

A contribution to the clinical history of Graves' disease (exophthalmic goitre) / by J. Russell Reynolds.

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amount of lung tissue deprived of air. The plug is sometimes suddenly removed by a fit of coughing.

The methods of inspection and palpation aid us little in bronchitis, and we have, as regards physical signs, to rely upon the negative sign of the absence of dulness, and the auscultatory rhonchus, sibilus, and mucous râles. The only symptom of bronchitis, in addition to the cough and sputum, which need be mentioned is one which has been already incidentally alluded to—viz., dyspnoea. A certain amount of dyspnoea is always present, but it may be very slight—in fact, it varies from a slight wheezing to the pronounced excessive dyspnoea such as is observed during an attack of asthma. When the dyspnoea is great, there is either inflammation of the small tubes with fever, with marked sibilant sounds on auscultation; or the exudation is inclined to be croupous rather than catarrhal, or a plug is lodged in a bronchial tube, producing the condition before described; or finally, there is some complication such as broncho-pneumonia. One of the most important prognostic criteria under these circumstances is the condition of the circulation. If there be much blueness of the lips and tongue, with coldness of the extremities, cold sweats and small, feeble, perhaps irregular pulse, the condition is serious. It is also a sign of the gravity of the attack if there is high fever, coupled with loud and intense râles all over the chest; and again, according to Stokes, if with the fever during ordinary respiration we hear little or no râle, because in the latter case the finer ramifications of the bronchial tubes are so turged that during ordinary respiration the air cannot enter them with sufficient force to produce a tone. A forced inspiration, however, will bring the sounds forth with considerable distinctness.

I do not propose to devote more time to the subject of *primary bronchitis*, but will next turn for a few minutes to the second class, into which I have divided bronchial catarrhs, and that only for the purpose of drawing attention to the fact that the presence of marked and persistent bronchial catarrh may be such as to make a case of typhoid fever be mistaken for general acute tuberculosis of the lung. I have seen such a mistake made, and it is neither very uncommon nor yet deserving of much blame. Now, in typhoid fever and in measles bronchitis is sufficiently common, and is, in all probability, a manifestation of the specific poison in both cases; in rheumatism and (according to various weighty authorities) in gout, again, the catarrh is but a manifestation of the working of the specific poison.

Dr. Greenhow has laid stress upon the frequent concurrence of gout and psoriasis or eczema with bronchitis among the out-patients of our hospitals. He found that in about one-quarter of the cases of bronchitis among his out-patients gout showed itself in a regular form, either coincidentally or alternately with the bronchitis; in others bronchitis was joined with the so-called rheumatic gout. He also called attention to the form of dyspnoea generally known under the name of *gouty asthma*, or the "asthmatic dyspnoea" of Dr. Graves. This form of dyspnoea, in which spasm of the bronchial muscles is said to enter, is always associated with bronchial inflammation in which the exudation is particularly sticky and difficult of expectoration.

The third class of cases, which includes those I have called local bronchial catarrhs, is I think even more important to us as connected with a chest hospital than the preceding two classes, as under this head is included the bronchial catarrhs connected with pulmonary tuberculosis.

Before we can discuss the connexion between bronchitis and phthisis, it will be necessary to allude to a condition of the lung which is connected with bronchitis—that is to say, *bronchiectasis*. Of the chief causes which produce chronic bronchitis, one of the commonest may be said to be the constant inhalation of irritating particles, which is bound to happen in occupations such as that pursued by coal-miners, masons, knife grinders, and the like. In this form of chronic bronchitis the course of the carbonaceous particles has been carefully traced by Professor Hamilton by means of microscopic examination of the lungs of patients who have died of the disease, as follows: "They first penetrate through the infundibula, air vesicles, and smallest bronchi, and from these they are poured into certain of the peri-bronchial lymphatics, but mostly into the large peri-vascular branches. Those which enter the peri-bronchial lymphatics apparently very soon pass into the larger lymphatics round the arteries. From the peri-vascular lymphatics they run into the lobular septa, from this to the deep layer of

the pleura, and finally into the bronchial glands." The peri-bronchitis and peri-arteritis which follow in some cases appear to implicate not only the fibrous tissue around the bronchi and arteries, but also the lobular septa and pleura, so that a very large amount of new fibrous tissue results. It is by the cicatrization of this tissue that irregular dilatations of the bronchi result, so Dr. Hamilton says. They may occur anywhere in the lung, but particularly in the apex and base. In the latter case it is very likely that it is the chief posterior basic bronchus in either lung which is affected. This has been shown by the researches of Aebly and Ewart to be the main continuation of the bronchial stem. It is only fair to say that some pathologists and physicians take a different view of the formation of irregular bronchiectases in the lower lobe of the lung than the one here given. Many believe that they are due to antecedent pleurisy and consequent fibrous thickening. Whether this view is correct or not, there is no doubt that chronic bronchial catarrh is always associated with the condition described. I have no time to touch here upon the other forms of bronchiectasis—viz., the *fusiform* and *sacculated*.

A CONTRIBUTION TO THE CLINICAL HISTORY OF GRAVES' DISEASE (EXOPHTHALMIC GOITRE).

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THE term "Graves' disease" is employed in this paper in preference to that of "exophthalmic goitre," inasmuch as it has a wider range of meaning and connotes three sets of symptoms which are not hinted at in this latter term, but which are quite as important as those two which it does convey. Moreover, it involves no theory as to the nature of the connexion between those symptoms, nor any suggestion as to their relative value or order of sequence. Prominence of eyeball and enlargement of the thyroid body have been in many cases delayed until long after cardiac or nervous symptoms have been developed, and become urgent; so that the real nature of the malady has been concealed, and its treatment rendered ineffective. It is this fact which has led me to make the following communication, in the hope that its perusal may lead to an earlier recognition of the true nature of the malady, and so further to its treatment at the time when such treatment is by far the most efficacious.

During the past four years, from 1886 to 1890, I have made notes of forty-nine cases of Graves' disease which have come under my care in private practice. Of these, by far the most severe, characteristic, and acute in development presented themselves in the year 1888, in which year also a larger number occurred than in any two of the other years. To this matter I shall recur presently when speaking of external conditions in relation to the possible etiology of this curious disease. But,

I. With regard to the internal conditions of the individuals affected.

Sex.—Forty-eight were females, and one only was a male, but in this latter the symptoms were highly characteristic and severe. I have not included in this category a curious case of a gentleman over sixty, whose pulse while lying was 120, who was partly crazy, and had notably prominent eyeballs, without any enlargement of the thyroid. The exophthalmos was rather a simple peculiarity of shape of unknown duration; and the rapidity of pulse was probably due to past, but considerable, intemperance with alcohol.

Age.—Of 48 cases there were 12 from ten to twenty years of age; from twenty to thirty, 15; from thirty to forty, 10; from forty to fifty, 7; from fifty to sixty, 4. So far as this small number of cases can show anything on such a large subject as the influence of age in the production of disease, it is to the effect that although more than one half of the cases were under thirty, yet the influence of age is reduced to next to nil if regard be paid to the number of people living in the succeeding decades. The cases which occurred in 1888 exhibited nothing special in relationship to the age at which the malady occurred.

Social position.—All the patients whom I have seen

were in easy, and some in affluent, circumstances. No one was either underfed, underclothed, badly housed, or overworked. In some instances there had been anxiety, or strain, or fear; but in almost all the cases it was impossible to refer the malady to the four most common of anti-hygienic conditions. Of 48 cases, 27 were single and 21 were married; the man was married. Of the married women, a large proportion (6:2) had families varying in number from 1 to 9.

II. *Symptoms.*—Graves' disease consists essentially in the combination of five sets of symptoms—viz., (1) disturbance of the circulation, (2) prominence of the eyeballs, (3) enlargement of the thyroid, (4) derangement of the nervous system, and (5) impairment of the general health. The amount of disturbance in these five directions varies greatly, sometimes one set being much more pronounced than the others, and occasionally one or two being absent, and yet the nature of the case undoubted. In 4 out of 42 cases marked symptoms occurred in three directions only, whereas in 16 four sets of symptoms were present, and in 21 cases there was the combination of five; thus, 37 cases were very complete examples of the malady.

1. *Circulation.*—These symptoms were in very many cases initial, and in some they continued for weeks or months before any other disturbance appeared. They consisted of (a) palpitation in the cardiac region, almost always both objective and subjective, frequently extending to the throat, temples, abdominal aorta, and to both the upper and lower extremities. The impulse of the heart was felt over an enlarged area, and with sufficient force in several instances to shake the thorax, and indeed the whole body. (b) Distressing sensations of "more than beating," such as bursting, faintness, want of breath, suffocation, impending dissolution, "giddiness" referred to the "thumping in the head," "confusion" likewise so related, also "noises in the ears" keeping time with the pulsation. (c) Epigastric distress associated in time with the throbbing, such as pain, nausea, sinking, occasional retching or vomiting, explosions of flatus, rhythmic and most annoying borborygmi, and the like. (d) Frequency of pulsation: In every case there has been increased frequency, and in only two has it been but a slight symptom. The pulse has ranged from 98 to 160, the most common rate, while the patient was sitting, being from 110 to 118 or 120. On the slightest exertion, such as rising from a chair or walking even slowly, the pulsations become too rapid to be counted, while absolute rest in the recumbent posture may reduce the number by 20 or even 30 in the minute. This is especially noticeable when the rate of pulsation is very high. In the man to whose case I have referred the pulse was frequently from 140 to 150 or 160. Emotion, or any sudden startling sight, sound, touch, or pain will quicken the pulse almost as notably as will physical exertion. In some cases the pulse, although very rapid, may be small and very feeble; even when full and throbbing it is often easily compressed, while in almost all cases the beat has been at the time of observation habitually regular in both force and rhythm. (e) In no single case has there been any disease of the orifices, or of their valves, or of the substance of the walls of the heart. At the same time there has been recognisable but varying size of the heart's cavities, and in feeble women, advancing in years, there has been attenuation of, and doubtless degenerative change in, the cardiac walls. (f) Murmurs are audible, in at least two-thirds of the cases, at the base of the heart and at the second cartilages, right and left; and in the supra-clavicular regions; also, occasionally and temporarily, at the mitral apex of the heart. These are systolic in time, and either hæmic or muscular in their origin. When the pulsation is very vehement a systolic murmur is often audible over the whole cardiac region and along the course of the aorta. (g) Venous hum has been present in the large majority of cases. It has varied in intensity, character, and pitch of tone, and has been most audible, as a rule, over the right clavicle. However, I have frequently observed it in the left supra-clavicular space along the superior longitudinal sinus and over the torcular Herophili. It differs in no way from the ordinary "hum" of anæmia.

2. *Exophthalmos* was absent in six cases, but present in all the others. It was the only absentee in five out of the six cases; while in the sixth the other failing symptom was "nervous derangement." The amount of prominence varied widely, from slight protrusion, such as friends had scarcely observed, to deformity that was quite conspicuous and distressing. Many of the patients were myopic, but

they had been so before the malady commenced. Only three or four complained of any alteration of sight, and all that they noticed was "some mistiness," due apparently to irritation of the conjunctiva from the contact of dust. In all but three cases the fundus of the eye was pale, but presented no other departure from health. In three cases there was hyperæmia of the discs. In only four individuals—one a man—was the sclerotic visible above the iris when the patient was looking downwards.

3. *Goitre* was present in every case but one; its degree, however, varied as widely as did that of the exophthalmos. There was generally enlargement of the whole organ, but principally of the lateral lobes. The fulness and hardness of the swelling varied from day to day, but almost always differed in direct ratio with the frequency of the pulse and the fulness of the eyeballs. In a small number of cases there had been slight goitre for several years before any other departure from health was recognised; in a larger number it had come on, together with exophthalmos, some weeks or months after other symptoms (palpitation, nervous distress, anæmia) had set in. In one highly marked and typical case the goitre and exophthalmos did not appear until after the patient had been under observation for twenty-two months. When sufferers from Graves' disease have been "cutting the wisdom-teeth" I have often observed that the goitre has increased when any special irritation of the gums has arisen, from "cold" or other causes, and that the increase has passed away as that irritation has been reduced. Vascular murmur, synchronous with the pulse, is sometimes heard in the enlarged body, but this, so far as my observations go, is quite exceptional, even when such murmurs are distinct in the carotid arteries and at the base of the heart, and when also there is a loud hum in the jugular veins.

4. *Nervous disturbances*, though various in character, are invariably present and usually severe. (a) "Hysterical" symptoms are the most common and troublesome, but not so serious as are many others. The highly "susceptible nervous temperament" is general; but genuine "hysterical attacks" occurred in not more than one-fourth of the cases I have observed. In all these patients, however, there were other symptoms of wider range. There is nothing "special" in the character of the "hysterical paroxysm"; its inception, duration, and features have been of the common sort, with no peculiar change in the respiration or capillary circulation. (b) Mental symptoms present themselves in the form of "depression," amounting to definite melancholia in some cases; but, in the majority, alternating with periods of "excitement," irritable temper, mendacity, wandering, troublesome capriciousness, insomnia, delirium, fancies, delusions, and crazy conduct that it is not easy to separate from mania in subacute attacks or chronic form. There is often a condition of mind which I have been in the habit of describing as a "chorea of ideas," which is peculiarly trying to the patient and her friends. The patient tries to think one thing, and thinks something else instead; and is often so much bewildered as to give up the attempt in despair. (c) Sensations are strangely perverted, and frequently painful. Cephalalgia is very common, but has no special character, and is indicative rather of the condition of the general health than of this particular disease. Paræsthesiæ are as numerous as they well can be; and among the most frequent are vertigo, or something short of it, denoted as dizziness, confusion, instability in standing or walking, tinnitus aurium of varying intensity and duration, but so distressing as to induce deafness, and increase the incapacity for "taking in what is said." Sensorial illusions, such as spectra of sight, sometimes so apparently real as to provoke conversation with imaginary people, and yet recognised by the individual as being imaginary. Spectra of hearing also occur, voices of different qualities uttering sentences to which replies are made, the patient at the time not always being quite certain whether they are real or not, but at other times being quite confident that they were imaginary. There is, with these paræsthesiæ, very frequently a sense of restlessness, highly distressing, and often so aggravated when the patient is alone as to induce most distressing insomnia. In many cases this sleeplessness has been the one symptom for which relief has been most earnestly sought. Perhaps the most general condition has been one of great dread of impending evil, or of some sudden collapse, usually based upon the fact of painful or indescribably horrid sensations. (d) Muscular disturbances are common, but not equally frequent with sensorial.

They, however, have occasioned still greater alarm. Stuttering and stammering have occurred in several instances, with occasional inability to articulate certain words, and some general difficulty in "getting out any words," so as to carry on a conversation. This difficulty is rarely persistent, but comes and goes, and is particularly prone to come when most annoying, and in the presence of strangers. In two of my cases there were attacks of aphasia, occurring several times in the day, and lasting from a few minutes only to three or four hours. Choreic movements of the facial muscles, of the arms, hands, and legs have been common enough; and with these, disorderly movements of the respiratory muscles, inducing a feeling of breathlessness and occasional attacks of dyspnoea, which the patients and their friends describe as "asthma." In such conditions there is often a sense of faintness, and objectively slight cyanosis, with irregular respiration and intermittent pulse. Tremors and jactitation of the upper extremities are very common, and in some instances there has been tremulous movement of the head. Eclamptic attacks were present in one case; and epileptoid seizures, like those of petit mal, in one. In two cases there was slight but distinct paresis of the left arm, and in these there was difficulty of articulation. So widely distributed and so various are the signs of nervous derangement that it is obvious no one symptom, or even group of symptoms, is peculiar to Graves' disease. All that can be said is that they are of the general sort that accompanies depressed nervous force in dependence upon a general innutrition.

5. The general health in one case was good, but in all the others there was pronounced anæmia, indicated by all its usual features, in varying degrees of relative intensity. There has been nothing special in the character of the anæmia. It has sometimes been present for months before any other symptoms were observed, and it has persisted when the exophthalmos, the goitre, and the palpitation have passed away. In such cases, however, its intensity has been reduced. In by far the larger number of cases anæmia has been observed to arise together with the palpitation and the nervous disturbances, and has advanced and receded, *pari passu*, with goitre and prominence of the eyeballs. Atonic dyspepsia has been present in about half the cases, but has been as distinctly absent in the other, so that its association with the malady cannot be regarded as other than accidental. In only two cases has there been any departure from health in regard to the renal secretions, and in these there was slight and transient albuminuria. In several cases there have been occasional excesses in the amount of alkaline phosphates, or of the lithates, but these have clearly borne no definite relation to the general disease. With the exception of three cases, in which there were disturbances of the uterine structure or functions, those functions have been generally healthy in both character and time. Sometimes menstruation has been scanty, but I have not met with any case of amenorrhœa, or of menorrhagia; and dysmenorrhœa has been simply accidental, and only very rare in its occurrence. In almost every case the patient has been weak, incapable of healthy exertion, chilly, and very easily "disturbed"—i.e., "run down" by a cold, or any onset of dyspepsia, any accidental shock or fatigue—but beyond this condition I have been unable to discover any proclivity to any special kind of organic disease. In no one case have I met with tubercle, struma, syphilis, rickets, gout, rheumatism, or any like dyscrasia, as an active participator in the general condition of malaise.

III. External conditions that might possibly operate in the production of the disease. The number of cases, and the relatively great and rapid development of the malady in 1888, as compared with the preceding and following years, have led me to investigate the conditions of the weather during this epoch, and the results are as follows:—From November, 1886, to October, 1887, during which time the number of cases was but relatively small, the mean temperature was -9°F. , the mean rainfall was -8.40 in. , and the mean barometric pressure was $+1.26\text{ in.}$ From November, 1887, to October, 1888, during which time the number of cases was the highest, the mean temperature was -20°F. , the mean rainfall was -7.05 in. , and the mean barometric pressure was $+0.28\text{ in.}$ From November, 1888, to October, 1889, during which period the number of cases fell to less than one-half, the mean temperature was $+8^{\circ}\text{F.}$, the mean rainfall was -2.5 in. , and the mean barometric pressure was -0.13 in. Another point of some interest is the amount of sunshine, and with regard to this I find that, from September, 1887, to

February, 1888, during which the large number of cases were being developed, the amount of sunshine was only 216 hours, whereas in the period from September, 1888, to February, 1889, when the number of cases fell to less than one-half, the amount of sunshine was 306 hours. From these facts I cannot but think that low temperature, diminished rainfall, and diminished amount of sunshine, may have entered into the causation of the malady, while the barometric pressure would appear to be without influence. There has been nothing which I could trace as of etiologic value in the mode of living or place of residence of my patients; they came from London and other large towns, and from various parts of the country in England, Scotland, and Ireland.

IV. The treatment adopted has been essentially and uniformly the administration of iodine, bromine, and iron in combination—the proportion between these elements varying in relation to the predominance of the thyroid enlargement with the exophthalmos, the nervous derangements, or the anæmia. The combination has been arrived at experimentally, and I have found that where the goitre is large and the exophthalmos highly marked iodine can be given in doses of ten and fifteen grains three times daily with advantage. It also seems to be the ingredient most effective in reducing palpitation of the heart and frequency of pulse. Together with these drugs—and as the definite result of observation I must assert that it is only when the three are taken together that much relief is obtained—rest from physical exertion and from emotional disturbances has been most strictly enjoined, while a generous diet has been allowed. This kind of treatment has been followed by marked relief when other drugs, such as belladonna, digitalis, and many others have been found absolutely inert. It is not, perhaps, unnecessary to say that, of course, other symptoms have been treated by other means according to their character, but it is quite needless for me to describe such treatment here.

V. The history of many, and, indeed, of the large majority of cases, has been highly satisfactory. In several instances the improvement has been marked in a short time, from five to ten days, and has steadily advanced to complete restoration of health. In others the progress has been less rapid so far as the goitre and exophthalmos are concerned, whereas the cardiac and nervous symptoms have been speedily removed. In a very small number the subjective symptoms have been reduced, but some enlargement of the thyroid body remains, and the patients are subject to occasional attacks of palpitation or of nerve disturbance upon being exposed to physical fatigue or mental or moral strain.

In this paper I have simply stated some facts in illustration of the clinical history of Graves' disease; but I hope shortly to communicate another paper on its pathology.

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ON THE REMOVAL OF PYÆMIC THROMBI FROM THE LATERAL SINUS.¹

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FOUR cases of pyæmic thrombosis of the lateral sinus have been under my care. The clinical records of these cases are briefly as follow:—

CASE I.—H. S.—, aged twenty-one, was admitted to St. Thomas's Hospital on May 24th, 1889. He was placed under my care through the kindness of Mr. Croft. He said that he had had a discharge, off and on, from the left ear for fifteen years, but that there had been none for some time previously to the present illness. On May 13th he had pain in the left ear. On the 14th he had headache and earache, but continued his work as a carman. On the 19th he had an attack of shivering and vomiting. Several other attacks of shivering and vomiting complete the history of the case up to the time of admission. On admission (May 24th) he was pale, with flushed cheeks, heavy and sleepy, anxious to be left in peace; tongue moist and thickly furred. He complained chiefly of incessant vomiting, frontal headache, and pain in the back of the neck and on moving the head.

¹ Paper read before the Medical Society of London, on March 31st, 1890.

The left membrane showed a large perforation filled with granulations, and the canal was occupied by a little pus. There was no tenderness or swelling over the mastoid. Temperature 104°; pulse 64. Bowels loose: motions liquid and yellowish. No optic neuritis. So far, if it had not been for the prominence of the pyæmic symptoms, rigors, vomiting, and the great variations of temperature (98° to 104° on the day of and the day following admission), enteric fever must have been the diagnosis.—May 27th: Patient's condition has in no way improved, notwithstanding frequent irrigation of the canal with sublimate solution. I therefore scraped out the tympanum with a curette, offensive granulations and thick pus being removed.—28th: Patient much worse than on admission. Severe headache, high fever with one or two large daily oscillations, profuse sweating, hands and lips tremulous, voice feeble, no optic neuritis. At 4 P.M. slight swelling and tenderness were noticed over the upper part of the jugular vein, and over the mastoid process on the left side. Shortly afterwards a consultation was held, in which Mr. Croft, Mr. Clutton, and others took part.² It was felt that operative interference was the only chance which the patient had of life, and that relief from the perilous state in which he was should be at once attempted by trephining the mastoid. I was assisted at the operation by Mr. Robinson and Dr. Turney. A $\frac{5}{8}$ -in. trephine was used and a small gouge. No mastoid antrum was opened. The bone was very hard. On getting into the deeper layers of bone, I found they were greenish in colour, softened, and possessed of a foul odour. More bone was then removed, and on opening the groove for the lateral sinus bubbles of indescribably offensive pus and foul air welled up. The bone was then cut away so as to expose about one inch of the sinus, which was collapsed, and when subsequently opened was discovered to contain offensive clot. The extra-dural pus cavity was cleansed as much as possible with perchloride of mercury solution (1 in 2000). A probe so passed as to explore the posterior surface of the petrous bone allowed of a further escape of pus and foul air. The sinus was opened for the whole extent of the hole in the skull, and the clot in it was syringed out, or removed with a curette, as much as possible. The internal jugular vein was ligated in two places just above the omohyoid and divided between the ligatures. For a short time the patient's face and lips became blue, but this rapidly disappeared. The immediate change after the operation speaks for itself: for thirty-six hours he was bright and cheerful, with a normal temperature and restored appetite. The subsequent history shows the hold pyæmia already had upon him. Although never approaching in gravity the condition before operation, he became extremely ill. On June 3rd he produced blood-stained sputum and a patch of consolidation at the back of the right apex, and on the 5th a rigor, with pain and swelling of the right shoulder-joint and the right metatarso-phalangeal joint of the great toe. On the 7th, by pressure on the neck pus could be forced out of the opening in the sinus; so an incision was made down to the vein at the lower border of the parotid gland. It was opened, and pus came out; the sinus and vein were then irrigated with perchloride, a free stream of fluid passing in either direction, and bringing away small fragments of offensive clot. On the 17th a large abscess in the right buttock was incised, and on syringing the mastoid opening, that part of the lateral sinus which extended from the opening in the skull to the torcular, one inch and three-quarters in length, came away as a slough. The local treatment consisted in frequent syringing with perchloride solution, and internally quinine, alcohol, and invalid nourishment of all kinds were given. The two joints, which became during the illness swollen and painful, did not suppurate; they remained painful and stiff for a couple of months. During this period they were wrapped up, and treated by the application of belladonna. Whilst the sinus and vein were being irrigated the patient persistently declared that "he could always feel the water trickling down the inside of his neck." He completely recovered, and left the hospital on Aug. 29th. Two months later he returned to his occupation as carman.³

CASE 2.—E. P., aged eighteen, was admitted under my care into the West London Hospital on Aug. 29th, 1889. He had had a discharge from the right ear ever since he was

a child. It partly ceased fourteen days ago, when he became feverish, and suffered from pain in the head and neck, vomiting, shivering, and delirium at night. On admission, the notes say: "The boy is ill nourished and thin, with an anxious, dull expression of face. There are œdema and tenderness over the mastoid and over the upper part of the right internal jugular vein. There is marked tenderness on deep pressure at the posterior edge of the mastoid and just below the external occipital protuberance. Pulse 120; temperature 104°; tongue dry; boy drowsy; pupils small, equal; reactions normal; slight optic neuritis of both discs. Some fetid pus in right external auditory meatus. No abdominal signs, but some rhonchus in lungs, with mucopurulent expectoration, occasionally tinged pink." An operation seemed a desperate undertaking; but I decided at once to explore the sinus, which without doubt was plugged, and give the patient a last chance. Mr. Lloyd and Dr. Arkwright aided me at the operation. A $\frac{5}{8}$ -in. trephine was applied over the position shown in Fig. 1, and as soon as the groove was open in which the sinus lies, about half a teaspoonful of foul pus and a few bubbles of fetid air escaped. The trephine opening was then enlarged in the course of the sinus in both directions with angular cutting bone forceps. In cutting forwards, the mastoid, antrum, and tympanum were opened, so that the tympanum, antrum, and meatus could be flushed with perchloride solution. A probe was introduced, as shown in Fig. 2, in order to explore the posterior surface of the petrous bone, and along it a fresh quantity of foul pus and air escaped. The sinus itself where it had been in contact with pus was covered with whitish patches of lymph. A grooved needle was inserted into it to decide as to whether it was or was not plugged. As no blood came along the needle, the sinus was freely slit up with scissors. The clot it contained was not very offensive, and as far as possible it was removed by the syringe and curette. The internal jugular vein was then tied at the upper border of the thyroid cartilage in two places and divided between. When the jugular was ligatured the face became blue, but this soon passed away as some dark blood oozed out of the opening in the sinus. This hæmorrhage was encouraged, and distinctly gave relief to the venous engorgement. It probably depended upon the fact that clot contracts, and that therefore it did not quite obstruct the sinus and vein beyond the mastoid opening. Thus, if my ligature was placed on the jugular vein beyond the great tributaries, such as the common facial and lingual veins, a recurrent stream would at first make its way up the jugular, and escape out at the trephine hole. Sublimate solution was used at the operation and for the after-dressing. By the end of the operation the pulse was running, very feeble, and could not be counted. It was with much difficulty that the patient was rallied. The next morning the temperature had fallen to 101°. He was taking milk and brandy well; he had not vomited, the pain in the head was gone, and the enemata were retained. There was some rhonchus in the chest, the breathing was quick, and the pulse about 140. The following day he seemed still better, the pulse was stronger, the temperature below 100°; he was taking food well, and his only discomfort proceeded from the chest. The same evening (9 P.M.), however, he became violently delirious, the temperature rose to 106°, and he died. Post-mortem: No visible meningitis; no abnormal state of brain detected, except that the anterior part of the right lateral lobe of the cerebellum, where it touched the dura mater near the trephine opening (the dura mater, in fact, which had confined a collection of pus), was stained superficially, over an area about the size of a sixpence, of a greenish-yellow colour. The sinus was plugged from the internal occipital protuberance, and the clot extended into the vein for about two inches. The ligature on the vein was well below the termination of the clot. The abdominal viscera were healthy; there were no infarcts. The lungs showed many small infarcts and small abscesses. The operation was performed too late; the septic material had already travelled down the jugular, before a ligature was applied, in too large a quantity to be successfully dealt with by the "amœbæ" of this patient.

CASE 3.—L. T., aged fifteen, was admitted into St.

² This patient chiefly owes his life to the strenuous advocacy of operative treatment by my friend and colleague, Dr. Hawkins, resident assistant physician to St. Thomas's Hospital.

³ This patient, in robust health, was present at the meeting of the Society.

⁴ See Lauder Brunton's *Pharmacology, Therapeutics, and Materia Medica*, pp. 69 and 47. "The struggle for existence is between the amœbæ and the pathogenic bacteria." See also a discussion on *Obsolete Pus*, St. Thomas's Hospital Reports, vol. xvi., p. 186, and Carl Hess, *Untersuchungen zur Phagocytenlehre*, Virchow's Archiv, Band cix., Heft iii.