed from the left side of the nose. That this was not only caused merely by the circumstance that the passage through the nose became more free after removal of the polype is proved by the fact that the patient breathed freely through the nose before removal of the polype. Something similar happened in case No. 27, where the weight across the chest disappeared immediately on removal of a large polype from the left side, and where it is also remarked that the nose was not obstructed before. In case No. 28, a man aged 52, the result was also immediate after removal of the polypes, he directly felt a pleasant sensation of relief across the chest. No. 50, a lady aged 40, had no polypes, but a chronic rhinitis with strong asthmatic attacks which generally came at night,

whilst she had permanent shortness of breath and pressure across the chest during the day. When the middle turbinated bones were treated with galvano-cautery or chromic acid, she first had a violent tickling cough, and after that, instantaneous relief both as regards shortness of breath, and the pressure on her chest.

6. *In* 22 *cases the asthmatic attacks began with catarrh, and there was generally also obstruction of the nose* (No. 19, 20, 27, 29, 30, 34, 35, 36, 44, 45, 46, 48, 49, 51, 54, 56, 58, 62, 63, 64, 69, 71). —In many of these cases the condition was that the asthmatic attack only came directly after a violent catarrh with profuse watery discharge, sneezing, cramps, and epiphora, had developed, and that the asthma ceased to appear when treatment of the mucous membrane had prevented renewed attacks of catarrh. It must further be remarked, that whilst the attacks of catarrh often come both during day and night, it was in some cases only at night that they were accompanied by asthma, in some cases the asthmatic attacks also came in daytime.

Sometimes the asthmatic attacks were attached to the period of menstruation. In case No. 66, where this was the case, but where the local treatment of the mucous membrane had no influence upon the asthma, this must be accepted as the result of an irritant, which was conducted directly straight from the sexual organs to medulla oblongata, so that asthma and the nasal complaint were in this case co-ordinate, entirely independent, reflex-neuroses from uterus and the ovaries. It must meanwhile be remarked, that the connection is different in many cases, as asthmatic attacks, which appear during the period of menstruation and are accompanied by attacks of catarrh, as a rule receive their secondary irritation from the mucous membrane of the nose, for vaso-reflectoric phenomena of the nasal membrane, originating from the genital sphere, are by far

more frequent than direct reflexes from the uterus and its annexes to the medulla oblongata.*

As proof of the importance of nasal complaints with regard to asthma may also be mentioned those cases where asthma has continued in spite of every treatment during several years, and disappears or is improved at the same time as the disease in the nasal cavity.

* A casuistic contribution to the question of the relation between asthma and the genital disease is found in *A. Peyer's* work, Asthma und Geschlechtskrankheiten, (Asthma sexuale), Berliner Klinik, March, 1889.

TREATMENT.

Before beginning any treatment whatever, the patient must first be examined with regard to any disease of the lungs, heart, or kidneys; besides this, one must look for holding points for the belief in a decided result of the rhino-surgical treatment, and it is best always to be very reserved in expressing anything to the patient as regards the influence a local treatment may have upon the asthmatic attacks. I always consider it a great mistake to begin a local treatment of the nose in those cases where the clinical picture gives no decided support to the belief in a causal connection between the nasal disease and the asthmatic attacks; it is, in these cases, only when the patient himself wishes it, after he has vainly tried every other treatment, that one ought to begin the rhino-surgical treatment, but the result will probably be negative with regard to the asthma, though it may otherwise do the patient some good by curing his nose (see case No. 25).

As asthma first of all, as remarked above, depends upon a central complaint of the nervous system, and only the separate attacks are supposed to be caused by reflexes from the peripheral nerves, in these cases those of the mucous membrane, the treatment must be in several divisions which reciprocally supplement one another.

I. The general strengthening treatment, which specially aims at the increased reflex irritability of the medulla oblongata, must consist in strengthening hygiene, fresh air, good fare, methodical bodily exercise, sea-bathing, sea-trips, a stay in the country, etc.

Besides this, one must give the patients iron or arsenic, and apply such remedies as are known to have a strengthening influence on the nervous system. Daily cold or temperate washings of the whole or only the upper part of the body are, when carefully applied, of very good use. This strengthens the nervous system and counteracts the disposition to frequent colds which are so fatal for asthmatic people. We may also here mention treatment with compressed air, particularly in pneumatic chambers, which often has a surprisingly good effect upon asthma, although as a rule it lasts only a short time. The cause of this effect is partly that the respiration becomes deeper and easier, the oxidation of the organism more thorough, and the patient's general condition is improved; and partly that the compressed air has very good therapeutic qualities in all cases of chronic catarrh in the air passages, both of the nose, the larynx and the bronchi.

II. The local nasal treatment must be conducted according to the usual rhino-surgical principles. It is necessary to be very thorough, that is, to continue the treatment until the nasal complaint is cured; it often takes months of work, and requires great patience both of the operator and of the patient. Armed as we now are with well constructed instruments, and in possession of cocaine, by means of which nearly all operative treatment can be made absolutely free from pain, the treatment is not very encroaching, particularly when there is time and opportunity to proceed slowly, and distribute the treatment over a good stretch of time.

III. Hereto must be added a number of remedies that are applied during the asthmatic attacks, and which relieve or stop them, amongst which smoking with saltpetre paper or with a mixture of pulverised saltpetre and lobelia leaves is deservedly the best enumerated. I do not, however, intend to enumerate all the different remedies which in the course of time have been

recommended for asthma, as every more important manual of pathology will give all the necessary information.

If we now briefly sum up the result of this work it will be as follows:—

I. That *asthma must be considered as a bulbar neurosis.*

II. That the bulbar neurosis, *which consists in an excessive reflex irritability of the respiratory centre, may be,* though comparatively seldom, *accompanied by a state of general nervousness,* and in this case as a rule has the same etiological origin as hysteria or neurasthenia (whether it be inherited or acquired).

III. That the bulbar neurosis *may develop after weakening factors, such as child-birth, bleeding, continued fever, etc.*

IV. That the bulbar neurosis *sometimes appears in otherwise apparently healthy individuals* without any trace of other nervous phenomena, and in these cases it is presumedly the result of frequent and strong irritations, *which are conducted to the respiratory centre from the nasal fibres of trigeminus,* (to which the irritation of other nerves, *specially of the laryngeal and pulmonal fibres of the pneumogastric nerve,* may be added).

V. *That an asthmatic attack in many cases may originate from the mucous membrane of the nose* if only the necessary condition and the increased bulbar reflex-irritability be present, and that, *ceteris paribus,* irritations conducted to the medulla oblongata from any sensitive nerve whatever, are capable of causing an asthmatic attack.

VI. *That it is possible in some cases, by suppression of the peripheral irritations, e.g.,* in one case by a careful treatment of a

chronic nasal catarrh, *to stop definitely the asthmatic attacks*, but that this in many cases first succeeds after also having applied *a generally strengthening treatment* which aims at the central nervous complaint.

VII. *That one ought, in every case of asthma, to examine the nasal cavity*, and eventually, if the form of the disease and the objective state give a right to suppose a decided connection between the asthmatic attack and the nasal complaint, *to put the patient under competent treatment.*

VIII. *That nasal diseases may accidentally accompany cases of asthma*, without having any etiological connection with the asthmatic attacks.

I have in the above attempted a description of the relation between asthma and the nasal diseases, from the point of view from which it, in accordance with our present experiences, must be considered. The exclusive etiological importance of the nasal pathology with regard to asthma, which it has at first been attempted to vindicate, has been duly restricted. Although *Hack*, in his first enthusiasm over the seemingly wide bearing of his new observations, shot far beyond the mark, his great merit consists in the fact that he extended our views and brought within our reach a number of complaints, which up to that time had been almost entirely unnoticed by the medical world in general. It may be that his conclusions were partly wrong, because they went too far, but at any rate he gave the impulse to a diligent investigation of this question, which made it possible to decide the proper limits for the importance of the nasal diseases with regard to a number of neuroses and specially to asthma. It has been seen that many cases of asthma can be influenced by local treatment of the nose, and that some cases

can be entirely cured; but we have also seen that as asthma depends upon an affection of the central nervous system, a local treatment of the peripheral organs from which the nervous attack proceeds, is not always sufficient to cure the disease, and it must always be remembered in treating such cases as these, that one generally has to do with a suffering person, who is not merely an appendix to his nose (*Kurz*).*

* *Kurz*, Ueber Reflexhusten, Deutsch. med. Wochensch., 29th March, p. 247 1888.

January, 1890.

CATALOGUE OF WORKS

PUBLISHED BY

H. K. LEWIS

136 GOWER STREET, LONDON, W.C.

Established 1844.

SIR WILLIAM AITKEN, KNT., M.D., F.R.S.
Professor of Pathology in the Army Medical School.

ON THE ANIMAL ALKALOIDS, THE PTOMAINES, LEUCOMAINES, AND EXTRACTIVES IN THEIR PATHOLOGICAL RELATIONS. Second edition, Crown 8vo, 3s. 6d. [*Now ready.*

E. CRESSWELL BABER, M.B. LOND.
Surgeon to the Brighton and Sussex Throat and Ear Dispensary.

A GUIDE TO THE EXAMINATION OF THE NOSE, WITH REMARKS ON THE DIAGNOSIS OF DISEASES OF THE NASAL CAVITIES. With Illustrations, small 8vo, 5s. 6d.

G. GRANVILLE BANTOCK, M.D., F.R.C.S. EDIN.
Surgeon to the Samaritan Free Hospital for Women and Children.

I.

ON THE USE AND ABUSE OF PESSARIES. Second Edit., with Illustrations, 8vo, 5s.

II.

ON THE TREATMENT OF RUPTURE OF THE FEMALE PERINEUM IMMEDIATE AND REMOTE. Second Edition, with Illustrations, 8vo, 3s. 6d.

III.

A PLEA FOR EARLY OVARIOTOMY. Demy 8vo, 2s.

FANCOURT BARNES, M.D., M.R.C.P.
Physician to the Chelsea Hospital for Women; Obstetric Physician to the Great Northern Hospital, &c.

A GERMAN-ENGLISH DICTIONARY OF WORDS AND TERMS USED IN MEDICINE AND ITS COGNATE SCIENCES. Square 12mo, Roxburgh binding, 9s.

ASHLEY W. BARRETT, M.B. LOND., M.R.C.S., L.D.S.

Dental Surgeon to, and Lecturer on Dental Surgery and Pathology in the Medical School of, the London Hospital.

DENTAL SURGERY FOR GENERAL PRACTITIONERS AND STUDENTS OF MEDICINE. Second edition, With Illustrations, cr. 8vo. [*Just ready.*

[LEWIS'S PRACTICAL SERIES.]

ROBERTS BARTHOLOW, M.A., M.D., LL.D.

Professor of Materia Medica and Therapeutics in the Jefferson Medical College of Philadelphia, &c., &c.

I.

A PRACTICAL TREATISE ON MATERIA MEDICA AND THERAPEUTICS. Seventh Edition, Revised and Enlarged, 8vo, 18s. [*Just published.*

II.

A TREATISE ON THE PRACTICE OF MEDICINE, FOR THE USE OF STUDENTS AND PRACTITIONERS. Fifth Edition, with Illustrations, large 8vo, 21s.

H. CHARLTON BASTIAN, M.A., M.D., F.R.S.

Examiner in Medicine at the Royal College of Physicians; Professor of the Principles and Practice of Medicine in University College, London; Physician to University College Hospital, &c.

PARALYSES: CEREBRAL, BULBAR, AND SPINAL. A MANUAL OF DIAGNOSIS FOR STUDENTS AND PRACTITIONERS. With numerous Illustrations, 8vo, 12s. 6d.

GEO. M. BEARD, A.M., M.D.

Fellow of the New York Academy of Medicine, &c.

AND

A. D. ROCKWELL, A.M., M.D.

Professor of Electro-Therapeutics in the New York Post Graduate Medical School.

I.

A PRACTICAL TREATISE ON THE MEDICAL AND SURGICAL USES OF ELECTRICITY. Including Localized and General Faradization; Localized and Central Galvanization; Franklinization; Electrolysis and Galvano-Cautery. Sixth Edition. With nearly 200 Illustrations, roy. 8vo, 28s. [*Just published.*

II.

NERVOUS EXHAUSTION (NEURASTHENIA) ITS HYGIENE, CAUSES, SYMPTOMS AND TREATMENT. Second edition, 8vo, 7s. 6d.

E. H. BENNETT, M.D., F.R.C.S.I.

Professor of Surgery, University of Dublin.

AND

D. J. CUNNINGHAM, M.D., F.R.C.S.I.

Professor of Anatomy and Chirurgery, University of Dublin.

THE SECTIONAL ANATOMY OF CONGENITAL CŒCAL HERNIA. With coloured plates, sm. folio, 5s. 6d.

A. HUGHES BENNETT, M.D., M.R.C.P.

Physician to the Hospital for Epilepsy and Paralysis, Regent's Park, and Assistant Physician to the Westminster Hospital.

I.

A PRACTICAL TREATISE ON ELECTRO-DIAGNOSIS IN DISEASES OF THE NERVOUS-SYSTEM. With Illustrations, 8vo, 8s. 6d.

II.

ILLUSTRATIONS OF THE SUPERFICIAL NERVES AND MUSCLES, WITH THEIR MOTOR POINTS; a knowledge of which is essential in the Art of Electro-Diagnosis. (Extracted from the above). 8vo, paper cover, 1s. 6d.; cloth, 2s.

HORATIO R. BIGELOW, M.D.

Permanent Member of the American Medical Association; Fellow of the British Gynæcological Society, &c.

GYNÆCOLOGICAL ELECTRO-THERAPEUTICS. With an Introduction by Dr. Georges Apostoli. With Illustrations, demy 8vo, 8s. 6d.

DR. THEODOR BILLROTH.

Professor of Surgery in Vienna.

GENERAL SURGICAL PATHOLOGY AND THERAPEUTICS. In Fifty-one Lectures. A Text-book for Students and Physicians. With additions by Dr. Alexander von Winiwarter, Professor of Surgery in Luttich. Translated from the Fourth German edition with the special permission of the Author, and revised from the Tenth edition, by C. E. Hackley, A.M., M.D. Copiously illustrated, 8vo, 18s.

DRS. BOURNEVILLE AND BRICON.

MANUAL OF HYPODERMIC MEDICATION. Translated from the Second Edition, and Edited, with Therapeutic Index of Diseases, by ANDREW S. CURRIE, M.D. Edin., &c. With Illustrations, crown 8vo, 6s.

G. H. BRANDT, M.D.

I.

ROYAT (LES BAINS) IN AUVERGNE, ITS MINERAL WATERS AND CLIMATE. With Frontispiece and Map. Second edition, crown 8vo, 2s. 6d.

II.

HAMMAM R'IRHA, ALGIERS. A Winter Health Resort and Mineral Water Cure Combined. With Frontispiece and Map, crown 8vo, 2s. 6d.

GURDON BUCK, M.D.

CONTRIBUTIONS TO REPARATIVE SURGERY: Showing its Application to the Treatment of Deformities, produced by Destructive Disease or Injury; Congenital Defects from Arrest or Excess of Development; and Cicatricial Contractions from Burns. Illustrated by numerous Engravings, large 8vo, 9s.

MARY BULLAR & J. F. BULLAR, M.B. CANTAB., F.R.C.S.

RECEIPTS FOR FLUID FOODS. 16mo, 1s.

STEPHEN SMITH BURT, M.D.
Professor of Clinical Medicine and Physical Diagnosis in the New York Post-graduate School and Hospital.

EXPLORATION OF THE CHEST IN HEALTH AND DISEASE. With Illustrations, crown 8vo, 6s.

DUDLEY W. BUXTON, M.D., B.S., M.R.C.P.
Administrator of Anæsthetics at University College Hospital and the Hospital for Women, Soho Square.

ANÆSTHETICS THEIR USES AND ADMINISTRATION. Crown 8vo, 4s. [LEWIS'S PRACTICAL SERIES.]

HARRY CAMPBELL, M.D., B.S. LOND., M.R.C.S.
Assistant Physician and Pathologist to the North-West London Hospital.

THE CAUSATION OF DISEASE: An exposition of the ultimate factors which induce it. Demy 8vo, 12s. 6d.

ALFRED H. CARTER, M.D. LOND.
Member of the Royal College of Physicians; Physician to the Queen's Hospital, Birmingham; late Examiner in Medicine for the University of Aberdeen, &c.

ELEMENTS OF PRACTICAL MEDICINE. Fifth Edition, crown 8vo, 9s. [*Just published.*

P. CAZEAUX.
Adjunct Professor in the Faculty of Medicine of Paris, &c.
AND
S. TARNIER.
Professor of Obstetrics and Diseases of Women and Children in the Faculty of Medicine of Paris.

OBSTETRICS: THE THEORY AND PRACTICE; including the Diseases of Pregnancy and Parturition, Obstetrical Operations, &c. Seventh Edition, edited and revised by ROBERT J. HESS, M.D., with twelve full-page plates, five being coloured, and 165 wood-engravings, 1081 pages, roy. 8vo, 35s.

F. H. CHAMPNEYS, M.A., M.D. OXON., F.R.C.P.
Obstetric Physician and Lecturer on Obstetric Medicine at St. George's Hospital: Examiner in Obstetric Medicine in the University of London, &c.

EXPERIMENTAL RESEARCHES IN ARTIFICIAL RESPIRATION IN STILLBORN CHILDREN, AND ALLIED SUBJECTS. Crown 8vo, 3s. 6d.

W. BRUCE CLARKE, M.A., M.B. OXON., F.R.C.S.
Assistant Surgeon to, and Senior Demonstrator of Anatomy and Operative Surgery at, St. Bartholomew's Hospital; Surgeon to the West London Hospital; Examiner in Surgery to the University of Oxford.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE KIDNEY AMENABLE TO DIRECT SURGICAL INTERFERENCE. Demy 8vo, with Illustrations, 7s. 6d.

JOHN COCKLE, M.A., M.D.
Physician to the Royal Free Hospital.

ON INTRA-THORACIC CANCER. 8vo, 4s. 6d.

ALEXANDER COLLIE, M.D. ABERD., M.R.C.P. LOND.
Medical Superintendent of the Eastern Hospitals.

ON FEVERS: THEIR HISTORY, ETIOLOGY, DIAGNOSIS, PROGNOSIS, AND TREATMENT. Illustrated with Coloured Plates, crown 8vo, 8s. 6d. [LEWIS'S PRACTICAL SERIES.]

M. P. MAYO COLLIER, M.B., M.S. LOND., F.R.C.S. ENG.
Professor of Comparative Anatomy and Physiology at the Royal College of Surgeons, England, &c.

THE PHYSIOLOGY OF THE VASCULAR SYSTEM. Illustrations, 8vo, 3s. 6d.

WALTER S. COLMAN, M.B., M.R.C.P. LOND.
Pathologist and Registrar to the National Hospital for the Paralysed and Epileptic; Formerly Assistant to the Professor of Pathology in the University of Edinburgh.

SECTION CUTTING AND STAINING: A Practical Guide to the Preparation of Normal and Morbid Histological Specimens. Crown 8vo, 3s. [*Now ready.*

ALFRED COOPER, F.R.C.S.
Surgeon to the St. Mark's Hospital for Fistula and other Diseases of the Rectum.

APRACTICAL TREATISE ON THE DISEASES OF THE RECTUM. Crown 8vo, 4s.

W. H. CORFIELD, M.A., M.D. OXON.
Professor of Hygiene and Public Health in University College, London.

DWELLING HOUSES: their Sanitary Construction and Arrangements. Second Edit., with Illustrations. Cr. 8vo, 3s. 6d.

J. LEONARD CORNING, M.A., M.D.
Consultant in Nervous Diseases to St. Francis Hospital.

A PRACTICAL TREATISE ON HEADACHE, NEU-RALGIA, SLEEP AND ITS DERANGEMENTS, AND SPINAL IRRITATION. With an Appendix—Eye Strain, a Cause of Headache. By DAVID WEBSTER, M.D. Second edition, Demy 8vo, 7s. 6d.

EDWARD COTTERELL, M.R.C.S. ENG., L.R.C.P. LOND.
Late House Surgeon, University College Hospital.

ON SOME COMMON INJURIES TO LIMBS; their Treatment and After-treatment, including Bone-setting (so-called). With Illustrations, small 8vo, 3s. 6d.

CHARLES CREIGHTON, M.D.

I.

ILLUSTRATIONS OF UNCONSCIOUS MEMORY IN DISEASE, including a Theory of Alteratives. Post 8vo, 6s.

II.

CONTRIBUTIONS TO THE PHYSIOLOGY AND PATHOLOGY OF THE BREAST AND LYMPHATIC GLANDS. New Edition with additional chapter, with wood-cuts and plate, 8vo, 9s.

III.

BOVINE TUBERCULOSIS IN MAN: An Account of the Pathology of Suspected Cases. With Chromo-lithographs and other Illustrations, 8vo, 8s. 6d.

H. RADCLIFFE CROCKER, M.D. LOND., B.S., F.R.C.P.
Physician, Skin Department, University College Hospital.

DISEASES OF THE SKIN; THEIR DESCRIPTION, PATHOLOGY, DIAGNOSIS, AND TREATMENT. With 76 Illustrations, 8vo, 21s. [*Now ready.*

EDGAR M. CROOKSHANK, M.B. LOND., F.R.M.S.
Professor of Comparative Pathology and Bacteriology in, and Fellow of King's College, London.

I.

HISTORY AND PATHOLOGY OF VACCINATION. Vol. I., A Critical Inquiry. Vol. II., Selected Essays, (Edited) including works by Jenner, Pearson, Woodville, Henry Jenner, Loy, Rogers, Birch, Bousquet, Estlin, Ceely, Badcock, Auzias-Turenne, Dubreuilh and Layet. Two volumes, illustrated with 22 coloured plates, including reproductions of the plates illustrating Jenner's Inquiry, of selected plates from the work of Ceely and others, and with a reduced facsimile of an engraving of Mr. Jesty, a facsimile of the first folio of the manuscript of Jenner's original paper, a facsimile of an unpublished letter from Jenner to Mr. Head, Royal 8vo, 36s.

II.

MANUAL OF BACTERIOLOGY: being an Introduction to Practical Bacteriology. Illustrated with Coloured Plates from original drawings, and with other Illustrations in the text. Third Edition, 8vo. [*In preparation.*

III.

PHOTOGRAPHY OF BACTERIA. Illustrated with 86 Photographs reproduced in autotype, and wood engravings, royal 8vo, 12s. 6d.

RIDLEY DALE, M.D., L.R.C.P. EDIN., M.R.C.S. ENG.

EPITOME OF SURGERY, being a complete compendium of the Science and Art of Surgery. Large 8vo, 10s. 6d.

HERBERT DAVIES, M.D., F.R.C.P.
Late Consulting Physician to the London Hospital.

THE MECHANISM OF THE CIRCULATION OF THE BLOOD THROUGH ORGANICALLY DISEASED HEARTS. Edited by ARTHUR TEMPLER DAVIES, B.A. (Nat. Science Honours), M.B. Cantab., M.R.C.P.; Physician to the Royal Hospital for Diseases of the Chest; Crown 8vo, 3s. 6d. [*Just published.*

HENRY DAVIS, M.R.C.S. ENG.
Teacher and Administrator of Anæsthetics to St. Mary's and the National Dental Hospitals.

GUIDE TO THE ADMINISTRATION OF ANÆSTHETICS. Fcap. 8vo, 2s.

J. THOMPSON DICKSON, M.A., M.B. CANTAB.
Late Lecturer on Mental Diseases at Guy's Hospital.

THE SCIENCE AND PRACTICE OF MEDICINE IN RELATION TO MIND, the Pathology of the Nerve Centres, and the Jurisprudence of Insanity being a course of Lectures delivered at Guy's Hospital. Illustrated by Chromo-lithographic Drawings and Physiological Portraits. 8vo, 14s.

HORACE DOBELL, M.D.

Consulting Physician to the Royal Hospital for Diseases of the Chest, &c.

I.

ON DIET AND REGIMEN IN SICKNESS AND Health and on the Interdependence and Prevention of Diseases and the Diminution of their Fatality. Seventh Edition, 8vo, 10s. 6d.

II.

AFFECTIONS OF THE HEART AND IN ITS NEIGHBOURHOOD. Cases, Aphorisms, and Commentaries. Illustrated by the heliotype process. 8vo, 6s 6d.

JOHN EAGLE.

Member of the Pharmaceutical Society.

A NOTE-BOOK OF SOLUBILITIES. Arranged chiefly for the use of Prescribers and Dispensers. 12mo, 2s. 6d.

JOHN ERIC ERICHSEN.

Ex-President of the Royal College of Surgeons; Surgeon Extraordinary to H.M. the Queen, etc.

MODERN SURGERY; its Progress and Tendencies. Being the Introductory Address delivered at University College at the opening of the Session 1873-74. Demy 8vo, 1s.

DR. FERBER.

MODEL DIAGRAM OF THE ORGANS IN THE THORAX AND UPPER PART OF THE ABDOMEN. With Letter-press Description. In 4to, coloured, 5s.

J. MAGEE FINNY, M.D. DUBL.

King's Professor of Practice of Medicine in School of Physic, Ireland, &c.

NOTES ON THE PHYSICAL DIAGNOSIS OF LUNG DISEASES. 32mo, 1s. 6d. *[Now ready.*

AUSTIN FLINT, M.D., LL.D.

Professor of Physiology and Physiological Anatomy in the Bellevue Hospital Medical College, New York; visiting Physician to the Bellevue Hospital, &c.

I.

A TEXT-BOOK OF HUMAN PHYSIOLOGY. Fourth edition, Illustrated by plates, and 316 wood engravings, large 8vo, 25s.

II.

THE PHYSIOLOGY OF THE SPECIAL SENSES AND GENERATION; (Being Vol. V. of the Physiology of Man). Roy. 8vo, 18s.

J. MILNER FOTHERGILL, M.D., M.R.C.P.
Late Physician to the City of London Hospital for Diseases of the Chest, Victoria Park, &c.

I.

A MANUAL OF DIETETICS. Large 8vo, 10s. 6d.

II.

THE HEART AND ITS DISEASES, WITH THEIR TREATMENT; INCLUDING THE GOUTY HEART. Second Edition, entirely re-written, copiously illustrated with woodcuts and lithographic plates. 8vo. 16s.

III.

INDIGESTION AND BILIOUSNESS. Second Edition, post 8vo, 7s. 6d.

IV.

GOUT IN ITS PROTEAN ASPECTS. Post 8vo, 7s. 6d.

V.

THE TOWN DWELLER: His Needs and His Wants. With an Introduction by B. W. RICHARDSON, M.D., LL.D., F.R.S. Post 8vo, 3s. 6d. [*Now ready.*

VI.

HEART STARVATION. (Reprinted from the Edinburgh Medical Journal). 8vo, 1s.

FORTESCUE FOX, M.D. LOND.
Fellow of the Medical Society of London.

STRATHPEFFER SPA: Its Climate and Waters. With OBSERVATIONS HISTORICAL, MEDICAL, AND GENERAL, DESCRIPTIVE OF THE VICINITY. Crown 8vo, with Map and Illustrations, 2s. 6d.

ERNEST FRANCIS, F.C.S.
Demonstrator of Practical Chemistry, Charing Cross Hospital.

PRACTICAL EXAMPLES IN QUANTITATIVE ANA-lysis, forming a Concise Guide to the Analysis of Water, &c. Illustrated, fcap. 8vo, 2s. 6d.

ALFRED W. GERRARD, F.C.S.
Examiner to the Pharmaceutical Society; Teacher of Pharmacy and Demonstrator of Materia Medica at University College Hospital.

ELEMENTS OF MATERIA MEDICA AND PHAR-MACY. Crown 8vo, 8s. 6d. [*Just published.*

HENEAGE GIBBES, M.D.
Lecturer on Physiology and on Normal and Morbid Histology in the Medical School of Westminster Hospital; etc.

PRACTICAL HISTOLOGY AND PATHOLOGY. Third Edition, revised and enlarged, crown 8vo, 6s.

C. A. GORDON, M.D., C.B.
Deputy Inspector General of Hospitals, Army Medical Department.

REMARKS ON ARMY SURGEONS AND THEIR WORKS. Demy 8vo, 5s.

JOHN GORHAM, M.R.C.S.

TOOTH EXTRACTION: a Manual on the proper mode of extracting Teeth. Third Edition, fcap. 8vo, 1s. 6d. [*Now ready.*

W. R. GOWERS, M.D., F.R.C.P., M.R.C.S.
Physician to University College Hospital, &c.

DIAGRAMS FOR THE RECORD OF PHYSICAL SIGNS. In books of 12 sets of figures, 1s. Ditto, unbound, 1s.

J. B. GRESSWELL, M.R.C.V.S.
Provincial Veterinary Surgeon to the Royal Agricultural Society.

VETERINARY PHARMACOLOGY AND THERAPEU- TICS. With an Index of Diseases and Remedies. Fcap. 8vo, 5s.

SAMUEL D. GROSS, M.D., LL.D., D.C.L. OXON.
Professor of Surgery in the Jefferson Medical College of Philadelphia.

A PRACTICAL TREATISE ON THE DISEASES, IN- JURIES, AND MALFORMATIONS OF THE URINARY BLADDER, THE PROSTATE GLAND, AND THE URETHRA. Third Edition, revised and edited by S. W. GROSS, A.M., M.D., Surgeon to the Philadelphia Hospital. Illustrated by 170 engravings, 8vo, 18s.

SAMUEL W. GROSS, A.M., M.D.
Surgeon to, and Lecturer on Clinical Surgery in, the Jefferson Medical College Hospital, and the Philadelphia Hospital, &c.

A PRACTICAL TREATISE ON TUMOURS OF THE MAMMARY GLAND: embracing their Histology, Pathology, Diagnosis, and Treatment. With Illustrations, 8vo, 10s. 6d.

ALLAN McLANE HAMILTON, M.D.

THE MODERN TREATMENT OF HEADACHES. Square 16mo, 2s. 6d. [*Just Published.*

WILLIAM A. HAMMOND, M.D.

Professor of Mental and Nervous Diseases in the Medical Department of the University of the City of New York, &c.

I.

A TREATISE ON THE DISEASES OF THE NERVOUS SYSTEM. Seventh edition, with 112 Illustrations, large 8vo, 25s.

II.

A TREATISE ON INSANITY. Large 8vo, 25s.

III.

SPIRITUALISM AND ALLIED CAUSES AND CONDITIONS OF NERVOUS DERANGEMENT. With Illustrations, post 8vo, 8s. 6d.

ALEXANDER HARVEY, M.A., M.D.

Late Emeritus Professor of Materia Medica in the University of Aberdeen; Consulting Physician to the Aberdeen Royal Infirmary, &c.

I.

FIRST LINES OF THERAPEUTICS; as based on the Modes and the Processes of Healing, as occurring Spontaneously in Disease; and on the Modes and the Processes of Dying, as resulting Naturally from Disease. In a series of Lectures. Post 8vo, 5s.

II.

ON THE FŒTUS IN UTERO AS INOCULATING THE MATERNAL WITH THE PECULIARITIES OF THE PATERNAL ORGANISM. In a series of Essays now first collected. Fcap. 8vo, 4s. 6d.

ALEXANDER HARVEY, M.D.

Late Emeritus Professor of Materia Medica in the University of Aberdeen, &c.

AND

ALEXANDER DYCE DAVIDSON, M.D., F.R.S. EDIN.

Late Regius Professor of Materia Medica in the University of Aberdeen.

SYLLABUS OF MATERIA MEDICA FOR THE USE OF STUDENTS, TEACHERS AND PRACTITIONERS. Based on the relative values of articles and preparations in the British Pharmacopœia. Eighth edition, 32mo, 1s. 6d.

K. M. HEANLEY.

Matron of Boston Cottage Hospital.

A MANUAL OF URINE TESTING. Compiled for the use of Matrons, Nurses, and Probationers. Post 8vo, 1s. 6d.

GRAILY HEWITT, M.D.

Professor of Midwifery and Diseases of Women in University College, Obstetrical Physician to University College Hospital, &c.

OUTLINES OF PICTORIAL DIAGNOSIS OF DISEASES OF WOMEN. Folio, 6s.

C. HIGGENS, F.R.C.S.

Ophthalmic Surgeon to Guy's Hospital; Lecturer on Ophthalmology at Guy's Hospital Medical School.

MANUAL OF OPHTHALMIC PRACTICE.
Crown 8vo, illustrations, 6s. [*Now ready.*
[LEWIS'S PRACTICAL SERIES.]

BERKELEY HILL, M.B. LOND., F.R.C.S.

Professor of Clinical Surgery in University College; Surgeon to University College Hospital and to the Lock Hospital.

THE ESSENTIALS OF BANDAGING. With directions for Managing Fractures and Dislocations; for administering Ether and Chloroform; and for using other Surgical Apparatus; with a Chapter on Surgical Landmarks. Sixth Edition, revised and enlarged, Illustrated by 144 Wood Engravings, crown 8vo, 5s.

BERKELEY HILL, M.B. LOND., F.R.C.S.

Professor of Clinical Surgery in University College; Surgeon to University College Hospital and to the Lock Hospital.

AND

ARTHUR COOPER, L.R.C.P., M.R.C.S.

Surgeon to the Westminster General Dispensary.

I.

SYPHILIS AND LOCAL CONTAGIOUS DISORDERS.
Second edition, entirely re-written, royal 8vo, 18s.

II.

THE STUDENT'S MANUAL OF VENEREAL DIS-EASES. Being a Concise Description of those Affections and of their Treatment. Fourth edition, post 8vo, 2s. 6d.

C. R. ILLINGWORTH, M.D. ED., M.R.C.S.

THE ABORTIVE TREATMENT OF SPECIFIC FE-BRILE DISORDERS BY THE BINIODIDE OF MERCURY. Crown 8vo, 3s. 6d.

SIR W. JENNER, Bart., M.D.

Physician in Ordinary to H.M. the Queen, and to H.R.H. the Prince of Wales.

THE PRACTICAL MEDICINE OF TO-DAY: Two Addresses delivered before the British Medical Association, and the Epidemiological Society, (1869). Small 8vo, 1s. 6d.

C. M. JESSOP, M.R.C.P.

Associate of King's College, London; Brigade Surgeon H.M. British Forces.

ASIATIC CHOLERA, being a Report on an Outbreak of Epidemic Cholera in 1876 at a Camp near Murree in India. With map, demy 8vo, 2s. 6d.

GEORGE LINDSAY JOHNSON, M.A., M.B., B.C. CANTAB.

Clinical Assistant, late House Surgeon and Chloroformist, Royal Westminster Ophthalmic Hospital, &c.

A NEW METHOD OF TREATING CHRONIC GLAUCOMA, based on Recent Researches into its Pathology. With Illustrations and coloured frontispiece, demy 8vo, 3s. 6d.

NORMAN KERR, M.D., F.L.S.

President of the Society for the Study of Inebriety; Consulting Physician, Dalrymple Home for Inebriates, etc.

INEBRIETY: its Etiology, Pathology, Treatment, and Jurisprudence. Second edition, Crown 8vo, 12s. 6d. [*Now ready.*

NORMAN W. KINGSLEY, M.D.S., D.D.S.

President of the Board of Censors of the State of New York; Member of the American Academy of Dental Science, &c.

A TREATISE ON ORAL DEFORMITIES AS A BRANCH OF MECHANICAL SURGERY. With over 350 Illustrations, 8vo, 16s.

J. WICKHAM LEGG, F.R.C.P.

Assistant Physician to Saint Bartholomew's Hospital, and Lecturer on Pathological Anatomy in the Medical School.

I.

ON THE BILE, JAUNDICE, AND BILIOUS DISEASES. With Illustrations in chromo-lithography, 719 pages, roy. 8vo, 25s.

II.

A GUIDE TO THE EXAMINATION OF THE URINE; intended chiefly for Clinical Clerks and Students. Sixth Edition, revised and enlarged, with Illustrations, fcap. 8vo, 2s. 6d.

III.

A TREATISE ON HÆMOPHILIA, SOMETIMES CALLED THE HEREDITARY HÆMORRHAGIC DIATHESIS. Fcap. 4to, 7s. 6d.

ARTHUR H. N. LEWERS, M.D. LOND., M.R.C.P. LOND.

Assistant Obstetric Physician to the London Hospital; Examiner in Midwifery and Diseases of Women to the Society of Apothecaries of London, &c.

A PRACTICAL TEXTBOOK OF THE DISEASES OF WOMEN. Second edition, Illustrations, crown 8vo. [*Just ready.*

[LEWIS'S PRACTICAL SERIES.]

DR. GEORGE LEWIN.

Professor at the Fr. Wilh. University, and Surgeon-in-Chief of the Syphilitic Wards and Skin Disease Wards of the Charité Hospital, Berlin.

THE TREATMENT OF SYPHILIS WITH SUBCUTANEOUS SUBLIMATE INJECTIONS. Translated by DR. CARL PRŒGLE, and DR. E. H. GALE, late Surgeon United States Army. Small 8vo, 7s.

LEWIS'S PRACTICAL SERIES.

Under this title Mr. LEWIS is publishing a Series of Monographs, embracing the various branches of Medicine and Surgery.

The volumes are written by well-known Hospital Physicians and Surgeons, recognized as authorities in the subjects of which they treat. The works are intended to be of a THOROUGHLY PRACTICAL nature, calculated to meet the requirements of the practitioner and student, and to present the most recent information in a compact and readable form.

HYGIENE AND PUBLIC HEALTH.

By LOUIS C. PARKES, M.D., D.P.H. LOND. UNIV., Fellow of the Sanitary Institute; Member of the Board of Examiners; Assistant Professor of Hygiene and Public Health at University College. etc. With numerous Illustrations, cr. 8vo, 9s.

MANUAL OF OPHTHALMIC PRACTICE.

By C. HIGGENS, F.R.C.S., Ophthalmic Surgeon to Guy's Hospital; Lecturer on Ophthalmology at Guy's Hospital Medical School. With Illustrations, crown 8vo, 6s.

A PRACTICAL TEXTBOOK OF THE DISEASES OF WOMEN.

By ARTHUR H. N. LEWERS, M.D. Lond., M.R.C.P. Lond., Assistant Obstetric Physician to the London Hospital; Examiner in Midwifery and Diseases of Women to the Society of Apothecaries of London, etc. Second Edition, with Illustrations, crown 8vo. *[Just ready.*

ANÆSTHETICS THEIR USES AND ADMINISTRATION.

By DUDLEY W. BUXTON, M.D., B.S., M.R.C.P., Administrator of Anæsthetics in University College Hospital and the Hospital for Women, Soho Square. Crown 8vo, 4s.

TREATMENT OF DISEASE IN CHILDREN: EMBODYING THE OUTLINES OF DIAGNOSIS AND THE CHIEF PATHOLOGICAL DIFFERENCES BETWEEN CHILDREN AND ADULTS.

By ANGEL MONEY, M.D., F.R.C.P., Assistant Physician to the Hospital for Sick Children, Great Ormond Street, and to University College Hospital. Second edition, crown 8vo. *[Just ready.*

ON FEVERS: THEIR HISTORY, ETIOLOGY, DIAGNOSIS, PROGNOSIS, AND TREATMENT.

By ALEXANDER COLLIE, M.D. Aberd., Member of the Royal College of Physicians of London; Medical Superintendent of the Eastern Hospitals; Secretary of the Epidemiological Society for Germany and Russia. Illustrated with Coloured Plates, crown 8vo, 8s. 6d.

HANDBOOK OF DISEASES OF THE EAR FOR THE USE OF STUDENTS AND PRACTITIONERS.

By URBAN PRITCHARD, M.D. Edin., F.R.C.S. Eng., Professor of Aural Surgery at King's College, London; Aural Surgeon to King's College Hospital; Senior Surgeon to the Royal Ear Hospital. With Illustrations, crown 8vo, 4s. 6d.

A PRACTICAL TREATISE ON DISEASES OF THE KIDNEYS AND URINARY DERANGEMENTS.

By CHARLES HENRY RALFE, M.A., M.D. Cantab., Fellow of the Royal College of Physicians, London; Assistant Physician to the London Hospital; Examiner in Medicine to the University of Durham, etc., etc. With Illustrations, crown 8vo, 10s. 6d.

DENTAL SURGERY FOR GENERAL PRACTITIONERS AND STUDENTS OF MEDICINE.

By ASHLEY W. BARRETT, M.B. Lond., M.R.C.S., L.S.D., Dental Surgeon to, and Lecturer on Dental Surgery and Pathology in the Medical School of, the London Hospital. Second edition, with Illustrations, cr. 8vo. *[Just ready.*

BODILY DEFORMITIES AND THEIR TREATMENT: A HANDBOOK OF PRACTICAL ORTHOPÆDICS.

By H. A. REEVES, F.R.C.S. Edin., Senior Assistant Surgeon and Teacher of Practical Surgery at the London Hospital; Surgeon to the Royal Orthopædic Hospital, &c. With numerous Illustrations, cr 8vo, 8s. 6d.

Further volumes will be announced in due course.

LEWIS'S POCKET CASE BOOK FOR PRACTITIONERS AND STUDENTS. Designed by A. T. BRAND, M.D. Roan, with pencil, 3s. 6d. *nett.*

LEWIS'S POCKET MEDICAL VOCABULARY.
Over 200 pp., 32mo, roan, 3s. 6d.

T. R. LEWIS, M.B., F.R.S. ELECT, ETC.
Late Fellow of the Calcutta University, Surgeon-Major Army Medical Staff, &c.

PHYSIOLOGICAL AND PATHOLOGICAL RESEARCHES. Arranged and edited by SIR WM. AITKEN, M.D., F.R.S., G. E. DOBSON, M.B., F.R.S., and A. E. BROWN, B.Sc. Crown 4to, portrait, 5 maps, 43 plates including 15 chromo-lithographs, and 67 wood engravings, 30s. *nett.*

C. B. LOCKWOOD, F.R.C.S.
Hunterian Professor, Royal College of Surgeons of England; Surgeon to the Great Northern Hospital; Senior Demonstrator of Anatomy and Operative Surgery in St. Bartholomew's Hospital.

HUNTERIAN LECTURES ON THE MORBID ANATOMY, PATHOLOGY AND TREATMENT OF HERNIA. Demy 8vo, 36 illustrations, 5s.

J. S. LOMBARD, M.D.
Formerly Assistant Professor of Physiology in Harvard College.

I.

EXPERIMENTAL RESEARCHES ON THE REGIONAL TEMPERATURE OF THE HEAD, under Conditions of Rest, Intellectual Activity and Emotion. With Illustrations, 8vo, 8s.

II.

ON THE NORMAL TEMPERATURE OF THE HEAD. 8vo, 5s.

WILLIAM THOMPSON LUSK, A.M., M.D.
Professor of Obstetrics and Diseases of Women in the Bellevue Hospital Medical College, &c.

THE SCIENCE AND ART OF MIDWIFERY.
Third Edition, with numerous Illustrations, 8vo, 18s.

A. W. MACFARLANE, M.D., F.R.C.P. EDIN.
Examiner in Medical Jurisprudence in the University of Glasgow; Honorary Consulting Physician (late Physician) Kilmarnock Infirmary.

INSOMNIA AND ITS THERAPEUTICS
Medium 8vo, 12s. 6d. [*Just Published.*

RAWDON MACNAMARA.

Professor of Materia Medica, Royal College of Surgeons, Ireland; Senior Surgeon to the Westmoreland (Lock) Government Hospital; Surgeon to the Meath Hospital, etc.

AN INTRODUCTION TO THE STUDY OF THE BRITISH PHARMACOPŒIA. Demy 32mo, 1s. 6d. [*Just published.*

JOHN MACPHERSON, M.D.

Inspector-General of Hospitals H.M. Bengal Army (Retired). Author of "Cholera in its Home," &c.

I.

ANNALS OF CHOLERA FROM THE EARLIEST PERIODS TO THE YEAR 1817. With a map. Demy 8vo, 7s. 6d.

II.

BATH, CONTREXEVILLE, AND THE LIME SUL-PHATED WATERS. Crown 8vo, 2s. 6d.

DR. V. MAGNAN.

Physician to St. Ann Asylum, Paris; Laureate of the Institute.

ON ALCOHOLISM, the Various Forms of Alcoholic Delirium and their Treatment. Translated by W. S. GREENFIELD, M.D., M.R.C.P. 8vo, 7s. 6d.

A. COWLEY MALLEY, B.A., M.B., B.CH. T.C.D.

PHOTO-MICROGRAPHY; including a description of the Wet Collodion and Gelatino-Bromide Processes, together with the best methods of Mounting and Preparing Microscopic Objects for Photo-Micrography. Second Edition, with Photographs and Illustrations, crown 8vo, 7s. 6d.

PATRICK MANSON, M.D., C.M.

Amoy, China.

THE FILARIA SANGUINIS HOMINIS; AND CER-TAIN NEW FORMS OF PARASITIC DISEASE IN INDIA, CHINA, AND WARM COUNTRIES. Illustrated with Plates and Charts. 8vo, 10s. 6d.

PROFESSOR MARTIN.

MARTIN'S ATLAS OF OBSTETRICS AND GYNÆCOLOGY. Edited by A. MARTIN, Docent in the University of Berlin. Translated and edited with additions by FANCOURT BARNES, M.D., M.R.C P., Physician to the Chelsea Hospital for Women; Obstetric Physician to the Great Northern Hospital; and to the Royal Maternity Charity of London, &c. Medium 4to, Morocco half bound, 31s. 6d. *nett.*

WILLIAM MARTINDALE, F.C.S.

Late Examiner of the Pharmaceutical Society, and late Teacher of Pharmacy and Demonstrator of Materia Medica at University College.

AND

W. WYNN WESTCOTT, M.B. LOND.

Deputy Coroner for Central Middlesex.

THE EXTRA PHARMACOPŒIA with the additions introduced into the British Pharmacopœia, 1885, with Medical References, and a Therapeutic Index of Diseases and Symptoms. Sixth Edition, limp roan, med. 24mo. [*In the press.*

WILLIAM MARTINDALE, F.C.S.

Late Examiner of the Pharmaceutical Society, &c.

COCA, COCAINE, AND ITS SALTS: their History, Medical and Economic Uses, and Medicinal Preparations. Fcap 8vo, 2s.

MATERIA MEDICA LABELS.

Adapted for Public and Private Collections. Compiled from the British Pharmacopœia of 1885. The Labels are arranged in Two Divisions:—

Division I.—Comprises, with few exceptions, Substances of Organized Structure, obtained from the Vegetable and Animal Kingdoms.

Division II.—Comprises Chemical Materia Medica, including Alcohols, Alkaloids, Sugars, and Neutral Bodies.

On plain paper, 10s. 6d. *nett.* On gummed paper, 12s. 6d. *nett.*

*** Specimens of the Labels, of which there are over 450, will be sent on application.

S. E. MAUNSELL, L.R.C.S.I.

Surgeon-Major, Medical Staff.

NOTES OF MEDICAL EXPERIENCES IN INDIA PRINCIPALLY WITH REFERENCE TO DISEASES OF THE EYE. With Map, post 8vo, 3s. 6d.

J. F. MEIGS, M.D.
Consulting Physician to the Children's Hospital, Philadelphia.

AND

W. PEPPER, M.D.
Lecturer on Clinical Medicine in the University of Pennsylvania.

A PRACTICAL TREATISE ON THE DISEASES OF CHILDREN. Seventh Edition, revised and enlarged, roy. 8vo, 28s.

Wm. JULIUS MICKLE, M.D., F.R.C.P. LOND.
Medical Superintendent, Grove Hall Asylum, London, &c.

I.

GENERAL PARALYSIS OF THE INSANE.
Second Edition, enlarged and rewritten, 8vo, 14s.

II.

ON INSANITY IN RELATION TO CARDIAC AND AORTIC DISEASE AND PHTHISIS. Crown 8vo, 3s. 6d.

KENNETH W. MILLICAN, B.A. CANTAB., M.R.C.S.

THE EVOLUTION OF MORBID GERMS: A Contribu-tion to Transcendental Pathology. Cr. 8vo, 3s. 6d.

ANGEL MONEY, M.D. LOND., F.R.C.P.
Assistant Physician to University College Hospital, and to the Hospital for Sick Children, Great Ormond Street; Assistant Professor of Clinical Medicine in University College, London, &c.

I.

THE STUDENT'S TEXTBOOK OF THE PRACTICE OF MEDICINE. Fcap. 8vo, 6s. 6d. [*Just Published.*

II.

TREATMENT OF DISEASE IN CHILDREN: EM-BODYING THE OUTLINES OF DIAGNOSIS AND THE CHIEF PATHOLOGICAL DIFFERENCES BETWEEN CHILDREN AND ADULTS. Second edition, crown 8vo. [*Just ready.*
[LEWIS'S PRACTICAL SERIES.]

E. A. MORSHEAD, M.R.C.S., L.R.C.P.
Assistant to the Professor of Medicine in University College, London.

TABLES OF THE PHYSIOLOGICAL ACTION OF DRUGS. Fcap. 8vo, 1s.

A. STANFORD MORTON, M.B., F.R.C.S. ENG.

Surgeon to the Royal South London Ophthalmic Hospital.

REFRACTION OF THE EYE: Its Diagnosis, and the Correction of its Errors. Third Edition, with Illustrations, small 8vo. 3s.

C. W. MANSELL MOULLIN, M.A., M.D. OXON., F.R.C.S. ENG.

Assistant Surgeon and Senior Demonstrator of Anatomy at the London Hospital; formerly Radcliffe Travelling Fellow and Fellow of Pembroke College, Oxford.

SPRAINS; THEIR CONSEQUENCES AND TREAT-MENT. Crown 8vo, 5s.

PAUL F. MUNDÉ, M.D.

Professor of Gynecology at the New York Polyclinic; President of the New York Obstetrical Society and Vice-President of the British Gynecological Society, &c.

THE MANAGEMENT OF PREGNANCY, PARTURI-TION, AND THE PUERPERAL STATE. Second edition, square 8vo, 3s. 6d.

WILLIAM MURRELL, M.D., F.R.C.P.

Lecturer on Pharmacology and Therapeutics at Westminster Hospital; late Examiner in Materia Medica to the Royal College of Physicians of London, etc.

I.

MASSOTHERAPEUTICS, OR MASSAGE AS A MODE OF TREATMENT. Fourth edition, with Illustrations, crown 8vo, 4s. 6d. [*Just published.*

II.

WHAT TO DO IN CASES OF POISONING.
Sixth edition, royal 32mo, 3s. 6d. [*Just published.*

III.

NITRO-GLYCERINE AS A REMEDY FOR ANGINA PECTORIS. Crown 8vo, 3s. 6d.

IV.

CHRONIC BRONCHITIS AND ITS TREATMENT.
Crown 8vo, 3s. 6d.

DR. FELIX von NIEMEYER.

Late Professor of Pathology and Therapeutics; Director of the Medical Clinic of the University of Tübingen.

A TEXT-BOOK OF PRACTICAL MEDICINE, WITH PARTICULAR REFERENCE TO PHYSIOLOGY AND PATHOLOGICAL ANATOMY. Translated from the Eighth German Edition by special permission of the Author, by GEORGE H. HUMPHERY, M.D., and CHARLES E. HACKLEY, M.D. Revised edition, 2 vols. large 8vo, 36s.

GEORGE OLIVER, M.D., F.R.C.P.

I.

THE HARROGATE WATERS: Data Chemical and Therapeutical, with notes on the Climate of Harrogate. Addressed to the Medical Profession. Crown 8vo, with Map of the Wells, 3s. 6d.

II.

ON BEDSIDE URINE TESTING: a Clinical Guide to the Observation of Urine in the course of Work. Fourth Edition, fcap. 8vo, 3s. 6d. [*Just published.*

SAMUEL OSBORN, F.R.C.S.

Assistant-Surgeon to the Hospital for Women; Surgeon Royal Naval Artillery Volunteers

I.

AMBULANCE LECTURES: FIRST AID. Second edition. with Illustrations, fcap. 8vo, 1s. 6d.

II.

AMBULANCE LECTURES: NURSING. With Illustrations, fcap. 8vo, 1s. 6d.

WILLIAM OSLER, M.D., F.R.C.P. LOND.

Professor of Clinical Medicine in the University of Pennsylvania, &c.

THE CEREBRAL PALSIES OF CHILDREN. A Clinical Study from the Infirmary for Nervous Diseases, Philadelphia. Demy 8vo, 5s. [*Just Published.*

ROBERT W. PARKER.

Surgeon to the East London Hospital for Children, and to the Grosvenor Hospital for Women and Children.

I.

TRACHEOTOMY IN LARYNGEAL DIPHTHERIA, AFTER TREATMENT AND COMPLICATIONS. Second Edition. With Illustrations, 8vo, 5s.

II.

CONGENITAL CLUB-FOOT; ITS NATURE AND TREATMENT. With special reference to the subcutaneous division of Tarsal Ligaments. 8vo, 7s. 6d.

LOUIS C. PARKES, M.D., D.P.H. LOND. UNIV.

Fellow of the Sanitary Institute; Member of the Board of Examiners; Assistant Professor of Hygiene and Public Health at University College, &c.

HYGIENE AND PUBLIC HEALTH. With numerous Illustrations, crown 8vo, 9s. [LEWIS'S PRACTICAL SERIES.]

[*Just Published.*

JOHN S. PARRY, M.D.
Obstetrician to the Philadelphia Hospital, Vice-President of the Obstetrical and Pathological Societies of Philadelphia, &c.

EXTRA-UTERINE PREGNANCY; Its Causes, Species, Pathological Anatomy, Clinical History, Diagnosis, Prognosis and Treatment. 8vo, 8s.

THEOPHILUS PARVIN, M.D.
Professor of Obstetrics and Diseases of Women and Children at the Jefferson Medical School.

LECTURES ON OBSTETRIC NURSING, Delivered at the Training School for Nurses of the Philadelphia Hospital. Post 8vo, 2s. 6d.

E. RANDOLPH PEASLEE, M.D., LL.D.
Late Professor of Gynæcology in the Medical Department of Dartmouth College; President of the New York Academy of Medicine, &c., &c.

OVARIAN TUMOURS: Their Pathology, Diagnosis, and Treatment, especially by Ovariotomy. Illustrations, roy. 8vo, 16s.

G. V. POORE, M.D., F.R.C.P.
Professor of Medical Jurisprudence, University College; Assistant Physician to, and Physician in charge of the Throat Department of, University College Hospital.

LECTURES ON THE PHYSICAL EXAMINATION OF THE MOUTH AND THROAT. With an Appendix of Cases. 8vo, 3s. 6d.

R. DOUGLAS POWELL, M.D., F.R.C.P., M.R.C.S.
Physician Extraordinary to H.M. the Queen; Physician to the Middlesex Hospital and Physician to the Hospital for Consumption and Diseases of the Chest at Brompton.

DISEASES OF THE LUNGS AND PLEURÆ, INCLUD- ING CONSUMPTION. Third edition, entirely rewritten and enlarged. With coloured plates and wood engravings, 8vo, 16s.

URBAN PRITCHARD, M.D. EDIN., F.R.C.S. ENG.
Professor of Aural Surgery at King's College, London; Aural Surgeon to King's College Hospital; Senior Surgeon to the Royal Ear Hospital.

HANDBOOK OF DISEASES OF THE EAR FOR THE USE OF STUDENTS AND PRACTITIONERS. With Illustrations, crown 8vo, 4s. 6d. [LEWIS'S PRACTICAL SERIES.]

CHARLES W. PURDY, M.D. (QUEEN'S UNIV.)
Professor of Genito-Urinary and Renal Diseases in the Chicago Polyclinic, &c., &c.

BRIGHT'S DISEASE AND THE ALLIED AFFECTIONS OF THE KIDNEYS. With Illustrations, large 8vo, 8s. 6d.

CHARLES HENRY RALFE, M.A., M.D. CANTAB., F.R.C.P. LOND.
Assistant Physician to the London Hospital; Examiner in Medicine to the University of Durham, etc., etc.

A PRACTICAL TREATISE ON DISEASES OF THE KIDNEYS AND URINARY DERANGEMENTS. With Illustrations, crown 8vo, 10s. 6d. [LEWIS'S PRACTICAL SERIES.]

AMBROSE L. RANNEY, A.M., M.D.
Professor of the Anatomy and Physiology of the Nervous System in the New York Post-Graduate Medical School and Hospital; Professor of Nervous and Mental Diseases in the Medical Department of the University of Vermont.

THE APPLIED ANATOMY OF THE NERVOUS SYS-TEM. Being a Study of this portion of the Human Body from a stand-point of its general interest and practical utility in Diagnosis, designed for use as a text-book and a work of reference. Second edit., 238 Illustrations, large 8vo, 21s. [*Just published.*

H. A. REEVES, F.R.C.S. EDIN.
Senior Assistant Surgeon and Teacher of Practical Surgery at the London Hospital; Surgeon to the Royal Orthopædic Hospital.

BODILY DEFORMITIES AND THEIR TREATMENT: A HANDBOOK OF PRACTICAL ORTHOPÆDICS. With numerous Illustrations, crown 8vo, 8s. 6d.
[LEWIS'S PRACTICAL SERIES].

RALPH RICHARDSON, M.A., M.D.
Fellow of the College of Physicians, Edinburgh.

ON THE NATURE OF LIFE: An Introductory Chap-ter to Pathology. Second edition, revised and enlarged. Fcap. 4to, 10s. 6d.

W. RICHARDSON, M.A., M.D., M.R.C.P.

REMARKS ON DIABETES, ESPECIALLY IN REFER-ENCE TO TREATMENT. Demy 8vo, 4s. 6d.

SAMUEL RIDEAL, D.SC. (LOND.), F.I.C., F.C.S., F.G.S.
Fellow of University College, London.

PRACTICAL ORGANIC CHEMISTRY; The Detection and Properties of some of the more important Organic Compounds. 12mo, 2s. 6d. [*Just published.*

E. A. RIDSDALE.
Associate of the Royal School of Mines.

COSMIC EVOLUTION; being Speculations on the Origin of our Environment. Fcap. 8vo, 3s.

SYDNEY RINGER, M.D., F.R.S.

Professor of the Principles and Practice of Medicine in University College; Physician to and Professor of Clinical Medicine in, University College Hospital.

I.

A HANDBOOK OF THERAPEUTICS. Twelfth Edition, thoroughly revised, 8vo, 15s.

II.

ON THE TEMPERATURE OF THE BODY AS A MEANS OF DIAGNOSIS AND PROGNOSIS IN PHTHISIS. Second edition, small 8vo, 2s. 6d.

FREDERICK T. ROBERTS, M.D., B.SC., F.R.C.P.

Examiner in Medicine at the University of London; Professor of Therapeutics and of Clinical Medicine in University College; Physician to University College Hospital; Physician to Brompton Consumption Hospital, &c.

I.

A HANDBOOK OF THE THEORY AND PRACTICE OF MEDICINE. Seventh edition, with Illustrations, in one volume, large 8vo, 21s.

*** *Copies may also be had bound in two volumes cloth for 1s. 6d. extra.*

II.

THE OFFICINAL MATERIA MEDICA.
Second edition, entirely rewritten in accordance with the latest British Pharmacopœia, fcap. 8vo, 7s. 6d.

R. LAWTON ROBERTS, M.D., M.R.C.S.

Honorary Life Member of, and Lecturer and Examiner to, the St. John Ambulance Association.

ILLUSTRATED LECTURES ON AMBULANCE WORK.
Third edition copiously Illustrated, crown 8vo, 2s. 6d.

D. B. St. JOHN ROOSA, M.A., M.D.

Professor of Diseases of the Eye and Ear in the University of the City of New York; Surgeon to the Manhattan Eye and Ear Hospital.

A PRACTICAL TREATISE ON THE DISEASES OF THE EAR, including the Anatomy of the Organ. Sixth edition, Illustrated by wood engravings and chromo-lithographs, large 8vo, 25s.

ROBSON ROOSE, M.D.

Fellow of the Royal College of Physicians in Edinburgh.

I.

GOUT, AND ITS RELATIONS TO DISEASES OF THE LIVER AND KIDNEYS. Sixth Edition, crown 8vo, 3s. 6d.

II.

NERVE PROSTRATION AND OTHER FUNCTIONAL DISORDERS OF DAILY LIFE. Crown 8vo, 10s. 6d.

III.

LEPROSY AND ITS TREATMENT: as Illustrated by Norwegian Experience. Crown 8vo, 3s. 6d.

BERNARD ROTH, F.R.C.S.

Fellow of the Medical Society of London; Member of the Clinical and Pathological Societies, and of the Medical Officers of Schools' Association.

THE TREATMENT OF LATERAL CURVATURE OF THE SPINE. With Photographic and other Illustrations, demy 8vo, 5s.

J. BURDON SANDERSON, M.D., LL.D., F.R.S.

Jodrell Professor of Physiology in University College, London.

UNIVERSITY COLLEGE COURSE OF PRACTICAL EXERCISES IN PHYSIOLOGY. With the co-operation of F. J. M. PAGE, B.Sc., F.C.S.; W. NORTH, B.A., F.C.S., and AUG. WALLER, M.D. Demy 8vo, 3s. 6d.

W. H. O. SANKEY, M.D. LOND., F.R.C.P.

Late Lecturer on Mental Diseases, University College, London, etc.

LECTURES ON MENTAL DISEASE. Second Edition, with coloured plates, 8vo, 12s. 6d.

JOHN SAVORY.

Member of the Society of Apothecaries, London.

A COMPENDIUM OF DOMESTIC MEDICINE AND COMPANION TO THE MEDICINE CHEST: Intended as a source of easy reference for Clergymen, Master Mariners, and Travellers; and for Families resident at a distance from professional assistance. Tenth Edition, sm. 8vo, 5s.

E. SCHMIEGELOW, M.D.
Consulting Physician in Laryngology to the Municipal Hospital and Director of the Oto-Laryngological Department in the Polyclinic at Copenhagen.

ASTHMA: Especially in its Relation to Nasal Disease.
Demy 8vo. [*Just ready.*

DR. B. S. SCHULTZE.
Professor of Gynecology; Director of the Lying-in Hospital, and of the Gynecological Clinic at Jena.

THE PATHOLOGY AND TREATMENT OF DISPLACEMENTS OF THE UTERUS. Translated by J. J. MACAN, M.A., M.R.C.S. and edited by A. V. MACAN, M.B., M.Ch., Master of the Rotunda Lying-in Hospital, Dublin. With 120 Illustrations, medium 8vo, 12s. 6d. [*Now ready.*

JOHN V. SHOEMAKER, A.M., M.D.
Professor of Skin Diseases in the Medico-Chirurgical College and Hospital of Philadelphia; Physician to the Philadelphia Hospital for Diseases of the Skin.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN. Coloured Plates and other Illustrations, large 8vo, 24s.

WM. JAPP SINCLAIR, M.A., M.D.
Honorary Physician to the Manchester Southern Hospital for Women and Children, and Manchester Maternity Hospital.

ON GONORRHŒAL INFECTION IN WOMEN.
Post 8vo, 4s.

A. J. C. SKENE, M.D.
Professor of Gynecology in the Long Island College Hospital, Brooklyn, New York.

TREATISE ON THE DISEASES OF WOMEN, FOR THE USE OF STUDENTS AND PRACTITIONERS. Nine coloured plates and 251 engravings, large 8vo, 28s.

ALDER SMITH, M.B. LOND., F.R.C.S.
Resident Medical Officer, Christ's Hospital, London.

RINGWORM: Its Diagnosis and Treatment.
Third Edition, enlarged, with Illustrations, fcap. 8vo, 5s. 6d.

J. LEWIS SMITH, M.D.
Physician to the New York Infants' Hospital; Clinical Lecturer on Diseases of Children in Bellevue Hospital Medical College.

A TREATISE ON THE DISEASES OF INFANCY AND CHILDHOOD. Fifth Edition, with Illustrations, large 8vo, 21s.

FRANCIS W. SMITH, M.B., B.S.

THE SALINE WATERS OF LEAMINGTON. Second Edit., with Illustrations, crown 8vo, 1s. *nett.*

JOHN KENT SPENDER, M.D. LOND.

Physician to the Royal Mineral Water Hospital, Bath.

THE EARLY SYMPTOMS AND THE EARLY TREATMENT OF OSTEO-ARTHRITIS, commonly called Rheumatoid Arthritis, with special reference to the Bath Thermal Waters. Sm. 8vo. 2s. 6d.

LOUIS STARR, M.D.

Clinical Professor of Diseases of Children in the Hospital of the University of Pennsylvania; Physician to the Children's Hospital, Philadelphia, &c.

HYGIENE OF THE NURSERY. Including the General Regimen and Feeding of Infants and Children, and the Domestic Management of the Ordinary Emergiences of Early Life. Second edition, with Illustrations, crown 8vo, 3s. 6d. [*Just published.*

JAMES STARTIN, M.B., M.R.C.S.

Surgeon and Joint Lecturer to St. John's Hospital for Diseases of the Skin.

LECTURES ON THE PARASITIC DISEASES OF THE SKIN. VEGETOID AND ANIMAL. With Illustrations, crown 8vo, 2s. 6d.

W. R. H. STEWART, F.R.C.S., L.R.C.P. EDIN.

Aural Surgeon to the Great Northern Central Hospital; Surgeon to the London Throat Hospital, &c.

EPITOME OF DISEASES AND INJURIES OF THE EAR, with a Chapter on Naso-Pharyngeal Diseases causing Deafness. Demy 32mo, 2s. 6d.

LEWIS A. STIMSON, B.A., M.D.

Surgeon to the Presbyterian and Bellevue Hospitals; Professor of Clinical Surgery in the Medical Faculty of the University of the City of New York, &c.

A MANUAL OF OPERATIVE SURGERY. Second Edition, with three hundred and forty-two Illustrations, post 8vo, 10s. 6d.

ADOLF STRÜMPELL.

Director of the Medical Clinic in the University of Erlangen.

A TEXT-BOOK OF MEDICINE FOR STUDENTS AND PRACTITIONERS. Translated from the latest German edition by Dr. H. F. VICKERY and Dr. P. C. KNAPP, with Editorial Notes by Dr. F. C. SHATTUCK, Visiting Physician to the Massachusetts General Hospital, etc. Complete in one large vol., imp. 8vo, with 111 Illustrations, 28s.

JUKES DE STYRAP, M.K.Q.C.P., ETC.

Physician-Extraordinary, late Physician in Ordinary, to the Salop Infirmary; Consulting Physician to the South Salop and Montgomeryshire Infirmaries, etc.

THE MEDICO-CHIRURGICAL TARIFFS PREPARED FOR THE LATE SHROPSHIRE ETHICAL BRANCH OF THE BRITISH MEDICAL ASSOCIATION. Fourth Edition, fcap. 4to, revised and enlarged, 2s. *nett.*

C. W. SUCKLING, M.D. LOND., M.R.C.P.

Professor of Materia Medica and Therapeutics at the Queen's College, Physician to the Queen's Hospital, Birmingham, etc.

ON THE DIAGNOSIS OF DISEASES OF THE BRAIN, SPINAL CORD, AND NERVES. With Illustrations, crown 8vo, 8s. 6d.

JOHN BLAND SUTTON, F.R.C.S.

Lecturer on Comparative Anatomy, Senior Demonstrator of Anatomy, and Assistant Surgeon to the Middlesex Hospital; Erasmus Wilson Lecturer, Royal College of Surgeons, England.

LIGAMENTS: THEIR NATURE AND MORPHOLOGY. With numerous Illustrations, post 8vo, 4s. 6d.

HENRY R. SWANZY, A.M., M.B., F.R.C.S.I.

Examiner in Ophthalmic Surgery in the Royal University of Ireland, and to the Conjoint Board of the King and Queen's College of Physicians and Royal College of Surgeons, Ireland; Surgeon to the National Eye and Ear Infirmary, Dublin, etc.

A HANDBOOK OF THE DISEASES OF THE EYE AND THEIR TREATMENT. Second Edition, Illustrated with wood-engravings, colour tests, etc., small 8vo, 10s. 6d.

EUGENE S. TALBOT, M.D., D.D.S.

Professor of Dental Surgery in the Woman's Medical College; Lecturer on Dental Pathology and Surgery in Rush Medical College, Chicago.

IRREGULARITIES OF THE TEETH AND THEIR TREATMENT. With 152 Illustrations, royal 8vo, 10s. 6d.

H. COUPLAND TAYLOR, M.D.

Fellow of the Royal Meteorological Society.

WANDERINGS IN SEARCH OF HEALTH, OR MEDICAL AND METEOROLOGICAL NOTES ON VARIOUS FOREIGN HEALTH RESORTS. Crown 8vo, with illustrations.

[*Just ready*

JOHN DAVIES THOMAS, M.D. LOND., F.R.C.S. ENG.

Physician to the Adelaide Hospital, S. Australia.

I.

HYDATID DISEASE, WITH SPECIAL REFERENCE TO ITS PREVALENCE IN AUSTRALIA. Demy 8vo, 10s. 6d.

II.

HYDATID DISEASE OF THE LUNGS. Demy 8vo, 2s.

HUGH OWEN THOMAS, M.R.C.S.

I.

DISEASES OF THE HIP, KNEE, AND ANKLE JOINTS, with their Deformities, treated by a new and efficient method. Third Edition, 8vo, 25s.

II.

CONTRIBUTIONS TO SURGERY AND MEDICINE:—

PART 1.—Intestinal Obstruction; with an Appendix on the Action of Remedies. 10s.

, 2.—The Principles of the Treatment of Joint Disease, Inflammation, Anchylosis, Reduction of Joint Deformity, Bone Setting. 5s.

,, 3.—Fractures, Dislocations, Diseases and Deformities of the Bones of the Trunk and Upper Extremities. 10s.

,, 4.—The Collegian of 1666 and the Collegians of 1885; or what is recognised treatment? Second Edition, 1s.

,, 5.—On Fractures of the Lower Jaw. 1s.

,, 6.—The Principles of the Treatment of Fractures and Dislocations. 10s.

,, 8.—The Inhibition of Nerves by Drugs. Proof that Inhibitory Nerve-Fibres do not exist. 1s.

(Parts 7, 9 and 10 are in preparation).

J. ASHBURTON THOMPSON, M.R.C.S.

Late Surgeon at King's Cross to the Great Northern Railway Company.

FREE PHOSPHORUS IN MEDICINE WITH SPE- CIAL REFERENCE TO ITS USE IN NEURALGIA. A contribution to Materia Medica and Therapeutics. An account of the History, Pharmaceutical Preparations, Dose, Internal Administration, and Therapeutic uses of Phosphorus; with a Complete Bibliography of this subject, referring to nearly 200 works upon it. Demy 8vo, 7s. 6d.

J. C. THOROWGOOD, M.D.

Assistant Physician to the City of London Hospital for Diseases of the Chest.

THE CLIMATIC TREATMENT OF CONSUMPTION AND CHRONIC LUNG DISEASES. Third Edition, post 8vo, 3s 6d.

FREDERICK TREVES, F.R.C.S.

Hunterian Professor at the Royal College of Surgeons of England; Surgeon to and Lecturer on Anatomy at the London Hospital.

THE ANATOMY OF THE INTESTINAL CANAL AND PERITONEUM IN MAN. Hunterian Lectures, 1885. 4to, 2s. 6d.

D. HACK TUKE, M.D., LL.D.

Fellow of the Royal College of Physicians, London.

THE INSANE IN THE UNITED STATES AND CANADA. Demy 8vo, 7s. 6d.

DR. R. ULTZMANN.

ON STERILITY AND IMPOTENCE IN MAN. Translated from the German with notes and additions by ARTHUR COOPER, L.R.C.P., M.R.C.S., Surgeon to the Westminster General Dispensary. With Illustrations, fcap. 8vo, 2s. 6d.

W. H. VAN BUREN, M.D., LL.D.

Professor of Surgery in the Bellevue Hospital Medical College.

DISEASES OF THE RECTUM: And the Surgery of the Lower Bowel. Second Edition, with Illustrations, 8vo, 14s.

RUDOLPH VIRCHOW, M.D.

Professor in the University, and Member of the Academy of Sciences of Berlin, &c., &c.

INFECTION-DISEASES IN THE ARMY, Chiefly Wound Fever, Typhoid, Dysentery, and Diphtheria. Translated from the German by JOHN JAMES, M.B., F.R.C.S. Fcap. 8vo, 1s. 6d.

ALFRED VOGEL, M.D.

Professor of Clinical Medicine in the University of Dorpat, Russia.

A PRACTICAL TREATISE ON THE DISEASES OF CHILDREN. Third Edition, translated and edited by H. RAPHAEL, M.D., from the Eighth German Edition, illustrated by six lithographic plates, part coloured, royal 8vo, 18s.

A. DUNBAR WALKER, M.D., C.M.

THE PARENT'S MEDICAL NOTE BOOK. Oblong post 8vo, cloth, 1s. 6d.

JOHN RICHARD WARDELL, M.D. EDIN., F.R.C.P. LOND.

Late Consulting Physician to the General Hospital Tunbridge Wells.

CONTRIBUTIONS TO PATHOLOGY AND THE PRAC- TICE OF MEDICINE. Medium 8vo, 21s.

W. SPENCER WATSON, F.R.C.S. ENG., B.M. LOND.

Surgeon to the Great Northern Hospital; Surgeon to the Royal South London Ophthalmic Hospital.

I.

DISEASES OF THE NOSE AND ITS ACCESSORY CAVITIES. Profusely Illustrated. Demy 8vo, 18s.

II.

EYEBALL-TENSION: Its Effects on the Sight and its Treatment. With woodcuts, p. 8vo, 2s. 6d.

III.

ON ABSCESS AND TUMOURS OF THE ORBIT. Post 8vo, 2s. 6d.

FRANCIS H. WELCH, F.R.C.S.

Surgeon Major, A.M.D.

ENTERIC FEVER: as Illustrated by Army Data at Home and Abroad, its Prevalence and Modifications, Ætiology, Pathology and Treatment. 8vo, 5s. 6d.

W. WYNN WESTCOTT, M.B.

Deputy Coroner for Central Middlesex.

SUICIDE; its History, Literature, Jurisprudence, and Prevention. Crown 8vo, 6s.

E. G. WHITTLE, M.D. LOND., F.R.C.S. ENG.

Senior Surgeon to the Royal Alexandra Hospital for Sick Children, Brighton.

CONGESTIVE NEURASTHENIA, OR INSOMNIA AND NERVE DEPRESSION. Crown 8vo, 3s. 6d.

[*Just published.*

JOHN WILLIAMS, M.D., F.R.C.P.

Professor of Midwifery in University College, London; Obstetric Physician to University College Hospital; Physician Accoucheur to H.R.H. Princess Beatrice, etc.

CANCER OF THE UTERUS: Being the Harveian Lec-tures for 1886. Illustrated with Lithographic Plates, royal 8vo, 10s. 6d.

E. T. WILSON, B.M. OXON., F.R.C.P. LOND.

Physician to the Cheltenham General Hospital and Dispensary.

DISINFECTANTS AND HOW TO USE THEM. In Packets of one doz. price 1s.

DR. F. WINCKEL.

Formerly Professor and Director of the Gynæcological Clinic at the University of Rostock.

THE PATHOLOGY AND TREATMENT OF CHILD-BED: A Treatise for Physicians and Students. Translated from the Second German edition, with many additional notes by the Author, by J. R. CHADWICK, M.D. 8vo, 14s.

BERTRAM C. A. WINDLE, M.A., M.D. DUBL.

Professor of Anatomy in the Queen's College, Birmingham; Examiner in Anatomy in the Universities of Cambridge and Durham.

A HANDBOOK OF SURFACE ANATOMY AND LAND-MARKS. Post 8vo, illustrations, 3s. 6d.

EDWARD WOAKES, M.D. LOND.

Senior Aural Surgeon and Lecturer on Aural Surgery at the London Hospital; Surgeon to the London Throat Hospital.

I.

ON DEAFNESS, GIDDINESS AND NOISES IN THE HEAD.

VOL. I.—POST-NASAL CATARRH, AND DISEASES OF THE NOSE CAUSING DEAFNESS. With Illustrations, cr. 8vo, 6s. 6d.

VOL. II.—ON DEAFNESS, GIDDINESS AND NOISES IN THE HEAD. Third Edition, with Illustrations, cr. 8vo. [*In preparation.*

II.

NASAL POLYPUS: WITH NEURALGIA, HAY-FEVER, AND ASTHMA, IN RELATION TO ETHMOIDITIS. With Illustrations, cr. 8vo, 4s. 6d.

DAVID YOUNG, M.C., M.B., M.D.

Licentiate of the Royal College of Physicians, Edinburgh; Licentiate of the Royal College of Surgeons, Edinburgh, etc.

ROME IN WINTER AND THE TUSCAN HILLS IN SUMMER. A CONTRIBUTION TO THE CLIMATE OF ITALY. Small 8vo, 6s.

HERMANN VON ZEISSL, M.D.

Late Professor at the Imperial Royal University of Vienna.

OUTLINES OF THE PATHOLOGY AND TREAT-MENT OF SYPHILIS AND ALLIED VENEREAL DISEASES. Second Edition, revised by M. VON ZEISSL, M.D., Privat-Docent for Diseases of the Skin and Syphilis at the Imperial Royal University of Vienna. Translated, with Notes, by H. RAPHAEL, M.D., Attending Physician for Diseases of Genito-Urinary Organs and Syphilis, Bellevue Hospital, Out-Patient Department. Large 8vo, 18s. [*Just published*

Clinical Charts For Temperature Observations, etc.

Arranged by W. RIGDEN, M.R.C.S. 50s. per 1000, 28s. per 500, 15s. per 250, 7s. per 100, or 1s. per dozen.

Each Chart is arranged for four weeks, and is ruled at the back for making notes of Cases; they are convenient in size, and are suitable both for hospital and private practice.

THE NEW SYDENHAM SOCIETY'S PUBLICATIONS.

President :—W. T. GAIRDNER, M.D., LL.D.
Honorary Secretary :—JONATHAN HUTCHINSON, ESQ., F.R.S.
Treasurer :—W. SEDGWICK SAUNDERS, M.D., F.S.A.

Annual Subscription, One Guinea.

The Society issues translations of recent standard works by continental authors on subjects of general interest to the profession.

Amongst works recently issued are "Cohnheim's Pathology," "Henoch's Children," "Spiegelberg's Midwifery," "Hirsch's Historical and Geographical Pathology," "Essays on Micro-Parasites," works by Charcot, Duchenne, Begbie, Billroth, Graves, Koch, Hebra, Guttmann, etc.

The Society also has in hand an Atlas of Pathology with Coloured Plates, and a valuable and exhaustive "Lexicon of Medicine and the Allied Sciences."

The Annual Report, with full list of works published, and all further information will be sent on application.

PERIODICAL WORKS PUBLISHED BY H. K. LEWIS.

THE BRITISH JOURNAL OF DERMATOLOGY. Edited by Malcolm Morris and H. G. Brooke. Published monthly, 1s. Annual Subscription 12s. post free.

THE NEW YORK MEDICAL JOURNAL. A Weekly Review of Medicine. Annual Subscription, One Guinea, post free.

THE THERAPEUTIC GAZETTE. A Monthly Journal, devoted to the Science of Pharmacology, and to the introduction of New Therapeutic Agents. Edited by Drs. H. C. Wood and R. M. Smith. Annual Subscription, 10s., post free.

THE GLASGOW MEDICAL JOURNAL. Published Monthly. Annual Subscription, 20s., post free. Single numbers, 2s. each.

LIVERPOOL MEDICO-CHIRURGICAL JOURNAL, including the Proceedings of the Liverpool Medical Institution. Published twice yearly, 3s. 6d. each number.

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA. Volumes I. to VI., 8vo, 10s. 6d. each.

MIDDLESEX HOSPITAL, REPORTS OF THE MEDICAL, SURGICAL, AND Pathological Registrars for 1883 to 1888. Demy 8vo, 2s. 6d. *nett* each volume.

⁂ MR. LEWIS is in constant communication with the leading publishing firms in America, and has transactions with them for the sale of his publications in that country. Advantageous arrangements are made in the interests of Authors for the publishing of their works in the United States.

Mr. Lewis's publications can be procured of all Booksellers in any part of the world.

London: Printed by H. K. Lewis, 136 Gower Street, W.C.