On anthracosis or coal-miner's phthisis : the spurious melanosis of Carswell / [J. Warburton Begbie].

XX

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SPURIOUS MELANOSIS OF CARSWELL.

(*Reprinted from the 'Glasgow Medical Journal,'* 1866.)

A PULMONARY disease, described with sufficient accuracy by J. C. Gregory, William Thomson, Makellar, and others, specially although not exclusively met with in coal miners, now threatens to become very rare in its occurrence; there are indeed indications of its happily altogether disappearing. The increasing rarity of the disease, at all events in its exquisite or well-marked forms, is a subject intimately, and in a most interesting manner, connected with its etiology, and to this particular attention will at one part of the following observations be directed. In the course of hospital experience I have encountered several instances of well-marked carbonaceous infiltration of the lungs; and in particular have met with two examples of the disease differing very remarkably in many important features from each other, both of which terminated fatally. These cases I propose in the commencement of this communication to place on record.

The circumstance of the existence in the pulmonary structure of a varying amount of black pigmentary matter has long been

recognised. Laënnec, in writing of "Mélanoses" of the lungs,[1] alludes to the discovery of such pigment, more or less abundantly in the lungs of almost all adults, it being found chiefly in persons advanced in life. In the lungs of young persons, on the contrary, he remarks, rarely are any traces to be noticed. The appearance, as regards colour, presented by the lungs of young persons, Laënnec likens to that seen in the same organs in oxen and many other animals; and he hazards the conjecture that possibly the pigment, "matière noire," exists only in the lungs of man and of carnivorous animals; adding, however, with characteristitic modesty, that his own attention to comparative anatomy had been too limited to admit of his expressing a confident opinion on that head. What is of greater interest, however, and more immediately connected with the subject of this paper, is the further statement by Laënnec, at the same place, that he has sometimes surmised that the black matter in question may in part at least proceed from the smoke of lamps and combustible bodies used for the purposes of warming and of lighting; and again, that in the lungs, as well as in the bronchial glands, of cottagers unaccustomed to watching or sitting up late at night, the pigmentary matter is either absent or present in very small amount. This experience, Laënnec is careful to say, is not universal; for the discovery of pigment in considerable amount has on the other hand been occasionally made in the lungs of persons in no peculiar manner exposed to the causes just alluded to. The reader familiar with the illustrious work of Laënnec will remember that, although in no degree detracting from the value of the passage to which reference has now been made, there is in the chapter in which it occurs not a little confusion, occasioned by the want of a proper distinction, at the time impossible, between the true melanosis of the lung, an undoubted neoplasm, or new formation of cancerous nature, and the pigmentary substance with which we are at present more immediately concerned. To the disease which is generally known under one or other of the names placed at the head of this paper, but which has also been described as *Carbonaceous Bronchitis* (Dr. Walshe); *Black Phthisis* (Dr. Makellar); *Black Spit* (J. B. Thomson); and *Mélanose du Poumon*

[1] "Traité de L'Auscultation Médiate," deuxième partie, Productions accidentelles développées dans le Poumon.

(Valleix), the attention of the profession was to a certain extent directed as early as 1813, by Dr. Pearson, writing in the 'Philosophical Transactions' "On the Colouring Matter of the Black Bronchial Gland, and of the Black Spots of the Lungs;" but since that date the following important contributions regarding it have appeared:—"Report of a case of peculiar black infiltration of the whole Lungs, resembling Melanosis," by Dr. J. C. Gregory.[1] Article entitled "Spurious Melanosis," in the 'Cyclopædia of Practical Medicine,' by Dr. Carswell. In the same author's well-known work on 'Pathological Anatomy; Illustrations of the Elementary Forms of Disease,' there is a brief description of the appearances presented by the affected lungs; and likewise, under the head of Melanoma, plate 3, an illustration giving a very correct notion of their universal black discoloration. "On the Existence of Charcoal in the Lungs," by Thomas Graham, F.R.S.[2] "Cases of Spurious Melanosis of the Lungs," by Dr. William Marshall, of Cambuslang.[3] "On Black Expectoration, and the Deposition of Black Matter in the Lungs, particularly as occurring in Coal-Miners, &c.," by Dr. William Thomson.[4] "Melanotic Infiltration of the Lungs, with old and recent Pleuritis," by Dr. Hamilton, of Falkirk.[5] "An Investigation into the Nature of Black Phthisis," by Dr. Makellar.[6] Still more recently a valuable contribution to the pathology of miners' lung has appeared from Professor Virchow, of Berlin;[7] and Dr. J. B. Thomson, of Perth, has written an interesting paper on the Melanosis of Miners, giving details of his experience as a practitioner in a colliery district for twenty-four years.[8] In several of the best known and most highly esteemed treatises on diseases of the lungs, allusions more or less extended to this peculiar morbid condition exist, as for example in the work of Dr. Walshe.[9]

[1] 'Edinburgh Medical and Surgical Journal,' vol. xxxvi, 1831.
[2] 'Eodem Loco,' vol. xlii.
[3] 'Lancet,' 1833-4, vol. ii, p. 271; also p. 926.
[4] 'Medico-Chirurgical Transactions,' vol. xx, xxi.
[5] 'Eodem Loco.'
[6] 'Monthly Journal of Medical Science,' 1846.
[7] From notes by Dr. Alexander R. Simpson, 'Edinburgh Medical Journal,' 1858.
[8] 'Edinburgh Medical Journal,' 1858.
[9] 'Diseases of the Lungs,' p. 227.

Of the papers now mentioned, the most important and complete is that by the late Professor William Thomson, of Glasgow; the references made by that author to the observations and opinions of various writers, ancient and modern, concerning the presence of black matter in the expectoration, obviate the necessity that might otherwise have existed for making a more detailed allusion to the literature of the subject.

The observations which I propose to make on the nature, and more especially on the etiology of carbonaceous infiltration of the lungs, will succeed a brief narrative of the two interesting cases already referred to, as having fallen under my notice in the ordinary course of hospital experience. Several cases of well-marked black expectoration I encountered from time to time; but, with the exception of another instance of miner's lung complicated with mediastinal cancer, the two to which I presently direct attention were the only fatal cases which I have had the opportunity of observing:—

Case 1.—J. D—, æt. 49, was a patient in the Royal Infirmary for several weeks in the spring and early part of the summer of 1856. He had throughout life worked as an ordinary farm servant, but for some years his occupation had been almost entirely that of attending to a threshing mill, placed in a low-roofed and confined shed. Here, during fully nine months of the year he had worked, in the midst of much dust, from morning till evening; the remaining three months had been devoted to out-door farm work. This man, of sober habits, had not suffered from any chest affection till commencing, some four or five years before his death, the occupation to which reference has now been made. At that employment he had not worked above a few months when he became short in breathing and subject to cough. After a time he noticed his spit to be dark in colour, and gradually to acquire a black or inky hue. He was able, although with much difficulty, to continue at this work till the beginning of 1856, when from general feebleness, and particularly owing to severe cough and difficulty of breathing, he felt compelled to desist.

When brought under my observation in the hospital, this patient had lost flesh and strength to a great extent, and manifested the appearance of a person who had been for a lengthened period suffering from pulmonary disease. The expectoration was very abundant, and very black. The left front of the chest was universally dull on percussion, and immediately under the clavicle there were the marked signs of extensive excavation. Over the right front the percussion resonance was abnormally clear. The patient had at no time expectorated blood. The course of the disease did not differ in any particular from that of

ordinary pulmonary phthisis—hectic fever, night sweats, constant and extremely irritating cough, gradually wore out the poor man's strength. He died on the 2nd day of June.

On examination of the body by Dr. Haldane, the following appearances were presented. There was great emphysema of the upper anterior portion of the right lung. That lung was of a uniform dark colour both externally and internally, while on pressure a fluid of similar colour, and staining the fingers, escaped. In this lung there was no marked condensation. The left lung was firmly adherent, and the corresponding side of the chest contracted, The lung was of a very dark colour, non-crepitant in the lower lobe, yielding, on pressure after section, a very abundant inky fluid. In the upper lobe there were several considerable excavations, and a few small masses of tubercle. Bronchial glands were enlarged, and of extremely black colour. Liver and kidneys congested, but otherwise normal.

The most remarkable feature in this case consists in the circumstance that the subject of it was not a coal-miner, or other operative exposed in any extraordinary manner to the operation of those causes, which, as will be shortly seen, are supposed to engender the disease,—all his life this man had been an agricultural labourer. He was addicted to smoking, but it was ascertained that he did not inhale the fumes as some smokers are known to do. He had not been in any way peculiarly exposed to the inhalation of the smoke of oil-lamps, and had not known other men engaged in precisely the same occupation, suffer as he had done.

So much for the history of the case. It is further of interest to note, that in the left lung a little tubercle was found co-existing with the carbonaceous matter, and that the right lung was greatly emphysematous.

A careful inquiry, instituted at the time of its occurrence, satisfied me, that this case was the only one of its kind which had ever been seen in the district where D— worked for many years, where his pulmonary affection commenced, and from which, when no longer able to follow his employment, he came directly to the Infirmary.

CASE 2.—A. B—, æt. 53, married, a coal miner, native of Gilmerton, in the County of Midlothian, went to work in a coal mine when twelve years of age, and continued at the same employment till he had reached forty-five ; was a healthy man during the earlier portion of his life, but suffered a smart attack of pleurisy in the left side when about thirty. Twenty years ago, that is, eleven years before he gave up his occupation

as a miner, he began to suffer from a constant black spit, darkest in colour, and most abundant for a short time after leaving the mine, on the conclusion of each day's work. During the last eleven years of his employment as a miner, he was never free from pains in the chest, cough, and expectoration, while a shortness of breathing, at first trivial in degree, became gradually so serious as to compel him, as he had often noticed others among his fellow-workmen compelled, to abandon the calling of a miner altogether. Having somewhat improved in health, he was able for a time to work in the construction of railways, and for a limited period more particularly in tunnelling, and in the sinking of wells. For nearly two years has been altogether unable to work; he has during that time been subject to severe irritating cough, with expectoration of black matter, and to greatly increased difficulty of breathing, while his strength and flesh have greatly fallen off. During the same period he has repeatedly spat blood in small quantities. On the 27th of January, 1865, this man came under my care in the Royal Infirmary, he was then much emaciated, and had the appearance of a patient in the advanced stage of phthisis. His sufferings were of a very aggravated description, chiefly from dyspnœa, and urgent cough. The expectoration was copious, and for the most part not difficult. It consisted of black matter, closely resembling ink, with a good deal of frothy mucus, partially stained, and occasionally a little pus. The chest was considerably flattened under both clavicles, more particularly on the right front; percussion on that side was absolutely dull, and over the upper left front considerably impaired. Loud bronchophony, amounting at one spot over the second rib anteriorly to pectoriloquy, was audible over the right chest. Vocal resonance was increased also over the left sub-clavicular region. Loud and very coarse moist râles, frequently gurgling in character, accompanied a deep tubular sound of breathing over the upper portion of the right front, while, in the lower portions of the right lung, moist râles of finer quality were audible. Posteriorly, the physical signs over the right lung did not differ from these discovered in front, and in the left lung these indicated the existence of pulmonary consolidation with partial softening. Without the previous history of the patient, and still more without aquaintance with the characters presented by the expectoration, there was nothing to distinguish the case of B— from one of ordinary tubercular disease of the lungs advanced to the stage of excavation and disintegration. The sputa, however, did serve thus to distinguish it. I need not particularly dwell on the progress of this case in the hospital. The digestive organs, much affected from the period of his coming under my care, became more seriously disordered: vomiting frequently occurred; rapid declension of strength, with marked hectic supervened; and, without the occurrence of any remarkable symptom, death took place at 2 p.m., of the 25th of February. B— had been occasionally delirious at nights for some time; and the feet had also become œdematous; the urine was scanty, but never contained albumen.

The body of B— was examined on the 26th February, by Dr. Grainger

Stewart. The chest was much flattened, the body emaciated; heart enlarged, weight 17½ ounces, its right side dilated, substance of heart not materially altered; the blood fluid but thick and very dark. Right lung densely adherent, contained a large amount of black carbonaceous deposit, and had several cavities towards its apex. The bronchial tubes did not exhibit any marked deposit, but were congested and occupied by much black mucus. The left lung was much less adherent, the upper lobe shrunken, and contained a solid mass of carbon, about the size of an apple; there were also cicatrices deeply coloured at different portions of the surface of this lung. The bronchial glands of both lungs were deeply tinged, and those in the right lung were the seat of considerable carbonaceous deposition. The liver was congested and fatty; the spleen exhibited on its surface, and also at several points within its substance, depositions of black pigment; the kidneys were large, weighing 9½ ounces each, but their structure, beyond having a congested appearance, did not seem to be abnormal.

This case is, in all its particulars, an extremely illustrative instance of coal-miners' phthisis, as it has usually presented itself. The man worked as a coal-miner from his youth, became affected with black spit, and in due time, continuing his occupation in pits,—which were generally regarded as the "worst pits for the lungs," to use B—'s own language,—but seeing that they have long since undergone much improvement, or have ceased to be wrought, I need not name — he became the subject of cough, and shortness of breathing. Desisting from his employment as a miner, probably his life, already become burdensome, was thereby somewhat lengthened; but, just as in the cases described by Thomson, Graham, Makellar, and others, the progress of the disease was evidently unarrested, and it is now apparent that deposition and softening, with subsequent excavation of the lung substance, had been slowly going on during the nine years which had elapsed after his leaving the coal-mines. There are a few particulars in this case which are worthy of special notice.

1. Although I have not dwelt upon this circumstance, in the brief record of the case, I wish it to be understood that this man's sufferings were very great—greater than is usual in instances of ordinary pulmonary diseases, and particularly phthisis. Dr. Makellar has more especially depicted the sufferings of such patients, and my observation of B—'s case has convinced me that the portraiture by him has not been overdrawn.

2. The slowness of pulse, coldness of extremities, and blueness or lividity of countenance, described by some authors, were noticed in B—'s case. These features, the two former more especially, have been too readily regarded as the concomitants of a morbid condition of the blood, due to the presence of excess of carbon, at least induced by mal-oxygenation. It is not always so, for in fatal cases of bronchitis, and in instances of long existing cyanosis, and pulmonary emphysema, I have observed a frequency of the heart's action, with unusual maintenance of the animal temperature over the whole body, till dissolution itself has occurred: so was it in the case of B—.

3. The dilated condition of the right ventricle, discovered on dissection, accords with previous observations, and the pigmentary matter found in the substance, as well as on the surface of the spleen, tends to confirm the opinion—to be more prominently set forth in the sequel—that the black matter, whatever its real nature be, is a deposit from the circulating fluid.

The chief or distinguishing character of the pulmonary lesion in this disease is the black appearance assumed by the lungs from the deposition and impaction in their structure of a dark pigmentary matter. Regarding the precise nature of this deposit, as well as its source, a difference of opinion has arisen, and still exists. It is contended, on the one hand, by certain physicians and pathologists—as, for example, by Gregory, William Thomson, Carswell, Makellar, Brockmann, Robin, and others—that the origin of the black matter is *ab extra*; that it consists, in fact, of carbon inhaled during the occupation which those who chiefly suffer from this affection pursue. It is confessedly among persons who are much exposed to the inhalation of an atmosphere highly charged with carbonaceous particles that anthracosis mainly occurs. The great majority of such sufferers are coal miners; hence "Miners' Melanosis" and "Miners' Phthisis" have been used as synonyms for the disease. Again, chemical analysis of the black pigment has determined its close resemblance to carbon; indeed, its being identical with carbon. This was done by Dr. Christison in the instance of one of the earliest recorded cases, that by Dr. J. C. Gregory in 1831, and such experiments have since that time been frequently repeated. Boiled with concentrated nitric acid, the black colour remains unaffected, and, after immersion

for some time in a strong solution of chlorine, it is found to be equally black as before. Boiled in a strong solution of caustic potash, and then slowly filtered, the black matter remains on the filter, and this, when washed and carefully dried will burn like charcoal, leaving a grayish ash. Not only so, but a small quantity of the powder left after the action of the nitric acid, may, when properly treated, be caused to yield all the products of the distillation of coal and gas, similar in quality to that so produced, a naphthous fluid and crystalline principle called naphthalline. These circumstances must at once be admitted as establishing the carbonaceous nature of this peculiar lung pigment. Whether the extraneous origin of it admits of as conclusive a proof we have still to inquire. But another and contrary opinion to that now expressed is entertained by certain other physicians and pathologists—among these by Breschet—who, indeed, was the first to broach it—by Trousseau and Leblanc, and more recently, and very decidedly, by the distinguished Professor at Berlin, Virchow. They conceive that the black matter is altered blood pigment, in reality a transformation of hæmatin, that it is deposited from the blood, and has, therefore, an internal and not an extraneous origin. Virchow thus expresses his notion of the pigmentary changes, viz.—"as resulting from extravasations of blood, and subsequent transformations of hæmatin." It is not contended in this view that the pigmentary matter is not closely allied to carbon; it is not, indeed, sought to be established that it is otherwise than a form of carbon. An opposite conclusion could hardly be arrived at, seeing that, in chemical constitution, so far as is known, this black pigment and carbon are identical. But, then, we are cognisant of no test which is absolutely distinctive of carbon, and the question still remains: Is there any chemical difference between the black pulmonary substance discovered in anthracosis, and the carbon of coal and of smoke? This view may be otherwise expressed by saying, that, although carbonaceous, the black pigmentary matter found in the lungs, and also expectorated in cases of anthracosis, may not after all be the carbon of coal or of smoke. The chemical experiments of Guillot have shown this pigment to be composed of nearly pure carbon; to be, in fact, much richer in carbon than any form of coal is. It is curious, and likewise instructive, to notice how the different

theorists accept and apply these results of a renewed chemical investigation. In the view of Robin, who has always maintained the extraneous origin of the pigmentary matter, the discussion is now to be regarded as closed; the announcement of the results of Guillot's chemical inquiry leaves nothing more to be done.[1] These same results are, however, interpreted by Virchow in a manner totally at variance with the conclusions of the former observers.

Regarding the properties, and more especially the chemical relations of the pigment, both parties may be considered as nearly, although not wholly, agreed; but in respect to its primary origin they seriously differ. *One party* views the inhalation of the carbon, and its impaction in the minute bronchial ramifications and the ultimate air cells, as the ready explanation of its presence in the lungs. *Another view* is entertained by Virchow, that it is deposited from the blood, not as carbon but hæmatin, which undergoes transformation; an anthracosis succeeds the sanguineous extravasation. *A third view*, although it has not been brought prominently forward, may be thus stated; the presence of the black pigmentary matter in the lungs may be, in part, due to the inhalation of minute carbonaceous particles, and in part to the deposition, after some manner or other, of carbon from the blood. It may be contended by those who have formed this last opinion, that the great amount of the deposit in the lungs, its nearly entire limitation to the pulmonary structure, as well as the fact of its steady and often remarkable increase, long after the sufferer has been removed from those circumstances which exposed him to the inhalation of the carbonaceous dust, make this the probable, if not the only tenable, explanation. In regard to this point the inquiry is suggested, whether the carbon—the word is now used as synonymous with black pulmonary pigment—thus deposited from the blood, is a portion of what has been taken into the circulatory system originally at the lungs. That the black matter found in the pulmonary tissue is present in the circulation is at all events deposited from the blood, may be regarded as proved by the fact of the pigmentary substance

[1] See Article vii—"Charbon Pulmonaire"—in vol. iii of 'Traité de Chimie anatomique et physiologique normale et pathologique, &c,' par Charles Robin, et F. Verdeil. Paris, 1853.

being found in other situations than the lungs. This statement is, no doubt, opposed to the expressed opinions of Carswell and of others, but it is nevertheless true, for the same black deposit has been discovered many times in the bronchial glands, not unfrequently in the pleura, and, although with much less frequency, nevertheless unequivocally, in the peritoneum, free and intestinal, and in the mesenteric glands. Whether it be the altered hæmatin or the inhaled carbon, and I am disposed to regard the latter as the more likely, which is thus encountered, there can be little doubt that a real deposition from the blood takes place; all of the observed phenomena are not to be explained upon the principle of a simple inhalation and impaction. It is not difficult to understand why, in the latter stages of the lung affection incident to coal miners, when a considerable portion of the pulmonary tissue has suffered destruction, the arrest of the carbon should then take place in an increasing ratio alike as regards rapidity and amount. And for this result we should be prepared, whether the carbon be present in normal or in abnormal degree in the blood.

In the disease known as anthracosis or coal-miners' phthisis, the carbon exists in the circulating fluid in greatly increased amount. At the lungs there is not that free access of oxygen to the blood in the pulmonary capillaries which is necessary for the combustion of the carbon, and, as a necessary consequence, instead of carbonic acid being exhaled, an always increasing amount of carbon is deposited. Dr. Makellar has stated in strong terms, as the result of his long and attentive observation of many exquisite cases of "black phthisis," that when once carbon is lodged in the pulmonary structure by inhalation, there is created by it a disposing affinity for the carbon in the blood, by which there is caused an increase in the amount of the deposit without any more being inhaled." A similar opinion too, has been expressed by Brockmann, who acquired his knowledge of the disease as it exists among the miners of the Hartz mountains.[1]

In the general symptoms presented by the sufferers from anthracosis there exists a close similarity with many cases of tubercular disease of the lungs, and this agreement is also noticeable to a very marked degree, as may have been gathered

[1] See 'Neumeister's Repertorium,' December, 1844.

from the illustrative instances already recorded in this paper, in respect to the physical signs. The distinguishing and highly characteristic feature among the former is the black expectoration. There is often present in the sputa of patients affected by various pulmonary complaints a certain amount of black pigmentary matter; especially will this be noticed in the earlier stage of not a few cases of tubercular disease, and it will generally be found that, in its occurrence and particularly in its amount, the phenomenon in question bears a relation to the nature of the occupation in which such persons have been engaged. This, never otherwise than slight admixture of black pigmentary matter with the sputa, there is really no risk of mistaking for, or confounding with, the pigmentary expectoration of anthracosis. In this disease, besides being thoroughly charged with black matter, the expectoration continues thus altered during the whole course of the malady. No doubt certain changes in its characters are likely to occur, and for the most part do present themselves, for, at first mixed with mucus, this ingredient after a time disappears, and a puriform, to be succeeded by a purulent, sputum takes its place—all this time, however, the expectoration has never lost its very black colour.

It is quite extraordinary how large an amount of black matter will, in cases of anthracosis, be got rid of by expectoration. In one instance which was under my own observation in hospital, for a period of several months, the spit-box was daily filled with a dark, heavy mass. I have had from time to time the opportunity of seeing an old man, formerly a collier, now, at least lately, a toll-man, who, for many years, and to a far greater extent after leaving the coal-pits than while engaged in them, has expectorated very large quantities of black matter. In this case, as in others I have met with, the expectoration is not constant; for the cough, which always exists, will for weeks together become dry, and while dry always very distressing and painful. After the lapse of a few weeks, occasionally of a longer period, the expectoration again returns, being for a time scanty, but gradually becoming more and more copious. When most abundant, the cough and likewise the dyspnœa are most moderate. Dr. Makellar mentions, that in one of his cases the expectoration, as far as consistence went, had the appearance of treacle, being, however, perfectly black; and of this ten to

twelve ounces, were expectorated daily. During his attendance on this patient, Dr. Makellar separated the mucus from the black matter by the simple process of diluting the sputa with water, and thereafter separating the precipitated carbon. In this way he was enabled to procure about one and a half drachms of a beautiful black powder, daily, and in the course of a week he had a supply of nearly two ounces. This, Dr. Makellar informs us, he continued for some weeks, and he might have gone on till the period of the patient's death, several months thereafter. The same writer concludes, "It is undoubtedly a striking phenomenon connected with the pathology of the chest, that the human lung can be converted into a manufactory of lamp black!"

Some curious and interesting points suggest inquiry in relation to the expectoration. For example, among coal-miners, the class of operatives chiefly subject to anthracosis, and among them the workers at the stone wall in the pit,—who of all the miners are most frequently affected, and in whom the disease most speedily runs its course—there are very few who are at any time exempt from the black spit. Some there are who have it while at work in the pits, and perhaps for some hours after leaving it, but who find it gone before the stated period of their return to work. Others again, and of this class two interesting examples fell under my observation in the Royal Infirmary during the winter session, 1857-58, and were made the subject of remark at clinical lectures, continue for weeks and months to expectorate black matter: many of them without presenting any of the physical signs or other of the general symptoms of anthracosis. In persons so affected, the inhalation of the carbonaceous particles and their lodgment in the bronchial passages is surely the only satisfactory explanation of the phenomenon. Such patients, for the most part, pay no regard to the black spit; they treat it as a necessary consequence of their subterranean calling, and do not view it as any indication either of themselves being ill, or of their occupation being unhealthy. Some I have seen have sought relief for other affections, as in the instances occurring in hospital already referred to, both of whom suffered from chronic rheumatism. Still, although in many, as yet, a symptom of no very serious import, it behoves us to bear in remembrance, that in the case

of those who have afterwards become the victims of regular carbonaceous infiltration of the lungs, the occurrence of black expectoration has been the very earliest symptom. It will be readily admitted that a free expectoration of inhaled carbonaceous particles is just the most likely circumstance to prevent, at all events, to ward off for a time, its impaction in the air vesicles; and, if this explanation of the pathology of the disease in its earlier stage be essentially the correct one, it is likewise manifest how important an aim it should be to promote in the same stage of anthracosis a free expectoration. In this disease, as in tubercular phthisis, hæmoptysis is not unfrequent; that appears, however, from the cases which have been recorded, seldom to occur in the early progress of the malady, but to be one of the symptoms of the more advanced period when the pulmonary structure has become more or less seriously disorganised. In one of the two cases already recorded hæmoptysis never occurred; in the other case, that of A. B—, it took place for the first time about eleven years after his pulmonary ailment had given by other symptoms unmistakeable evidence of its existence.

The same indications of failing health present themselves in this disease and in phthisis, the same loss of strength and of flesh taking place by degrees, more or less gradually in different cases; for anthracosis is essentially a chronic disease, which tubercular consumption is not always. Great emaciation sometimes occurs in anthracosis. Dropsy, unattended by renal affection, is common in its advanced stages; this, as a peculiarly distressing symptom has been noticed by Makellar and others. Mr. Lawson Tait, who has recently resided in a colliery district, and has had the opportunity of carefully watching a few well-marked instances of the disease, informs me that he was struck by the frequency, as well as by the amount of general dropsical effusion in these cases. Dropsy, with albuminuria, I have also met with, in cases of anthracosis, but rarely. When albumen was present in the urine, it was not abundant, and was unassociated with other and still more significant indications of kidney disease. It was, in all probability, due to renal congestion of a passive kind, primarily to that stasis of blood in the renal capillaries, which, sooner or later, in all diseases characterised by special blood-impurity, results, and is

the direct determining cause of serous transudation and albuminuria. Connected with the slight albuminuria thus referred to, I have seen in the urine of anthracosis copious deposition of amorphous urates. I have been much interested in observing, that Dr. Robert Wilson, of Alnwick, who has had large opportunities of studying the diseases of colliers, makes the remark: I have never seen a case of Bright's disease in a pitman. That the disease is not uncommon in the district may be known from the fact that, at the time I write, I have five cases under treatment from albuminuria, and three of them the wives of pitmen."[1]

The cough, and difficulty of breathing are, generally speaking, most severe in this disease. The dyspnœa is, in all probability, intimately connected with the extremely impure condition of the blood, which, as the malady advances, ceases to present the characters of the vitalised fluid, and in appearance resembles a very dark and thick venous blood; when, as usually happens, the right side of the heart has become dilated, the resulting breathlessness is extreme, and, as in the case of A. B—, most painful to witness. It is at this stage, too, that the general dropsy becomes excessive. The symptoms, moreover, which mark the very advanced stage of tubercular phthisis are often present in anthracosis—the colliquative perspirations, the exhausting diarrhœa, and the wandering mind. The euthanasia, or easy death, not unknown to us in the sufferers from ordinary phthisis, is, I fear, never experienced in the instance of those dying of the disease which is now under consideration. On the contrary, there is, till near the close of life, invariably much suffering, and that of the most distressing nature.

It has already been remarked that the so-called physical signs of disease, in cases of anthracosis, offer a very close resemblance to those which we observe in the different stages of ordinary tubercular disease of the lungs. The varying degrees of dulness on percussion, and of altered resonance of the voice, are not more significant of lung condensed by tubercular deposition, than by carbonaceous infiltration; while the modifications of bronchial breathing, from a merely comparative harshness, limited in situation to a well-marked tubular

[1] "The Coal Miners of Durham and Northumberland, their Habits and Diseases." A paper read before the British Association for the Advancement of Science, at Newcastle, September, 1863. By Robert Wilson, M.D.

sound, and even cavernous râle, are, in some cases quite as readily recognised in the one condition as in the other. So, also, when softening and excavation have occurred, the moist sounds, the crepitant and sub-crepitant râle, and the coarser gurgling will be audible in anthracosis just as in phthisis. It is consistent with my own observation, and the two cases which have been shortly detailed will bear out the remark that a vomica, the result of softening, and ultimately of destruction of the pulmonary substance in anthracosis, may have such significant physical signs as cavernous breathing, gurgling râle, and pectoriloquy to distinguish it, and these quite as well-marked as when we meet with them in the advanced stages of tubercular disease. This will not always hold true, for the disease we have to deal with, an eminently chronic one, is specially apt to be attended by intercurrent pleural inflammations. Hence, pleural thickenings and dense adhesions, common enough in tubercular consumption, are still more so in anthracosis. It is probably owing to the chronic nature of the disease, but specially from the frequency of pleural inflammation and adhesion, that the occurrence of pneumo-thorax has not been observed in cases of carbonaceous infiltration of the lungs.

The appearance presented by the lungs when affected by anthracosis is very remarkable. The colour varies from a well-marked slate colour, to a deep, almost jet, black. The external surface usually resembling more exactly the former, while the cut surface presents the darker hue. If the lung is in the early stage of the disease, no excavations having formed, it is voluminous, of increased density, evidently condensed from the occupation of the parenchymatous structure by black pigmentary matter. If subjected to pressure a considerable amount of fluid, dark in colour, flows out, staining in a remarkable manner the hands. So deep is the stain thus caused that it generally requires several applications of soap and water thoroughly to remove it; certain parts of the lungs are generally found to be denser, and the tissue in these more completely occupied by carbonaceous matter than others. A portion of such will readily sink in water, communicating a deep black colour to the water as it passes down through it. Unlike the deposition of tubercular matter which usually commences in the apex, or towards the summit of the lung, this black matter

is found equally to invade all portions—the base is as subject to it as the apex. Nor is one lung more likely to be affected than the other; they suffer equally. This experience in regard to carbonaceous infiltration, so opposed to what holds true of tubercular deposition in the lungs, seems again to favour the view of the former being in the first instance, whenever it occurs, due to direct inhalation of minute particles. Were it otherwise, is it not reasonable to suppose that, as is commonly the case with tubercular deposition, the apices of the lung would chiefly suffer, and one lung might be found much diseased, while the other was comparatively unaffected?

It seems to have been at one time imagined that the carbonaceous infiltration and the deposit of tubercular matter in the lungs were mutually antagonistic. This opinion seems to be implied in certain of Dr. Makellar's observations, and, were it correct, undoubtedly we should have arrived at the knowledge of a very important fact. Such, however, is not the case; tubercle and this black pigment have been frequently found—the former in all its stages, recently deposited, crude, and softening—in the same lung. In the left lung of J. D— it was so, and I have seen the co-existence of the two, much more notably illustrated in the lungs removed from the body of a patient who died of miners' phthisis, by Dr. Maclean, now of Skye. That, under somewhat different circumstances, tubercle and carbon co-exist in the lung, the result of numerous *post-mortem* examinations testify. It is not uncommon to find in the lungs of elderly or old people the cicatrices of tubercular cavities, in which more or less of black pigment, not distinguishable from carbon, exists, and such lungs do further not unfrequently present throughout their entirety an unusually dark or slaty colour. In the advanced stages of anthracosis cavities are formed. These, like tubercular vomicæ, vary in size. Some are very small, others large, capable of holding an orange; less commonly they are much more extensive. These excavations are generally found to be partially occupied by a thick black fluid similar to what has been expectorated during life. As in tubercular cavities, some of the divisions of the bronchia, right or left, as the case may be, are seen opening into them. Blood-vessels also shrivelled and shrunken, as in the old tubercular excavations of chronic phthisis, are observed

crossing them from wall to wall, and, with these, portions of lung substance in a state of disorganisation, and having the appearance of shreds. The most frequent complication of anthracosis is bronchitis, indeed so frequent is it, and so invariable are the evidences of its previous existence, as discovered on *post-mortem* examination—the congested and thickened mucous membrane, and the dilated bronchial tubes—that bronchial inflammation may be considered an essential part of the malady. It is not uncommon to find more or less of emphysema.

It is now necessary to inquire in what part of the lung tissue the black pigmentary deposit originally occurs? This is undoubtedly various. So much so, indeed, that Virchow holds "the deposit may occur in very different parts of the lung in every case, and no classification can be made of different forms of the disease from the position of the pigment." The opinion generally entertained up to the time Virchow investigated the subject, was that the black matter is found free in the air vesicles, and in the epithelial cells of their walls, while it was limited to this situation. Virchow, however, finds it "free in the alveoli and in the alveolar cells; in the interior of the connective tissue, pleural, subpleural, interlobular, and peribronchial; not unfrequently, also, in the costal and diaphragmatic pleura, and always in the bronchial lymphatic glands." Moreover, he maintains that the black matter is never found in the epithelial cells of the bronchi, and further, that it is invariably noticed in the immediate vicinity of blood-vessels. From the circumstance that the black pigmentary matter is never absent from the bronchial glands, the same observer concludes that there is no evidence of a regular progressive absorption, and moreover, that the limited amount of pigment found in the inter-alveolar septa, and its frequent deposit under the pleura, further militate against this view, and are favorable to the notion of a deposition taking place from the blood. An important particular to attend to is the examination of the black substance itself. Virchow admits that it occurs in "all the forms in which particles of coal dust may present themselves." Sometimes larger, sometimes smaller, these particles may be found of round or angular form; occasionally they are flat and possess an almost crystalline lustre, just as is observed

on viewing portions of coal under the microscope. To the circumstance that none of the coal particles which he has ever examined having presented a pure black colour, Virchow attaches great importance. The pigmentary particles removed from the lung in cases of anthracosis are purely black, and the difference in colour between these and coal particles is so remarkable, that he is led to conclude "that the inhalation of particles of carbon cannot be the cause of the pigmentation." Recently a very interesting case of coal-miners' phthisis fell under the notice of Dr. Sanders, and the remarks made by him in regard to it are well worthy of attention. Dr. Sanders observed in the sputum of this patient little hard specks, having all the appearance of coal. One of these specks, nearly of the size of a pin's head, Dr. Sanders sent to Mr. James Bryson, optician, to prepare for the microscope, in order to determine whether it was coal or not. Mr. Bryson had succeeded with some difficulty in grinding the fragment sufficiently thin, and, on comparing the specimen thus prepared with a specimen of Dalkeith coal, it was found that they presented an identical structure consisting of bands of yellow material in a black matrix.[1]

It is quite conclusive, from this interesting observation that in coal-miners' phthisis, fragments of coal, by no means impalpable, do reach the pulmonary structure, and it may reasonably be conjectured that in many other cases, if not in all examples of anthracosis, coal particles in more minute subdivision are inhaled and become firmly impacted.

But in the consideration of the etiology of the subject, it is to be kept in remembrance, that the observation of the disease in the coal pits of Scotland very early gave rise to the notion that the inhalation, not so much of minute coal particles as of an impure atmosphere charged with the products of burnt carbon, by the burning of oil lamps in the confined situation of the pits, was the really efficient cause of anthracosis. This opinion, alluded to by earlier observers, is very strongly expressed in the paper of Mr. J. B. Thomson, of Perth, formerly a practitioner at Tillicoultry, where he had many opportunities of carefully studying the disease. Mr. Thomson has specially grounded the opinion now referred to on the fol-

[1] 'Edinburgh Medical Journal,' September, 1864, p. 274.

lowing considerations:—1st. That in all the low workings in the pit, where oil is used, large masses of black sooty matter, in strings or in flakes, are seen to adhere to and hang from the corners and roof. 2nd. The colliers themselves regard the burning of the oil as the cause of the black spits and the difficult breathing from which they suffer, and they have observed in many pits, in different parts of the country, that those among them who use the oil lamps are the earliest to fall into bad health and the earliest to die. 3rd. The black spit of coal miners is oily or unctuous, corresponding in this respect with the masses which adhere to the walls of the pit and float through the atmosphere. Mr. Thomson asserts "that the use of oil in mines is injurious and probably the exciting cause of black spit." It was noticed by Dr. Makellar, and the observation received confirmation from others, that those men who were frequently engaged in using gunpowder for the purpose of blasting the stone rock, in order to reach the coal seam, suffered more severely from the disease than did others not similarly employed. This was explained by the men engaged in blasting inhaling an atmosphere highly charged with smoke, for after the immediate action of the gunpowder they returned to their work. The opinion as to the injurious effects of blasting I have found to be one commonly entertained by colliers themselves. And I have been able to corroborate the opinion expressed by Mr. Thomson as to the baneful influence of the oil lamp. Where the burning of the oil lamp has been banished the disease has apparently received a most decided check. A further objection is taken by Virchow to the theory of the inhalation of carbonaceous particles being the cause of anthracosis, namely, that these particles are not always met with in the form of granules; at times he remarks the pigment is found "in a diffuse form," "so that cells may be seen grey or black, from the penetration of a matter which the highest microscopic power fails to break up into visible granules;" and he further states, that probably in the case of miners' lung, though much more decidedly in those instances of slighter pulmonary pigmentation which are met with from day to day, a gradual change can be traced by the microscope from a yellowish red, or reddish brown pigment, to a perfect black.

In the careful microscopic examination of recent specimens

of miners' lung I have been unable to verify the statement of Virchow thus alluded to, and I cannot help suspecting that the peculiarities in colour on which he lays so much stress may have been due to the lengthened preservation in spirit of the portions of lung submitted to his scrutiny. The granular form of the pigment is the only form which I have ever seen the particles removed from the sputa, or the lung itself, when examined, to exhibit.

In this paper the attempt has been made to signalise the chief features whether of pathological or etiological interest in cases of anthracosis. It must be admitted that several points in relation to both of these topics require renewed and still more careful investigation. Upon the whole, however, I feel disposed to conclude that—

1. Anthracosis is primarily determined by the inhalation of carbonaceous particles.

2. That in the instance of the coal miner, while capable of being produced in various ways, the chief exciting cause is the inhalation of the very impure atmosphere occasioned by the burning of oil lamps. It would appear that the long-continued inhalation of a very *dusty* atmosphere may, under certain circumstances, engender the same condition. (Case of J. D— detailed in the earlier portion of this paper.)

3. That when once the deposition of carbon in the pulmonary structure has taken place to any extent, and the true function of respiration is thereby interfered with, there occurs a tendency which gradually increases to the arrestment of carbon or carbonaceous pigment in the lungs, and its removal there from the blood.

4. That the presence of black pigmentary deposits in the bronchial glands, the pleura, and less frequently the peritoneum and mesenteric glands, makes it probable that there may in cases of anthracosis be some peculiar process of carbonaceous absorption as well as deposition of carbon.

5. That in this view, the opinion as to the black pulmonary deposit being the result of transformation in hæmatin, although supported by so distinguished an observer as Virchow, cannot be considered as so readily reconcilable with what we know of the natural history, and especially the etiology, of the disease.

It is extremely desirable that the chemical aspects of this

interesting subject should receive renewed investigation, and I would specially invite the chemical inquirer to determine whether the black matter found in the lungs in anthracosis, and that discovered in the bronchial glands, and less frequently in the remoter situations named, be *chemically* identical.

One word in conclusion in reference to the term anthracosis which has been employed in this paper. The expression, not a new one in medical phraseology, because used by some Greek writers to indicate a painful tumour of the eyeball, was first applied to black pigmentary infiltration of the lungs, by Dr. Thomas Stratton, R.N., in an interesting paper, a reference to which will be found below.[1] The word has also been adopted by Virchow, and, on account of its readily understood signification, it is not unlikely that *anthracosis pulmonum* will retain a place in preference to the longer—and of some it must be acknowledged the inaccurate—expressions which different writers have hitherto employed.

[1] "Case of Anthracosis or Black Infiltration of the whole Lungs," 'Edinburgh Medical and Surgical Journal,' vol. xlix, 1838, p. 490.

XXI.

STRUMA EXOPHTHALMICA[1]

(VASCULAR BRONCHOCELE AND EXOPHTHALMOS).

By PROFESSOR VIRCHOW.

(*Translated, with notes and observations, and reprinted from the 'Edinburgh Medical Journal,' April,* 1868.)

[In a recently published part of the important work of Virchow on "Tumours" ('Die Krankhaften Geschwulste').[2] there occur some statements and reflections in regard to a peculiar form of disease which, both in this country and on the Continent, has of late years attracted very considerable attention. The opinion, as to the nature of so complex a disorder as "Vascular Bronchocele and Exophthalmos," entertained by the eminent professor of Berlin, cannot fail to prove of interest to the members of the profession in general. I have therefore thought it worth while to offer a translation of the author's observations, and to this have added some remarks suggested by their perusal. The latter, for the sake of clearness, and in order to avoid all risk of confusing the reader, are

[1] The word "struma," as used by Virchow in the text, and employed by various German writers, means simply bronchocele or goitre—the enlargement of the thyroid gland from whatever cause—and has no relation to that morbid condition or cachexia known as the strumous, or scrofula.—(*Translator.*)

[2] 'Zweiundzwanzigste Vorlesung,' iii Band, i Halfte, S. 73.

thrown entirely by themselves at the close of the translation. The footnotes and references are those of the author unless otherwise distinguished.]

Finally, that is an exceedingly remarkable connection of goitre with affection of the heart (Herzreizung, literally heart-irritation) and large staring eyes (Glotzaugen). So far as is yet known, Flajani[1] was the first to notice the coincidence of goitre with lasting palpitation of the heart. He mentions three cases of this nature, all of which occurred in men, two of the three being youths. In all of these cases, chiefly by means of the external treatment of the bronchocele, a cure was obtained. Of the condition of the eyes he says nothing, but visible enlargement and varicosity of the veins over the thyroid gland were noticed. Parry[2] appears to have been the earliest to observe the third symptom—prominence of the eyes. Next to him, I find two descriptions with post-mortem examinations of accurately investigated cases by Adelmann,[3] in which considerable goitres appeared with enlargement of the heart. During life there existed continued violent palpitation in the region of the heart, great dyspnœa, pain in the abdomen; and in one of the cases it is mentioned that, in addition to these symptoms, "the staring look of the large eyes caused a very remarkable aspect." These facts, notwithstanding, remained nearly unknown till the new experience of Pauli,[4] Von Basedow.[5] and Graves,[6] was published. Although the first communication of Graves appeared in 1835,[7] that of Von Basedow has, notwithstanding, the advantage, the history of the disease having been, in the first place, completely given by him, and, through his knowledge, much information regarding it supplied. By

[1] Guiseppe Flajani, 'Collezione d'osservazioni e riflessioni di Chirurgia,' Roma, 1802, t. iii, p. 270.

[2] Caleb Hillier Parry, "Collections from his unpublished Medical Writings,' London, 1825, vol. ii, p. 3, quoted by Stokes. 'Die Krankheiten des Herzens u. der Aorta.' Uebersetzung von Lindwurm, Würzb., 1855, S. 232.

[3] Adelmann, 'Jahrbücher der philosophisch. medicinischen Gesellschaft zu Wurzburg, 1828, Bd. i, ii, S. 104-8.

[4] Pauli, 'Heidelberger Medic. Annalen,' 1837, S. 218.

[5] Von Basedow, Casper's 'Wochenschrift,' 1840, No. 13, S. 198.

[6] Robert James Graves, 'Klinische Beobachtungen,' Deutsch von Bressler, Leipz., 1843, S. 409.

[7] Stokes, a. a. O., S. 234.

Von Basedow was originated the designations of exophthalmos, of the staring eye (Glotzauges) as the most striking feature, and of the cachexia exophthalmica, large staring eye cachexia (Glotzaugenkachexie), which has more recently become so universally known; and it is from this circumstance that, according to the proposal of G. Hirsch,[1] it has been customary to style the whole assemblage of complex symptoms "Morbus Basedowii." Trousseau,[2] on the other hand, maintains that the disease should be termed "Graves' disease." I hold that this is not correct; for Graves regarded both the palpitation of the heart and the goitre as essentially symptoms of hysteria, while the condition of the eyes is only incidentally mentioned by him; moreover, he is not the first who observed the complex symptoms. By recent writers, prominence has been assigned at one time to one, at another time to another of three principal symptoms; and, according to it, the choice of a designation for the disease has been made. Of late, the name "Struma exophthalmica" (goitre exophthalmique) has become very generally disseminated; but Lebert,[3] having reference to the affection of the heart, suggests for the disease the appellation of "Tachycardia strumosa."[4]

The condition of the thyroid gland is, during life, subject to variety. As a general rule, the swelling is not so great as that of the ordinary goitre, still a very marked enlargement is discovered. The most conspicuous feature of the swelling is an increased development of the vessels, with which, not unfrequently, a diastolic beat and "souffle" (ein diastoliches Klopfen und Rauschen) are perceived, so as to be directly styled "Struma aneurysmatica,"[5] or "Bronchocele vasculosa."[6]

[1] G. Hirsch, 'Klinische Fragmente,' Königsberg, 1858, Heft ii, S. 224.

[2] Trousseau, 'Gazette Hebdomadaire de Médecine,' 1862, No. 30, p. 472.

[3] Lebert, 'Die Krankheiten der Schildrüse,' S. 307.

[4] "Tachycardia" (Ταχύς, quick, Καρδία, the heart), in reference to the rapid and excited action of the organ. The exact term suggested by Lebert is "tachycardia exophthalmica strumosa." See his 'Grundzüge der Artzlichen Praxis,' 1867, S. 230.—(*Translator*).

[5] Henoch, Casper's 'Wochenschrift,' 1848, No. 40, S. 629. Romberg und Henoch, 'Klinische Wahrnehmungen und Beobachtungen,' Berlin, 1851, S. 191. (Of this interesting paper, an abridged rendering by the translator will be found in the 'Edinburgh Medical and Surgical Journal,' April, 1854.) Bullar, 'Medico-Chirurgical Transactions,' 1861, vol. xliv, p. 37.

[6] Laycock, 'Edinburgh Medical Journal,' 1863, p. 1. J. Warburton Begbie, ditto, September, 1863, p. 211.

Sudden appearance of swelling, and its rapid subsidence, have been associated. The results of anatomical inquiries are not agreed upon.[1]

In the only case investigated by me, and of which Traube and Von Recklinghausen have given an account, the gland moderately increased in size, exhibited simply excessive plastic without any gelatinous, nodular, or cystic formation. The lobes of the thyroid reached very distinctly forwards, the interstitial structure was abundant, and the veins only were generally enlarged. Very similar was its condition in the case given by Reith, also in one by Trousseau, which Peter has described, except that, in the last, there is no mention made of the enlargement of the veins. Smith found a very considerable augmentation, especially of the right lobe of the gland, while the arteries were much enlarged and strangely tortuous. Markham observed the gland as being large and firm, at the same time (in a woman of twenty-six years of age) he found an enlarged and persistent thymus gland. In an instance recorded by Hirsch, the thyroid gland was big, hard, and externally covered by enlarged vessels. Heusinger describes the thyroid as double the natural size and uniformly hypertrophied, but without the presence of any abnormal formation. Very similar was its condition, according to the observation of James Begbie. In the case of Schleich, related by Laqueur, Runge found a large gelatinous goitre. Naumann describes the thyroid as very large, its structure uniformly red, and presenting hæmorrhagic spots, the arteries greatly developed. Von Basedow discovered the gland enormously enlarged with hydatid and

[1] Marsh, 'Dublin Journal of Medical Science,' 1842, vol. xx, p. 471. Von Basedow, Casper's 'Wochenschrift,' 1848, No. 49, S. 775. Heusinger (in Braunschweig), Casper's 'Wochenschrift,' 1851, No. 4, S. 53. Naumann, 'Deutsche Klinik,' 1853, No. 25, S. 269. Smith, bei Stokes, a. a. O., S. 239. Banks, 'Dublin Hospital Gazette,' 1855 (quoted by W. Moore, 'Dublin Quarterly Journal,' 1865, November, p. 347). James Begbie, 'Edinburgh Medical and Surgical Journal,' 1855. 'Case-book,' p. 33. F. Praël, sen., 'Archiv f. Ophthalmologie, 1857, Bd. iii, 2, S. 199. Markham, 'Transactions of the Pathological Society of London,' 1858, vol. ix, p. 163. Hirsch, a. a. O., S. 224. L. Laqueur, 'De Morbo Basedowii nonnulla adjecta, singulari observatione,' Dissertatio inauguralis, Berol., 1860, p. 12. Traube und Von Recklinghausen, 'Deutsche Klinik,' 1863, No. 29, S. 286. Trousseau et Peter, 'Gaz. Hebdom.,' 1864, No. 12, p. 181. Archibald Reith, 'Medical Times and Gazette,' November, 1865, p. 521.

varicose degenerations, and Marsh (Sir Henry) saw the thyroid irregularly lobed, containing cysts, which were occupied by a clear fluid, and the jugular veins very greatly distended. Analogous to this was the case recorded by Banks. Lastly, Praël found a ponderous goitre which stretched downwards into the cavity of the chest, its right lobe embracing the trachea, and having passed into a state of cartilaginous degeneration.[1]

It appears from the foregoing comparison of observations, that it is not a determinate variety of goitre, or a fixed enlargement of the same, or definite course, which settles the appearances. Indeed, in many cases the alteration of tissue is so trifling that we may ask, as Graves did, whether it is in reality a bronchocele, or merely a swelling (intumescentia) of the gland which exists. From this consideration, there arises a direct refutation of the opinion entertained by some, that the cause of the exophthalmos is the pressure of the thyroidal tumour on the vessels of the neck.[2] Further, it shows, that at first a simple swelling of the gland exists from which a true bronchocele is formed, and that the goitre runs its usual course from a very moderate, chiefly plastic formation, or advances to a fibrous induration of nodular form. The same series of changes, however, occurs with sufficient frequency in the ordinary goitre, without the appearance of the other symptoms, and accordingly the alteration of the thyroid gland is to be regarded as a secondary phenomenon. That the persistent enlargement of the vessels, and especially of the veins, plays a decided part, may already be conjectured from clinical details. It seems to depend less upon the condition of the arteries; at least in all cases in which these were remarkably changed, there existed also considerable disease in other parts of the vascular system.

In nearly all the cases the heart is greatly enlarged, for the most part dilated, even where the valves are healthy, the left ventricle being chiefly affected. The aorta and great vessels

[1] Besides the names already mentioned in the text, that of "cardiagmus strumosus" (καρδιωγμός, a Hippocratic term, synonymous with cardialgia) has been applied to this disease by Hirsch.—(*Translator.*)

[2] Piorry, 'Gazette Hebdomadaire,' 1862, No. 30, p. 477. A. Cros, 'Gazette Hebdom.,' No. 35, p. 548. Nunneley, 'Medico-Chirurgical Transactions,' vol. xlviii, p. 32.

were, in most instances, but by no means in all, atheromatous. Clinical investigation demonstrates that the hypertrophy of the heart belongs to an advanced stage of the disease; accelerated motion (100 beats and upwards in the minute) is the ordinary phenomenon.

The earliest entertained notion in regard to the eyes was that a hydrophthalmos existed: this is now on all sides abandoned. Naumann alone has found a trifling enlargement of the eyeball. The essential change lies in the fatty tissue of the orbit, which is sometimes hypertrophied, but is for the most part expanded by a hyperæmic swelling, capable of being overcome during life by pressure, and readily disappearing after death.[1] Reith alone, besides greatly distended veins, found a small quantity of partially coagulated blood effused over the eyeball.[2] If to this be added a fatty degeneration of the muscles of the eye, as Von Recklinghausen detected, we are enabled to understand how so considerable a prominence of the eyeballs occurs, that in fact the eyelids can no longer be closed,[3] and that in the uncovered portion of the eye inflammation may be induced, which, in turn, may lead to a complete destruction of the cornea and wasting of the eyeball.[4] As a rule, the prominence of the eyes is on both sides and also symmetrical; still it does happen that the protrusion is either earliest seen, or, at all events, is more marked in one eye than the other.[5]

For the present it must be left undecided whether the majority of observers have found enlargement of the spleen to be an essential or merely an accidental result. At all events, we cannot on *à priori* grounds lightly estimate the disturbance of the digestive function, more particularly the vomiting and

[1] Deschambre ('Gazette Hebdomadaire,' 1862, p. 482) quotes an interesting parallel observation by Decès ('Thèse inaugural sur l'Anévrysme cirsoïde,' 1857), where a transitory exophthalmos appeared in a woman who suffered from alternating arterial dilatations in different parts of the body.

[2] A. Reith, l. c., p. 521.

[3] Graves, a. a. O., S. 411. Stokes, a. a. O., S. 231.

[4] Casper's 'Wochenschrift,' 1840, No. 14, S. 221. Von Gräfe, 'Archiv f. Ophthalmologie,' 1857, Bd. iii, 2, S. 282. Teissier, 'Gazette Méd. de Lyon,' 1863, No. 1, 2.

[5] Von Basedow, a. a. O., 1848, No. 49, S. 772. Henoch und Romberg, 'Klinische Wahrnehmungen,' S. 182. Reith, l. c., p. 521. Praël, a. a. O., S. 206, 207.

tendency to diarrhœa, which are often observed. There always remain the three intimate symptoms or triad-affection of the heart, the thyroid gland, and eyes (orbital-polsters, orbit cushions), as the regular, although, in relation to each other, not constant phenomena, and it may be asked what the explanation of this combination is. That the lesion of the thyroid gland is not to be considered as the centre or mainspring of this complex disorder, I have already made apparent. Individual observers indicate that the bronchocele may be altogether absent.[1] Still less can we regard the affection of the fatty tissue in the orbit as of principal importance, particularly as the protrusion of the eyes is sometimes wanting, or else it only becomes apparent at a later stage.[2] Neither can it be held that the hypertrophy of the heart is itself to be looked upon as the point of departure. On the one hand, hypertrophy is not always present; and on the other, considerable hypertrophy of the heart often exists without the staring eyes and without the goitre. The anatomical changes of all these elements cannot then be regarded as diagnostic.

We come, therefore, to the question of the functional disturbances. Here I must specially call attention to the fact, that there exists a peculiar combination of affections of the thyroid gland and heart. This combination, which was formerly mentioned (vol. i, p. 114), is the so-called iodism, or the goitre cachexia (Kropfcachexie). Here we observe, with the disappearance of the goitre as the consequence of a slight iodism, a most remarkable acceleration of the pulse, not unfrequently the production of annoying palpitation. Only the exophthalmos is wanting; instead of it there is another prominent symptom rarely present in the "struma exophthalmica,"[3] to wit, the association of rapid and great emaciation with voracious appetite [mit Bulimie].[4] The point now mentioned, at all times worthy of notice, is so much the more so, from the circumstance that in a case of Oliffe's,[5] the moderate

[1] Praël, a. a. O., S. 209.

[2] Henoch und Romberg, 'Klinische Wahrnehmungen,' S. 179, 180.

[3] Trousseau, 'Union Méd.,' 1860, tome 8, p. 437-456.

[4] Emaciation and bulimia do sometimes co-exist in cases of "struma exophthalmica."—(*Translator.*)

[5] Trousseau, 'Union Méd.,' 1860, tome 8, p. 513.

exhibition of iodine in "struma exophthalmica" produced the worst effects. Trousseau[1] himself has made similar observations, and on this account has not hesitated, in the discussion on iodism in the French Academy of Medicine, to regard as cases of "struma exophthalmica" instances which, by Rilliet, had been described under the name of iodism. Rilliet[2] has, on the contrary, in the most decided manner claimed as examples of iodism recorded cases which had been described under the name of "struma exophthalmica." Extended observations are required in order to clear up this dispute. Neither bronchocele nor iodine produce the phenomena of the "cachexia exophthalmica," or of the "cachexia iodica;" in both cases there must, in addition, be the presence of something peculiar. In reference to this, we must go back to an original predisposition; and I may mention that Bednar[3] has repeatedly found in newly born children the co-existence of an enlargement of the thyroid gland and hypertrophy of the heart. Yet these facts, supposing them to possess a general importance, which is unlikely, do not exclude from the inquiry the existence of a further cause.

In the acceptation of the humoral pathology, it is concluded that there is always a blood derangement when several organs are together affected, without there appearing to be a simple dependence of the disease on one or other of these. Von Basedow[4] has forthwith extended this view to the establishment of an independent dyscrasia, which he has expressed as a hidden scrofula. At a later period, he has pointed out this dyscrasia as being similar to the chlorotic.[5] This opinion has been subsequently embraced by many other observers,[6] and anæmia has become the theoretical foundation of the complex symptoms, while Mackenzie has gone so far as to indicate the condition of the eyes as being neither more nor less than "exophthalmia anæmica." In favour of this view, there is not merely the

[1] Trousseau, 'Gazette Hebdom.,' 1860, Avril, p. 219-67.

[2] Rilliet, 'Mémoire sur l'Iodisme constitutionnel, Paris, 1860, p. 83.

[3] Bednar, a. a. O., S. 79.

[4] Von Basedow, a. a. O., 1840, S. 225.

[5] Von Basedow, in the same place, 1848, S. 772.

[6] L. Gros, 'Gaz. Med.,' 1857, p. 232. Hervieux, 'Union Méd.,' 1857, No. 117, p. 477. Beau, 'Gaz. Hebdom.,' 1862, No. 34, p. 539. Fischer, 'Arch. Génér.,' 1859, Dec., p. 671. Begbie, 'Edin. Med. Jour.,' 1863, Sept., p. 201. Praël, a. a. O., S. 210.

frequent occurrence of pulsations, palpitations, and murmurs in the vascular system, as in chlorotic patients, not merely the circumstance that the majority of cases of staring eyes with goitre (Glotzaugen-Kropf) are observed in women,[1] and that on several occasions pregnancy and child-bearing have exerted a remarkably favorable influence on the removal of the malady,[2] but also very specially the experience which we possess in relation to the satisfactory operation of an invigorating treatment.

It is, however, undoubted that the anæmia, granting its existence, cannot directly produce such an effect. At the very least, we must assume that, through the disordered blood, an injurious influence on the nerves takes place. In returning, however, to the nerves, the question arises, whether anæmia is required in order to produce such a condition of the nervous system. Different observers[3] have been content to look upon it as a feeble state of the nervous system (einen Schwächezustand des Nervensystems). Graves and Brück[4] considered it hysterical. Stokes[5] limited himself to pointing out that the essence of the disease consisted in a functional disturbance of the heart, upon which organic change is apt to follow. More recently a further advance has been made, and attention has been directed to the nerves of the heart, and especially to the sympathetic,[6] with perhaps also participation of the spinal cord.[7] Köben, the first to offer this conjecture, supposed that the sympathetic was compressed and irritated by the bronchocele; since then the

[1] Trousseau, 'Union Médicale,' 1860, t. viii, S. 437. Charcot, 'Gaz. Med.,' 1856, Sept., p. 584. 'Gaz. Hebdom.,' 1862, Sept., p. 564. Corlieu, 'Gaz. des Hôpitaux,' 1863, p. 125.

[2] Von Basedow (Casper's 'Wochenschrift,' 1848, S. 774) mentions the following remarkable facts: that the mammæ of a man were found greatly enlarged, the left being hard, congested, and painful, yielding colostrum.

[3] Handfield Jones, 'Medical Times and Gazette,' Dec., 1860, p. 541. Fletcher, 'British Med. Journal,' 1863, May. (Hyperneurie.)

[4] Graves, a. a. O., S. 410. A. Th. Brück, Casper's 'Wochenschrift,' 1840, No. 28 (Buphthalmus hystericus), 1848, No. 18, p. 275.

[5] Stokes, a. a. O., S. 244.

[6] Köben, 'De Exophthalmo ac Struma cum Cordis affectione;' Diss. inaug., Berol., 1855. Von Gräfe, a. a. O., S. 280. Trousseau, 'Union Méd.,' 1860, t. viii, p. 487. Arau, 'Gaz. Hebdom.,' No. 49, p. 796. Reith, l. c., p. 522.

[7] Laycock, 'Edin. Med. Jour.,' 1863, Feb., p. 681; July, p. 1.

bronchocele has justly been regarded as pertaining to the neurosis. In support of this view, some not unimportant facts in pathological anatomy have been advanced. Peter[1] found the lowest cervical ganglion enlarged and greatly reddened, its interstitial tissue increased, the nerve fibres diminished. Somewhat similar is the account given by Moore[2] of the inquiry conducted by Cruise and M'Donnel. Reith describes the middle and lower cervical ganglion on both sides, especially the left, as enlarged, hard, and firm; and, when viewed under the microscope, filled with a granular material resembling a lymph gland in the first stage of tuberculosis. The trunk of the sympathetic itself, as well as its branches proceeding to the "arteria thyroidea inferior" and "arteria vertebralis," were enlarged. He held these changes to be tubercular. Directly opposed is the observation of Von Recklinghausen, in so far as the cord and ganglia of the sympathetic were small, as if atrophied, but without histological changes. All now stated was undoubtedly insufficient to explain the real nature of this interesting affection, especially as the appearances of the "struma exophthalmica"—if we appeal to the familiar physiological experiments of Cl. Bernard—correspond in part to the paralysis, in part merely to the irritation of the sympathetic; while, again, there appears to be no true connection, as some of these constant phenomena in the pupil have not been noticed.[3] Only in isolated cases has enlargement of the pupil been observed. Stromeyer[4] compares the "exophthalmia strumosa" with the temporary incomplete prominence of the globe, which he had noticed in connection with habitual spasm of the head (Krampfe des Kopfnickers). When this cramp occurs either from maintaining the erect posture, or from mental emotion, he seeks the foundation of the staring eyes in spasm of the oblique muscles of the eye, and the levator muscles of the eyelids. Demme[5] has also frequently observed with the ordinary goitre partial changes in the pupils, especially "mydriasis," and a notable

[1] Peter, l. c., p. 182.

[2] Moore, 'Dublin Quar. Jour., 1865, Nov., p. 348.

[3] Henoch und Romberg, 'Klin. Wahrnehmungen,' S. 182. Reith, l. c., p. 251.

[4] Stromeyer, 'Handbuch der Chirurgie,' ii, 2, S. 389.

[5] H. Demme, 'Würzb. Med. Zeitschrift,' Bd. iii, S. 269, 273, 297.

elevation of the upper lids. He gives as an anatomical condition at the same time (besides serous swelling and interstitial connective tissue in the recurrent nerve) marked reddening and serous swelling of the sympathetic. These statements, however, suffice just as little as the older descriptions of different changes in the vagus connected with the goitrous condition. Certainly the direction of the inquiry turns, even as in the question of the connection between disease of the supra-renal capsules, bronze-skin,[1] and other cases, more and more to the nerves themselves; while there still exists too little material for enabling us to arrive at a decision.[2] After all, the question resolves itself not so much into an examination of the cases in their later stages, which can be cleared up by autopsies, but into an investigation of the earliest determining cause.

At least, there can no longer be any hesitation in acknowledging the intimate nervous dependence of the complex symptoms as the only probable view. With justice has reference been made to the existence of great derangement of the general nervous system, to the loss of sleep, the often noticed epigastric pulsation, the sensation of heat,[3] and, lastly, to a macular eruption occurring on the head after a slight mechanical irritation.[4] In what particular portion of the nervous system the original seat of the disturbance, and what the disturbance itself

[1] *Bronzing of the skin* occurs in connection with "struma exopthalmica." It exists in a marked degree on the face of a patient (a man) of Dr. Begbie's presently under observation.—(*Translator.*)

[2] Only very recently there died, in my division, a man who had long suffered from very violent palpitation of the heart, with great dyspnœa. His eyes, without being precisely exophthalmic, had an unusual glare (glanz), and gave the impression of being increased in size. A few months previously, Herr Von Gräfe, on account of a commencing glaucoma, had performed iridectomy. Near the close he was affected by dropsy, with very diminished secretion of urine, which was albuminous and rich in uric acid; also with obstinate and violent pain, associated with bloody diarrhœa, great restlessness and fever, with other symptoms. On post-mortem examination I found hypertrophy of the heart, with very extensive myocarditis, a goitre, and very considerable enlargement and interstitial thickening of the sympathetic in the neck, especially of the uppermost and lowest ganglion.

[3] Von Basedow, Casper's 'Wochenschrift,' 1840, No. 13, S. 202; No. 14, S. 220. Teissier, 'Gaz. Méd. de Lyon,' 1862, No. 29; 1863, Nos. 1, 2. Trousseau, 'Gaz. Méd.,' 1864, No. 12, p. 180. Warburton Begbie, 'Edin. Med. Jour.,' 1863, Sept., p. 216.

[4] Trousseau, 'Gaz. Méd.,' 1864, No. 12, p. 180.

is, that must first be more accurately established; and the inquiry must be made also, whence, from what source (whether from the blood) the disturbance has been developed. At all events, it is a step in advance to become acquainted with these complex symptoms, and the jeers of M. Piorry are unable to deter us from acknowledging the entity of the disease.[1] In the history of goitre, it forms an episode as remarkable as it is important; for although this variety of bronchocele seems of itself to have little importance, yet it constitutes a part of a grave malady, and one not unfrequently fatal, although, in other circumstances, readily curable.

As to the ætiology, there remains little more to be said. According to the observations hitherto advanced, it is by no means in goitre-districts of country that this variety has frequently occurred. Still more does the "struma exophthalmica" plainly constitute one of the most important species of sporadic goitre. Females in a greatly preponderating degree suffer,[2] more so in the early period of life, especially about puberty, and in childbed. Uterine derangements act by no means always as exciting causes; and while serious diseases such as typhus, and colds particularly affecting the throat, exert an influence, chlorosis is chiefly to blame. Since the latter disease, according to my understanding, is one of early life—is even a disease of development[3]—we are led to assume the existence of an original predisposition. Romberg and Juncken[4] observed the disease in two sisters.[5] We are still further removed from understanding the cause of the disease in men. Exhausting labour, great and long continued depression of the mind, and

[1] Piorry, 'Gaz. Hebdom.,' 1862, p. 477.

[2] It is not without interest that Rorie ('Edin. Med. Jour.,' 1863, Feb., p. 696) frequently found prominence of the eyeballs in persons of weak intellect, and this particularly in women (35 per cent.); inequality of the pupils, also, he noticed not unfrequently. Foderé remarks, concerning cretins:—"Aux uns les yeux sont enfoncés dans la tête, aux autres ils sont très en dehors. En général leur régard est fixe et égaré, et il y a toujours un air d'étonnement."

[3] Virchow, 'Cellular Pathologie (3rd edition), S. 211.

[4] Henoch, Casper's 'Wochenschrift,' 1848, No. 40, S. 627.

[5] Dr. Begbie informs me that, quite recently, he has observed the disease in two sisters, both married. In both, the malady had assumed its unequivocal characters.—(*Translator.*)

weakening diseases, have at times preceded it. According to the comparison instituted by Von Gräfe,[1] the disease appears at a later period, on the average, in men, but, at the same time, is more serious. It is worthy of remark that, not unfrequently, the commencement of the malady has been noticed to be quite sudden, for example, after a fright or hard labour.

Death results with an increase of the appearances, sometimes very quickly, accompanied by great uneasiness and disturbance of the brain, mostly in a gradual manner, with decay of nutrition and strength, which is hastened by urgent diarrhœa, sometimes dysenteric in character, and mucous catarrh of the lungs. At another time, on the other hand, chiefly in recent cases, a complete cure results; the goitre, however, it is true, not always entirely disappearing. Sometimes the preparations of iron have effected this, sometimes digitalis,—it is seldom that iodine is useful. The best consequences have succeeded the employment of cold-water treatment, sea-bathing, and an invigorating diet.[2]

Observations by Translator.—It is necessary, in the first place, to correct an error into which Virchow has fallen when offering the interesting historical summary regarding "Struma Exophthalmica," with which his observations commence. Parry, he remarks, appears to have been the earliest to observe the prominence of the eyes. The fact is, however, that Parry noticed the enlargement of the thyroid gland in connection with disease of the heart, but in the whole course of his statement regarding that connection there is only a single, and that evidently casual, reference to the condition of the eyes. Unquestionably the earliest observer in our own country of the peculiar affection of the eyes, believed by him, at the time, to be a real enlargement, was Dr. Stokes, and next in order to him was the

[1] Von Gräfe, a. a. O., S. 292.

[2] I may take the opportunity of directing attention to a brief but very interesting account of the disease by a physician of Heidelberg, Dr. Theodor Von Dusch, in his recently published volume, entitled 'Lehrbuch der Herzkrankheiten,' Leipzig, 1868.

Dr. Von Dusch's observations on the "Basedow'sche Krankheit" are illustrated by a woodcut representing an example of double exophthalmos, but without goitre, in a man of thirty-two years. The portrait, in the first instance, was photographed from nature.—(*Translator.*)

late Sir Henry Marsh, of Dublin. Antecedent to 1835, the date of his first publication on the subject, Dr. Graves had incidentally had his attention directed to the coincidence of cardiac disease and enlargement of the thyroid gland. In 1839, Dr. Begbie had evidently, in a manner altogether independent, noted the association of the three peculiar symptoms. During the succeeding ten years other instances of the kind occurred to him in practice, and, in 1849, he published an account of them. In doing so, Dr. Begbie was the earliest in this country to assert the entity of the disorder, to advance a theory of its cause, namely, its dependence on anæmia, to indicate its amenability to treatment, and capability of perfect cure, and, lastly, to suggest a plan of treatment, the success of which has, happily in many instances since that time been most satisfactorily proved. Five years subsequently to the incidental observation by Dr. Graves, of enlargement of the thyroid gland with disease of the heart, a German physician, Von Basedow, published a paper, in which terms now sufficiently familiar in connection with the disease, were for the first time employed. For example, "Exophthalmos," "Cachexia exophthalmica," and, in the German, "Glotzaugen" (staring eyes), "Glotzaugenkachexie" (staring-eye or goggle-eye cachexia). In these phrases it will be noticed that no particular reference is made to the condition of the thyroid gland, which in connection with heart-enlargement, had already attracted the attention of Parry and others; but Von Basedow was familiar with the bronchocele as well, and accordingly, in consideration of the correctness of his observation so far, there can be no objection, as has been proposed by Hirsch, and followed by German physicians generally—although scarcely receiving the sanction of Virchow's high authority—to designate the disease "Basedow's disease" ("Basedow'sche Krankheit," "Morbus Basedowii"). The late distinguished and lamented physician of the "Hôtel Dieu," whose unbounded admiration for the character and writings of Dr. Graves is as well known as it is highly appreciated by all readers of the 'Clinical Lectures,' has styled the disease, "Graves' disease" ("Maladie de Graves"), and whether rightly or wrongly so—Virchow, as we have seen, thinks wrongly—there can be no doubt that under this name, as originally employed by Trousseau, it will long be familiarly known and

described. Were it not that I entirely agree with the late Dr. Todd, of London, in regarding it as no compliment to the great names of our profession "to attach them to any of the numerous ills which flesh is heir to,"[1] I should feel disposed to suggest the appellation of "Stokes' disease." Such, too, is a sufficient reason for not encouraging the use of that name which my filial respect had otherwise most cordially approved, to wit, "Begbie's disease," as already proposed by more than one writer. There is little to be said in favour of the other nomenclature adverted to in the translation, the "Tachycardia strumosa," or "Tachycardia exophthalmica strumosa," of Lebert, and the "Cardiagmus strumosus" of Hirsch and Von Dusch; and it must be confessed that a really good and serviceable title for the disease is still a desideratum.

Like other observers, it is worthy of note, that Virchow indicates no special form of disease as incident to the thyroid gland in this complex disorder. The most marked or characteristic feature is its increased vascularity, and the peculiar pulsation, or pulsatory thrill, which is, at all events, distinguishable over it. Hence the application to this variety of goitre of the terms "vascular bronchocele" and "struma aneurysmatica." While increase of gland structure, and various kinds of degeneration, as, for example, the fibrous and cystic, have been detected in such goitres, there is no doubt whatever that the augmented activity and chronic enlargement of the vessels, particularly the veins in them, is of chief importance.

The central organ of the circulation invariably and, in point of time primarily, suffers. At first, however, and usually for a lengthened period, the heart is only functionally disturbed. Of this disturbance its greatly accelerated action is the prime, as it is the unmistakable indication. After a time, structural change ensues, and that is, for the most part, of the nature of dilatation, or hypertrophy with dilatation. The left ventricle is the chamber chiefly affected. Valvular disease of the heart is certainly rare; when it exists, the imperfection is secondary, never primary. In other words, the increased size of the mitral and tricuspid orifices, discovered on the post-mortem examination of some cases of the disease, bore an intimate relationship

[1] In referring to facial palsy as "Bell's paralysis," in 'Clinical Lectures on Diseases of the Nervous System,' Lecture 4.

to the greatly augmented capacity of both ventricles. This, the earlier result, was evidently the cause on which the insufficiency of the auriculo-ventricular valves depended.[1]

In the great majority of cases, a disturbed action of the heart, generally spoken of as palpitation, is the *first* symptom to attract attention. If, however, a very careful inquiry into the previous history of such patients be made, it will be found that for some time before the distressing action of the heart was noticed—possibly at a considerable period antecedent to the acknowledged existence of any departure from health—there had occurred a diarrhœa or lientery, a menorrhagia or leucorrhœa, an epistaxis, rather a frequently recurring loss of blood from the nose, or a hæmorrhage from piles; and although, in many cases, none of these may have been sufficient to produce the more manifest indications of anæmia, it will, I firmly believe, be further found that impoverishment of blood—readily enough recognisable—exists.

Virchow, like all recent observers of this disease, rejects the notion of the prominence of the eyes being due to "hydrophthalmos." He looks upon a change in the fatty tissue of the orbit—a view originally maintained by Heusinger—as being the essential morbid condition upon which the very strange aspect of the eyes depends. An hypertrophy of the fatty tissue, or its congestion, are the states more particularly indicated. Enlargement of the spleen is referred to by Virchow as having been noticed by some observers, but he truly remarks that the degree of importance to be attached to its occurrence has not been as yet accurately determined.

There are then, it may be stated, *four* essential symptoms in this most interesting malady—namely, 1. Disturbance of the heart's action prone to terminate in structural change; 2. Enlargement—vascular in its nature—of the thyroid gland; 3. Prominence, with peculiar expression, of the eyes; and, 4. Remarkable visible pulsation and vibratory thrill throughout the whole arterial system. Of this "tetrad" of symptoms, the first and fourth are always present; the second and third may each be absent. Without cardiac and vascular derangement, the disease has no existence. An exquisite illustration

[1] See, for example, the case of J. K—, as recorded by Dr. Begbie, in Contributions to Practical Medicine,' pp. 143, 148.

of the malady, however, presumes the presence of all the features now mentioned.

In discussing the essential pathology of "struma exophthalmica," Virchow has justly observed that anæmia, granting its existence, cannot directly produce the results which are witnessed. While the "primum mobile" is, however, seated in the blood, it is abundantly evident that an injurious influence is largely exerted on the nerves. A decided advance in our knowledge on this point has recently been made, for Peter, Reith, and Von Recklinghausen have each discovered a distinct lesion of the sympathetic nerve and its ganglia, while Virchow himself so far confirms their interesting and probably important observations as to have found in a case not exactly of the "struma exophthalmica," but bearing a certain resemblance to it, a lesion of the same nervous trunk.

Further observations are, however, required in order to determine, with any amount of accuracy, what value is to be attached to these morbid appearances in relation to the intimate pathology of that strange disease with which they have been found connected.[1]

It cannot be too distinctly stated, nor too carefully borne in remembrance, that, in this disease, *iodine* is an unsuitable remedy—its administration, so valuable in ordinary goitre, is in the "struma exophthalmica" not only useless, but injurious. From *iron*, *digitalis*, and *belladonna*[2] discriminately employed, and from the steady perseverance with an invigorating plan of treatment, the best effects have been found to follow.

[1] I have observed a decided feebleness in the lower extremities, almost amounting to paraplegia, in two or three aggravated cases of the disease. This also points to the implication of the nervous system. In two of these instances the patients walked with considerable difficulty, and had acquired a peculiar rotatory movement in progression.

[2] "On Vascular Bronchocele and Exophthalmos," by the translator; 'Edinburgh Medical Journal,' 1863, p. 217.

XXII.

THE THERAPEUTIC ACTIONS AND USES OF TURPENTINE.

(*Read before the Medico-Chirurgical Society of Edinburgh, 7th June,* 1871.)

Turpentine, the τερέβινθος or τέρβινθος, and in the earlier form τέρμινθος, of the Greeks, has an ancient as well as interesting history. Already esteemed as a remedy in Hippocratic times, and mentioned in three of the treatises which bear the name of the Father of Medicine,[1] if indeed these were not composed by Hippocrates, there exists little ground for questioning the identity of the Pistachia Terebinthus,[2] a plant yielding, in common with certain of the Coniferæ, the liquid turpentine, with the Terebinthus of the ancient writers. By Theophrastus, Dioscorides, Galen, and Pliny, many original observations concerning the use of turpentine are also made, and these are copied by such subsequent writers as Aetius, Oribasius, Paulus Ægineta, and Alexander Trallianus. Hippocrates, at least the Hippocratic author, had ascertained the emmenagogue virtues of turpentine, and also its action in restraining discharges from mucous surfaces, particularly those of the genito-urinary pas-

[1] ΠΕΡΙ ΓΥΝΑΙΚΕΙΗΣ ΦΥΣΙΟΣ. ΠΕΡΙ ΓΥΝΑΙΚΕΙΩΝ, *τὸ δεύτερον*. ΠΕΡΙ ΣΥΡΙΓΓΩΝ.

[2] "Indeed, this last-mentioned plant is probably the true Terebinthus of the ancients."—Pereira, 'The Elements of Materia Medica and Therapeutics,' vol. ii, part i, p. 1183.

sages,[1] and the writers subsequent to him, of whom Dioscorides[2] as a Greek, and Pliny[3] as a Latin author may be particularly cited, indicate their knowledge of its possessing many other important properties.

Coming down to the modern history of turpentine, we meet with a subject naturally complex, from the circumstance that there are *many* officinal substances derived from the coniferous plants. A very clear and instructive narrative of the natural and chemical history of the Terebinthinæ is given by Dr. Christison in his Dispensatory, and the previous labours of M. Guibourt[4] and Dr. Pereira, are by him both acknowledged and rendered further available. The last-mentioned authority, Dr. Pereira, in his able discussion of turpentine, has found it most convenient to treat of the coniferous terebinthinates under four heads:—1. The oleo-resinous juices. 2. The volatile oil obtained by distillation. 3. The resinous

[1] After referring to passages in the Hippocratic writings regarding turpentine, Trousseau and Pidoux observe, "Si la première de ces citations est vague et caractérise peu l' action spéciale de la Terébenthine, ce que nous sommes loin de nier, puisque le père de la médecine n'a presque jamais parlé d'un remède excitant sans le déclarer emménagogue, la seconde établit clairement que ce grand observateur avait administré la Terébenthine dans los cas où elle est le mieux indiquée, les flux muqueux, et spécialement ceux des voies génito-urinaires."—'Traité de Thérapeutique et de Matière Médicale,' tome seconde, p. 582.

[2] ΠΕΔΑΚΙΟΥ ΔΙΟΣΚΟΡΙΔΟΥ. *Περὶ ὕλης ἰατρικῆς, βιβλίον πρῶτον. Περὶ Τέρμινθου.* In this passage the learned Anazarbian signalises the possession by turpentine of diuretic and aphrodisiac properties, also its virtues in pulmonary catarrhs and phthisical disorders, in rheumatic affections, in palpebral inflammations, attended by loss of the eyelashes, in scabies, and certain chronic cutaneous eruptions. Moreover, he recommends the employment of turpentine in the form of an electuary, with honey (*ἐκλεικτόν*, Hippocrates—*ἔκλειγμα*, Aretaeus: literally, a medicine which melts in the mouth), a method of administration of the remedy, the mention of which (in the words of the French writers already quoted, "remise en honneur de nos jours") gives increased interest to the Hippocratic passage; finally, turpentine is noticed as affording relief to pain when simply applied to the side, or used as an ointment in pleurisy.

[3] 'C. Plinii Secundi Naturalis Historiæ,' tomus secundus, lib. xiii, cap. vi. "De Terebintho;" also lib. xxiv, cap. vi. In the latter, there occur the following sentences:—"Terebinthi folia et radix collectionibus imponuntur. Decoctum eorum stomachum firmat. Semen in capitis dolore bibitur in vino, et contra difficultatem urinæ. Ventrem leniter emollit. Venerem excitat. Piceæ et laricis folia trita et in aceto decocta dentium dolori prosunt."

[4] 'Histoire Abrégée des Drogues Simples,' tome second, p. 339.

residuum. 4. Tar and pitch. In a closely similar manner Dr. Christison considers *seriatim* the various substances admitted into the pharmacopœias, and in the following order:—Frankincense, with its modification, Burgundy pitch, common turpentine, Venice turpentine, Canada balsam, resin, oil of turpentine, tar, and pitch. Of these, frankincense (*Thus Americanum*), Burgundy pitch (*Pix Burgundica*), Canada balsam (*Terebinthina Canadensis*), resin (*Resina*), oil of turpentine (*Oleum terebinthinæ*), and tar (*Pix liquida*), find their places in the British Pharmacopœia; the Terebinthina vulgaris and Terebinthina Veneta are excluded. Among the substances now named, the oil distilled from the oleo-resin turpentine, which, again, is obtained from various pines, is a most valuable therapeutic agent, possessing actions on various organs and structures of the body which render it available in the treatment of disease. To these, attention will be directed after a brief consideration of what is known regarding the physiological action of the drug. The ultimate physiological action of oil of turpentine may be said to be twofold; it is irritant and stimulant. But these actions embrace others which turpentine very notably possesses, and we observe that according as its irritant action is exerted on the intestinal canal, the urinary organs, or skin, it is a cathartic, a diuretic, or a diaphoretic. As a stimulant, it acts in producing, when a moderate dose has been taken, a by no means disagreeable sensation of warmth in the stomach, which is sometimes diffused over the greater part of the abdomen and chest. It quickens the circulation, and augments the temperature. Moreover, in limited doses, it unquestionably produces a stimulating action on the brain, giving rise to impressions which closely resemble those produced by alcohol, and with these an ability for sustained mental as well as physical exertion. Should the quantity taken or administered be more considerable it may cause remarkable effects on the sensorium. Such has been known to produce disorder of the intellectual functions, nearly identical with intoxication. Dr. Copland in his own person realised this condition. Sir Thomas Watson also speaks of a patient who was supposed to be dying, but was found to be only intoxicated by the free dose of turpentine which he had swallowed.[1] Occasionally the oil has been

[1] 'Lectures on the Principles and Practice of Physic,' vol. i, p. 663.

observed to cause sleep. Indeed, a remarkably soothing influence on the nervous system is a by no means uncommon result of the administration of turpentine. Purkinje noticed this The same has been experienced by others after taking the oil in doses of a drachm. Dr. Andrew Duncan observes, "I have seen large doses produce temporary intoxication, and sometimes a kind of trance, lasting twenty-four hours, without, however, any subsequent bad effect."[1] Applied to the skin, turpentine produces rubefaction, and sometimes a vesicular eruption. A scarlet eruption over the skin has also been observed to succeed the internal administration of turpentine. That the external application may be followed by cutaneous absorption is evident from the distinct odour of turpentine in the breath of some persons, over whose chests or other portions of the trunk the warm terebinthinate epithem has been placed. In the same way the peculiar, indeed distinctive, odour communicated to the urine by turpentine, that of violets, may be produced. The violaceous odour of the urine here referred to, depends on a portion of the oil having undergone a chemical change in its passage through the system; but while this is taking place, it also appears that some portion of the oil leaves the economy by the urine altogether unchanged. This is illustrated in the experiments by Moiroud on horses, to whom turpentine had been given for some days, in the enormous dose of ten or twelve ounces.[2] It is not by the kidneys alone, however, that the absorbed turpentine is eliminated. The skin and the bronchial surfaces act in a similar manner. After the administration of a few doses, it may be even a single dose, if large, there is a distinct odour of turpentine recognisable over the cutaneous surface, and in the breath. It may be further observed, that, while the violaceous odour of the urine is produced after the earlier doses of the remedy, in cases in which its continued administration has been practised, the urine ultimately comes to have an odour altogether terebinthinate, the by no means disagreeable aroma, resembling violets, being lost. This effect may, in all probability, be accounted for by the more pungent odour of the turpentine concealing the aroma, during the increased elimination of the remedy by the kidneys, for the

[1] 'The Edinburgh New Dispensatory,' p. 553.

[2] In Pereira's 'Materia Medica,' vol. ii, part i, p. 1188; also Headland on the 'Action of Medicines in the System,' p. 79.

result of a suspension of the administration of the turpentine is the restoration of the violaceous odour to the urine before the final disappearance from it of all characteristic smell. The persistence of the violaceous odour is a notable feature. That produced by a single small dose of turpentine may be readily detected in the urine for eight-and-forty hours. It is much more persistent than many stronger odours which the urine acquires from the ingesta, as, for example, from asparagus. A further effect of turpentine is irritation of the urinary organs, leading not unfrequently to hæmaturia; and apart from any idiosyncrasy or special susceptibility to the irritant action of turpentine on the kidneys, which is possessed by some few individuals, there appear to be two modes of administration, after either of which the hæmaturia may come. It may succeed the use of the remedy, in a large or considerable dose, given probably with the view of producing catharsis. Here the remedy has either been wholly directed to the urinary organs, the intestinal canal escaping its influence, or, reaching the latter and failing to exert any effect, it has been reabsorbed, and ultimately attracted to the kidneys. This view seems borne out by the circumstance, that, while in one instance the hæmaturia is produced very speedily after the administration of the turpentine, in another, a considerable time has elapsed before the occurrence of the usual irritation. There is one other interesting circumstance in connection with the action of turpentine on the kidneys. It would appear that the production of the violaceous odour may, to a certain extent, be taken as a test of the integrity of these organs.[1] However the drug has been introduced into the system, whether by the mouth or rectum, from the skin, or by inhalation, this seems to hold good; but the most delicate test is that by cutaneous absorption, and it admits of being proved that a shorter time elapses till the odour in question is produced, and when produced, the odour is infinitely more distinct, when no symptom or indication of renal disease is in existence, than when the converse obtains. There may be reason in avoiding the use of turpentine as a counter-irritant in cases where the kidneys are unsound, and the caution regarding its use, which is expressed by some writers, Dr.

[1 *Vide* 'St. Barth. Hosp. Reports,' vol. iii, 1867, p. 216, "On the Passage of certain substances into the Urine in Healthy and Diseased States of the Kidneys," by the Editor.]

George Johnson[1] for example, may prudently be acted upon; nevertheless, it is consistent with my own observation, that, when under such circumstances turpentine is employed as a rubefacient or counter-irritant, the elimination which succeeds its absorption by the skin is effected conspicuously by the bronchial mucous membrane, by the intestines, and probably also by the cutaneous surface.

With these few observations on the physiological action of the drug, I pass to the consideration of its therapeutic actions and uses.

There are certain therapeutic actions of turpentine to which a brief reference is alone required, experience having already incontestably determined its precise value as a remedy. Foremost among these may be noticed its operations as a *cathartic* and *anthelmintic*. As a simple cathartic, turpentine is rarely employed, and for the good reason that its action, even when administered in large doses, is uncertain. When combined with other purgatives, and more particularly castor-oil, a greater certainty of operation is secured. The combination now referred to is justly esteemed, and, as Dr. Christison remarks, "has often moved the bowels in obstruction from long-continued constipation, after other powerful cathartics had failed." Dr. Kinglake has particularly insisted on the efficient operation of turpentine in cases of obstinate constipation attended by exaggerated tympanites, while Dr. Paris has borne testimony to its value where the obstruction has apparently been dependent on affections of the brain. The anthelmintic virtues of turpentine are chiefly prized in tape-worm, and may be ranked with those of the liquid extract of the male shield-fern and pomegranate-root bark.[2] In the treatment of ascarides the remedy is chiefly

[1] 'Diseases of the Kidney,' p. 133.

[2] "As perhaps the most effectual remedy we possess for the expulsion of tape-worm, oil of turpentine stands deservedly in high repute."—Neligan's 'Medicines, their Uses and Modes of Administration.' Edited by Dr. Macnamara. 6th edition, p. 47. "Oil of turpentine appears to be the best remedy for expelling tape-worms; it is usually given in large doses for this purpose, but I have sometimes found that it fails when thus given, while the continued use of it in small doses succeeds in expelling the parasites. Thus, in the case of the late Mr. Williams, the apothecary in Charlemont Street, ten drops given three times a day, and continued without intermission for six weeks, expelled a long tape-worm, which had resisted the same remedy in large doses."—Graves's 'Clinical Lectures,' Lecture 53. "Oil of turpen-

useful when administered as an enema. It is also efficacious over the lumbrici. Turpentine is a *hæmostatic*—it arrests hæmorrhage. The interest attached to this action of the drug is increased by the consideration that it also causes one variety of hæmorrhage, hæmaturia. The condition which determines the escape of blood from the capillaries is, however, very different in the two cases. The one is an active hæmorrhage, due to the presence of the absorbed turpentine in the blood of the Malpighian capillaries, causing their irritation and rupture; while the other, that which turpentine cures, is of a passive description, determined in all probability by a neurosis of blood-vessels. Turpentine in the latter instance is an available remedy. I am inclined, from what I have witnessed of its action in cases of purpura hæmorrhagica, with which hæmaturia has been associated, to regard it indeed as the most available remedy. Its action I believe to be through the nervous system, controlling and regulating the current of blood in the minute vessels by stimulation of their contractility. In many, if not in all, of the different forms of hæmorrhage turpentine has been employed, and a strong testimony has been borne by many experienced physicians to its value. Thus, in treating of the means we possess for the arrestment of pulmonary hæmorrhage, Dr. Wood of Philadelphia remarks: "Another hæmostatic medicine, which sometimes acts very promptly and efficiently in hæmoptysis, is oil of turpentine. How it operates is not well understood, though probably by some influence on the capillaries, perhaps through the sympathetic nerve-centres. It is applicable to cases without inflammatory action or febrile excitement; and if plethora exist, it should be subdued before recourse is had to the oil. Mere frequency of pulse does not contraindicate it. I have found no remedy more efficacious than this under circumstances favorable to its use. In one apparently desperate case I succeeded after failure with all other means. Ten drops of it may be given every hour or two. If the hæmorrhage is very copious, the dose may be much larger."[1]

In hæmatemesis, as well as in hæmoptysis, turpentine was much used by the distinguished John Hunter; in regard to the

tine unquestionably acts as a most virulent poison upon the entozoa, especially upon the tape-worm, which it expels lifeless and livid."—Paris, 'Pharmacologia,' p. 354.

[1] 'A Treatise on the Practice of Medicine,' vol. ii, p. 329.

former, he states that he has seldom found it fail when given in doses of ten drops every two or three hours. In uterine hæmorrhage, the value of the remedy has been tested by many observers. Dr. Copland remarks: "I have had recourse in extreme or prolonged cases to the spirits of turpentine, either in a draught or in an enema, or in the form of epithem or fomentation, applied over the hypogastrium, and always with success. This practice was first adopted by me in 1819, in metro-hæmorrhagia occurring after delivery, and has been pursued by me in other hæmorrhages, whenever it was considered advisable speedily to arrest them. In 1820, I publicly recommended the treatment; and I know that it has succeeded with those who were thus led to employ it."[1] In the intestinal hæmorrhage of fever, in hæmorrhoidal flux, in epistaxis, and the profuse bleeding which occasionally succeeds the extraction of teeth, in the hæmorrhage from leech-bites and from wounds, internally administered and externally applied, turpentine has often proved eminently useful.[2]

As a *stimulant*, turpentine has been very largely employed in the advanced stages of adynamic fevers. In typhus, more particularly where there exists marked depression of the vital powers, the patient being sunk in the bed, with more or less of stupor or low muttering delirium, and coma evidently threatened, with very probably hiccough, subsultus tendinum, and tympanitic distention of the belly, there is no remedy we possess which is so capable of effectually rousing the vital energy. I appeal with confidence to the experience of physicians who have seen much of fever, when I affirm that, without turpentine, we should, in such circumstances, be, if not powerless, at all events deprived of our most useful and potent auxiliary. In connection with the stimulating effect of turpentine on the nervous system, and through it on the vascular, there is to be taken into account its wonderfully soothing action on the nervous centres, how delirium and restlessness are overcome, and often completely subdued by its use.[3] Not only so, but

[1] 'Dictionary of Practical Medicine,' vol. ii, p. 113.

[2] See "Terebinthinæ Oleum," in 'Manual of Practical Therapeutics,' by Edward J. Waring, M.D., p. 724.

[3] Dr. Dewees found the spirit of turpentine, in doses of twenty drops, procure sleep in cases of uterine cancer, when it could not be obtained from opium.—'Diseases of Females,' p. 274.

even maniacal excitement has been similarly overcome. Dr. Graves, in speaking of the administration of turpentine, under just such circumstances, remarks: "Hence the value of this remedy is very great indeed, for it not only opens the bowels (a point of considerable importance in such affections), but also removes tympanites, and exercises a powerful influence in controlling and quieting the nervous system. I have seen persons' lives saved by a few doses of the oil of turpentine, and have watched its tranquilising effect on the nerves with pleasure and surprise."[1] Dr. Copland speaks of the spirits of turpentine exhibited in similar circumstances as "frequently productive of benefit."[2] Dr. Murchison recommends the internal administration of turpentine in the extreme tympanites of typhus; also in the hæmorrhage of enteric fever.[3] The eminent Swedish physician, Dr. Magnus Huss, has emphatically indicated the reliance which may be placed in turpentine, as a remedy in the low forms of chest affection, the catarrh and pneumonia, occurring in fevers. He remarks: "I have a rather long experience of this treatment with turpentine, as I before said in the account of the treatment within the hospital in 1842, with respect to pneumonia typhosa, that the use of the turpentine in certain cases of typhus fever is one among the greatest steps forward the medical art has made of late in the treatment of these forms of disease."[4] Nor is the language employed by Dr. Murchison less assuring. He states: "Its effects in the bronchitis of adynamic fevers are sometimes marvellous. It ought to be given in doses of from ten to twenty minims, with fifteen to thirty minims of chloric ether or sulphuric ether, and half a drachm of spiritus juniperi compositus, in mistura acaciæ, mistura amygdalæ, or yelk of egg. The dose may be repeated every two hours at first, until the desired effect be produced. After a few doses the patient often begins to cough and expectorate large quantities of viscid mucus, with great relief to the

[1] Op. cit., p. 101.

[2] 'Dictionary of Practical Medicine,' vol. i, p. 1037.

[3] 'Treatise on Continued Fevers,' pp. 286, 575.

[4] 'Statistics and Treatment of Typhus and Typhoid Fever; from twelve years' experience, gained at the Seraphim Hospital in Stockholm, 1840-1852,' by Magnus Huss, M.D. Translated from the Swedish original, by Ernst Aberg, M.D., p. 139.

respiratory symptoms. The quantity of urine is likewise increased. I have never known strangury produced."[1] Dr. Wood, of Philadelphia, to whose confidence in turpentine as a hæmostatic reference has already been made, uses the remedy largely in the treatment of typhoid fever. He observes: "Should the tongue become very dry, and the abdominal distention remain undiminished, the oil of turpentine will prove an excellent remedy. I cannot too strongly impress upon the profession my convictions of the importance of this medicine. It may be employed in all cases in the advanced stages of this disease when the tongue is dry. But there is a particular condition, and that a not uncommon, and sometimes a very dangerous condition, in which I have often employed it, and hitherto have seldom known it to fail." Dr. Wood here refers to cases in which the tongue, after cleaning, wholly or partially, becomes quite dry, while with this change in the tongue there is generally associated aggravation of other symptoms, but particularly of the tympanites. Turpentine, administered under such circumstances, acts as a stimulant, but also, Dr. Wood believes, as an "alterative to the ulcerated surfaces in the intestinal mucous membrane." The usual dose is ten drops every two hours. It may be given in doses of from five to twenty drops every hour or two. Summing up the evidence which he has collected in regard to the efficiency of the remedy, Dr. Wood, whose enthusiasm in its praise at least merits most attentive consideration, concludes: "I will repeat that the oil of turpentine may be used with great hope of benefit in any case of enteric fever, in the advanced stages, with a dry tongue, but, in the cases above referred to, with great confidence of success, so far as an experience of more than thirty years may be admitted as a ground of confidence."[2]

There is another form of fever in which turpentine has been frequently employed, and by many physicians with success—namely, *puerperal fever*. Dr. Brenan, of Dublin, in 1814, was the first to use it in this disease, in doses of one or two tablespoonfuls every three or four hours, and sweetened; the application of turpentine stupes over the abdomen being also practised. It may be admitted that some of the more distressing symptoms of this disease, more particularly the tympanitic

[1] Op. cit., p. 283. [2] Op. cit., vol. i, p. 359.

distention of the abdomen, may be effectually relieved by the remedy. The testimony of certain writers subsequent to Brenan, Douglas, and Kinneir, who, like them, upheld the employment of turpentine as almost a specific, has, however, not been confirmed by Dr. Gooch,[1] Dr. Copland, Sir Charles Locock, and Dr. Churchill.[2] Dr. Craigie remarks: "It does not appear, however, either to be alone adequate to the cure of this disease, or to possess any specific powers over the morbid action. It is by no means even always capable of assuaging the violence of the vomiting or the abdominal pains."[3] I am aware that, by some physicians, turpentine is still regarded as the "summum remedium" in this very serious disease, and I feel satisfied that I have witnessed good effects from its use. It is possible that a consideration of some topics which follow may tend to strengthen the reliance which may be placed in its virtues.

There are many forms of *nervous disease* in which turpentine has been administered, and is still justly prized as a remedy. These include both painful and spasmodic affections, and likewise the more formidable convulsive disorders. In epilepsy, turpentine appears to have been earliest prescribed by Dr. John Latham, an allusion to the subject being made in his work on Diabetes, published in 1811. A few years subsequently a strong testimony to the efficiency of the remedy in this disease was borne by the same writer, and by Dr. Edward Percival, of Dublin.[4] They had been accustomed to prescribe turpentine

[1] "Although I have been unsuccessful in the use of turpentine in peritoneal fevers, the testimony of competent witnesses convinces me that there is a class, or perhaps a stage, of these fevers, in which oil of turpentine, given internally, is sometimes highly efficacious, and that cases apparently hopeless have been recovered by it."—'An Account of Some of the Most Important Diseases peculiar to Women,' p. 103.

[2] "Having frequently employed the spirits of turpentine in the more malignant states of fever, and being aware of Dr. Brenan's recommendation of it for the malady, I next prescribed this substance, both by the mouth and in enemata, trusting to it principally, but without obtaining from it all the advantages which I had expected. It should, however, be stated that frequently I was not called to a case until it was far advanced."—(Op. cit., vol. iii, part i, p. 536.) See on the same subject a lengthened and interesting discussion in 'Traité de Thérapeutique et de Matière Médicale,' par A. Trousseau et H. Pidoux, tom. ii, p. 602.

[3] 'Elements of the Practice of Physic,' vol. ii, p. 241.

[4] 'Medical Transactions,' published by the College of Physicians in London, vol. v, p. 65; also 'Edinburgh Medical Review,' 1810.

as an anthelmintic, and had found it effectual in removing the convulsive disorders which are sometimes connected with the presence of tape-worm or lumbrici in the intestines. A more general employment of the remedy, however, had satisfied them that, not when connected with worms alone, but when occurring as an idiopathic disorder, epilepsy may be removed by turpentine. By the physicians now named turpentine was exhibited iu *large* doses. It is in reference to their practice and that of other English physicians that Joseph Frank writes: "Oleum terebinthinæ in epilepsiis non solum a vermibus, sed et in aliis nerveis, et potissimum maniacorum, ad doses incomprehensibiles, recentiores Angli, utinam jure! commendant."[1] Subsequently the remedy came to be employed not in large, but in small doses, and acquired to a considerable extent professional confidence; so much so, that we find Sir Thomas Watson remarking: "If I were called upon to name any single drug from which, in ordinary cases of epilepsy, I should most hope for relief, I should say it was the oil of turpentine. And I find that other physicians have come to the same conclusion."[2] There can be little doubt that the accomplished author, whose words have just been quoted, entertains a different opinion now, and that he, like most physicians, would not be unwilling to subscribe to the statement of Dr. Russell Reynolds—"Bromide of potassium is the one medicine which has, so far as I know, proved of real service in the treatment of epilepsy."[3] In *chorea*, turpentine as a cathartic, and likewise as an external application, has been highly recommended by Dr. Copland[4] and other physicians. Dr. James Jackson, of Boston, U.S., in alluding to the treatment of chorea, says, "But the great remedy is the oil of turpentine. . . . In a severe case,

[1] 'Praxeos Medicæ Universæ Præcepta.' Partis secundæ, volumen primum, sectio secunda, p. 407. The following note is appended in illustration of the statement made by Frank in the text: ℞ Olei terebinthinæ, sacchari, āā unciam unam. Misce terendo, affunde aquæ menthæ piperitidis libras duas (!) S. Bis terve in die cochlear majus (!!). Vel, ℞ Olei terebinthinæ drachmas tres. Aquæ fontis libram unam. S. Omni quartâ horâ uncias duas. *Vide* 'The London Medical and Surgical and Pharmaceutical Journal,' 1814, May.

[2] Op. cit., vol. i, p. 662.

[3] 'A System of Medicine,' vol. ii, p. 280.

[4] 'Medical Dictionary,' vol. i, p. 334.

however, or when other remedies fail, this should be used. . . . In a very young child, you may begin with five drops three times a day, but the dose should be increased steadily till relief is obtained, if no objection occurs. . . . A child of eight or ten years of age will sometimes bear a teaspoonful for a dose. This remedy is successful whether given early or late in the disease."[1] As an anthelmintic, turpentine deservedly holds its ground in the treatment of chorea, as well as other nervous disorders dependent on the reflex irritation which worms in the intestinal canal produce; but probably the opinion of Dr. Radcliffe, as expressed in the following statement, will meet with little contradiction, in so far as the abandonment of turpentine is concerned: "Turpentine has been given for various reasons in chorea, as an anthelmintic and purgative chiefly. At one time I gave it rather as a general stimulant, and, as it seemed, with benefit to the patient. I then tried mineral naphtha with the same view, and came to the conclusion that this medicine was more pleasant than turpentine, less trying to the system, and not less efficacious. During the last six or eight years, however, I have rarely given either one or the other of these medicines, and one chief reason for this seems to be that I have gradually come to prefer the treatment of which I have to speak in a few moments."[2] That plan of treatment, as those familiar with the writings and practice of the eminent physician now referred to are aware, is "the free use of alcoholic drinks." For my own part, I am so thoroughly satisfied with the potency of arsenic in the treatment of chorea, as to esteem it above all other remedies. In tetanus, infantile convulsions, puerperal eclampsia, and asthma, turpentine has at different periods, and by different physicians, been employed as a remedy; in none of these, however, has it for any time, or with justness, retained its reputation as a therapeutic agent. It is necessary now to notice its employment in the treatment of nerve-pain, or neuralgia, in various of its forms. Of these, sciatica is the one in which turpentine has been chiefly used. The remedy is not new; Galen certainly used it; but Dr. Cheyne, of Dublin, and Dr. Francis Home, were the earliest, in recent times, to employ it. The latter observes, "I have used

[1] 'Letters to a Young Physician just entering upon Practice, p. 86.
[2] 'Reynolds' System of Medicine,' vol. ii, article "Chorea," p. 138.

it for many years, as an efficacious and valuable medicine."[1] Seven cases of pure sciatica are detailed, which were treated in the clinical wards of the Edinburgh Infirmary; of these five were cured, and the remaining two much relieved. Dr. Home adds, "I have cured a great number of patients in private practice, during the many years I have used it." He prescribed the remedy according to Dr. Cheyne's plan, with a draught of sack, whey or warm drink after it. The following is the prescription:

℞ Olei terebinthinæ, ʒij;
Mellis optimi, ʒj.

M. Fiat linctus. Capiat cochlear parvum mane et vespere, superbibendo haustum potus communis tepidi.

Dr. Copland[2] speaks very favorably of the use of turpentine in sciatica, and also in other forms of neuralgia. In France, turpentine was largely administered, and highly esteemed as a remedy in neuralgia, by Récamier and Martinet; and although M. Valleix is not so sanguine in his appreciation of it, he readily admits its possession of notable therapeutic properties in this disease.[3] I have frequently employed it in sciatica, also in crural and brachial neuralgia, and with great benefit, so much so as to feel satisfied that, in turpentine, we possess a very valuable remedy for such disorders. I have, on several occasions, prescribed turpentine in cases of long-standing sciatica, in which the violence and lengthened continuance of the pain had greatly reduced the patient's strength, and in one or two instances had caused great debility. Ordinarily, I have used it when other remedies had failed; and in one case, which occurred this last winter, not only had many remedies failed, but the suffering of the patient was extreme and his prostration great. His recovery was complete after taking the turpentine for three weeks. It agrees well with old people, who are so frequently the sufferers from sciatica and other neuralgias. The dose varies from ten to thirty minims thrice daily. Usually I have prescribed twenty minims, to be taken in a little cold water, thrice daily. The *modus operandi* of turpentine in

[1] "Clinical Experiments, Histories, and Dissections," 1783. 'Experiments upon the Effects of the Oleum Terebinthinæ in the Sciatica,' p. 265.

[2] Op. cit., vol. ii, p. 891.

[3] Valleix, 'Traité des Névralgies,' p. 632.

neuralgia, and particularly in sciatica, is, I am disposed to think, not unfrequently connected with its action on the intestinal mucous surface, with some irritation of which the painful nerve affection is not unfrequently connected. The same remark applies to irritation of the kidney as a cause of sciatica, in which case Sir Thomas Watson has conjectured turpentine does most good.[1] In illustration of this I may refer to an experience by no means uncommon, that after a brisk action of a cathartic, and for this purpose none is more suitable than the combination of turpentine and castor-oil, a severe attack of sciatica has been entirely removed. A better understanding of its action, however, as a remedy will, I hope, be suggested by some considerations which are to follow. Turpentine enemata are likewise useful in sciatica. As an external application in all neuralgic affections, turpentine acts much more efficaciously than the mere counter-irritant and rubefacient effects which it produces will serve to explain; the remedy is absorbed, and in some way or other operates through the blood on the pained nerve. "I have known oil of turpentine," remarks Dr. Pereira, "now and then act most beneficially in sciatica, without giving rise to any remarkable evacuation by the bowels, skin, or kidneys, so that the relief could not be ascribed to a cathartic, a diaphoretic, or a diuretic operation." This statement exactly expresses the experience which I have had of the remedy in the same disease. I venture to believe that the efficiency of the drug, when applied externally, in bronchitis, pleuritis, and pneumonia, also in laryngitis, in which Dr. Copland highly prized it, and in abdominal inflammation, admits of a similar explanation, that there is inherent in turpentine a remarkable power of restraining inflammatory action. In *chronic rheumatism*, and in *lumbago*, the oil of turpentine has been largely employed, more especially as an external application; it has also been administered internally. The stimulating and diaphoretic properties of the drug appear to exert a favourable influence on these disorders, and more particularly when the subjects of them are old and debilitated; but unquestionably the remarkable curative power possessed by turpentine over neuralgias, and chiefly among these sciatica, does not extend to rheumatic disorders properly so called.

[1] Op. cit., vol. i, p. 733.

Bearing some analogy to neuralgia is the severe headache which is apt to occur in nervous and hysterical females. In this painful affection, occurring in young persons of a delicate excitable temperament, without any menstrual or leucorrhœal complication, Dr. Graves placed great reliance on turpentine. He gave it in doses of one or two drachms, to be repeated according to its effects. The best vehicle, he adds, is cold water. Some will bear and derive advantage from two or three doses of this medicine in the day, experiencing from its use a diminution of headache, and removal of flatulency, together with a moderate action of the bowels and kidneys. There is, moreover, another class of sufferers from headache, and this composed of both sexes, who may be relieved by turpentine. I refer to the frontal headache which is most apt to occur after prolonged mental effort, but may likewise be induced by unduly sustained physical exertion, what may be styled the headache of a fatigued brain. A cup of very strong tea often relieves this form of headache, but this remedy, with not a few, is perilous, for, bringing relief to pain, it may produce general restlessness, and, worst of all, banish sleep. Turpentine, in does of twenty or thirty minims, given at intervals of an hour or two, will not only remove the headache, but produce, in a wonderful manner, that soothing influence to which reference has already been made. One dose is not uncommonly sufficient, but it is rarely necessary to repeat the remedy for more than two or three. I willingly subscribe to Dr. Graves's statement, that it is best given in cold water; and have further to urge, that neither the physician nor the patient need be deterred from employing it, from the highly exaggerated notions which have been entertained regarding its disagreeable taste and liability to cause sickness.

In *diseases of the eye,* turpentine has long been a favourite remedy, chiefly in iritis and inflammation of the choroid membrane. In the rheumatic and syphilitic iritis, it was first strongly recommended by Mr. Carmichael, in doses of a drachm thrice daily. Its effects in the treatment of inflammation of the eye may be uncertain, and may have disappointed the expectations of some surgeons; still there can be no doubt that, by oculists generally, turpentine is up to the present time regarded as a valuable antiphlogistic remedy.

Turpentine has been proposed by some writers as a *solvent of biliary concretions or gall-stones*;[1] but although undoubtedly useful as a cathartic and diuretic in jaundice, and as an external application in allaying and even in averting the attacks of gall spasm, there seems no good ground for accepting the action here referred to.[2]

As a local application in burns, in chilblains, and in ulcers of the limbs, turpentine has had its day; but in all of these, as well as in certain other affections, of which it is here unnecessary to make mention, more approved modes of treatment have of late years been adopted.

Reference has already been made to the employment of turpentine by the ancient physicians in affections of the mucous surfaces attended by copious secretion of altered mucus, in a single word, in cases of blennorrhagia, although that term has by some been erroneously restricted to discharges from the vagina or urethra of venereal origin. There can be no doubt that, in the *latter*, when they have become, or have threatened to become, chronic, turpentine is an available remedy. In bronchitis, however, attended by excessive muco-purulent secretion, its remedial virtues are seen most conspicuously. Sir Dominic Corrigan, of Dublin, and Dr. Waters, of Liverpool, have used it, in doses varying from a drachm to an ounce, at intervals of two hours, in cases of severe, or neglected, bronchitis, connected with pulmonary emphysema, and attended by excessive accumulation of secretion in the bronchial tubes. I have seen the remedy signally serviceable in such circumstances. An emetic suggests itself as a likely means of affording relief, but the frequent feeble pulse, and the clammy surface of the body, with features almost collapsed, and livid lips, forbid its employment. Turpentine is then an alternative remedy, and it is a safe one; given internally and diligently applied externally, it will not unfrequently reward the confidence which has been placed in it. In less urgent cases

[1] Durande's mixture, which was vaunted for this purpose, consisted of turpentine and ether.

[2] By its diuretic action the oil of turpentine may sometimes usefully influence the kidneys in cases where the epithelium is impregnated with yellow colouring matter, and consequently somewhat impaired in action.—'Thudicum on Gall Stones,' p. 286.

than those now briefly described, but still sufficiently serious, and often little amenable to cure, we have a remedy in turpentine; I mean in chronic pulmonary catarrh attended by fetid secretion. Again, in all cases of bronchial abscess, in pulmonary abscess, and in the formidable gangrene of the lung, turpentine may be hopefully employed, from what has already been observed of its effects. Many years ago, I was strongly impressed by witnessing the remarkable influence produced by small and frequently-repeated doses of turpentine in a case of pulmonary gangrene in the Royal Infirmary; and since then I have always prescribed it in such circumstances. Its action I believe to be stimulating, but also antiseptic, I had almost said specific. Speedily, under its use, the extreme fetor of the breath and expectoration undergo a change; then the latter becomes diminished in amount, while blood disappears from it, and with these changes a corresponding amelioration in the general condition of the patient takes place. Turpentine is borne, in these cases, in a way in which alcoholic stimulants are not. This fact I saw very strikingly illustrated in the case of a man about forty years of age, but of somewhat broken-down constitution, the subject of gangrene of the lower part of the right lung consequent on pneumonia. He was treated by thirty-minim doses of turpentine administered every second or third hour, continued for many days, and the result was most satisfactory. Skoda, the eminent physician of Vienna, has employed the inhalation of turpentine vapour in the treatment of the same disease. The oil of turpentine is poured upon boiling water, and the patient is directed to inhale the vapour every second hour for fifteen minutes at a time.[1] During the early summer of 1870 I saw, with Dr. Somerville, a gentleman who, while convalescent from a severe attack of modified small-pox, had become affected by cough, fetid expectoration, and marked febrile disturbance. Over the upper part of the left mammary region, in this gentleman's chest, there was dulness on percussion, extending below into the region of cardiac dulness, and upwards into the subclavicular region, where it was less pronounced. On auscultation there was audible

[1] "Fälle von Lungenbrand behandelt und geheilt durch Einathmen von Terpentinöl-Dämpfen." 'Zietschrift der Kais. Kön. Gesellschaft der Aerzte zu Wien,' 1853, p. 445.

abundant coarse moist rattle, and the resonance of voice was much increased. Over the other portions of the chest the physical signs were normal. The patient complained of the extremely disgusting odour and taste of the expectoration, and was frequently caused to vomit after the effort of coughing had led to its discharge. He was ordered thirty minims of the oil of turpentine in a small wineglassful of cold water every third hour, and this he continued to take for several days. There occurred no disagreeable effects from the remedy, but speedily a notable diminution in the amount of the expectoration, while gradually its fetid character also disappeared. The doses of the turpentine were lessened in amount and frequency after the seventh day, but the remedy was not entirely discontinued till after the twelfth day from its commencement. In this case Dr. Somerville and I noticed the diaphoretic, diuretic, and stimulant action of the turpentine, in addition to its very evident specific operation on the local disease. The patient, whose prostration was very great, while his appetite also was very feeble, had claret wine, but seemed to us to require no other stimulant than the turpentine. His ultimate recovery was complete. I have seen him lately, the picture of good health. I think it unnecessary to furnish the details of other cases similar or nearly so in their nature; but the following remarkable instance of recovery from impaction of a foreign body in the right lung, I need offer no apology for relating.

In April, 1866, I attended, with Dr. Rutherfoord Turnbull, R. F—, residing in Fountainbridge, who, when I first saw him, was expectorating a large quantity of extremely fetid purulent matter, stringy in appearance, and occasionally mixed with blood. This expectoration had been going on for some days previously, and was consequent upon a severe pain towards the lower part of the right side, with which the patient had been seized while at his usual occupation as a groom. There was no difficulty in recognising the existence of pulmonary condensation and evacuation. Its situation was a little below the middle part of the right lung, the physical signs being most distinct posteriorly. I recommended the employment of turpentine, and this, in doses of thirty minims every second hour, was forthwith commenced. It was continued for several days with manifest improvement in the general symptoms, which had

previously indicated very considerable prostration. The fetid odour from the sputa, which had been more powerful and penetrating than anything I had before encountered, causing in myself invariably a feeling of nausea, and frequently in his wife, who assiduously nursed the patient, actual sickness, underwent a remarkable modification: not ceasing to be disagreeable, it became much more bearable. Up to the time, however, on which there occurred the interesting circumstance which I have now to record, I was unable to trace any change in the condition of the affected lung. The same dulness on percussion below the lower angle of right scapula, the same absence of all vesicular breathing, and the same somewhat distant but very coarse moist sound, with bronchial breathing and loud bronchophony over a limited space, were present, while the vesicular breathing in the upper portion of the right lung, and over the whole left lung, was greatly exaggerated or puerile. I had requested the patient's wife, his only attendant, to examine carefully the expectoration, and cautioned her not to allow any portion of it to be removed without her having subjected it to a careful scrutiny. This very unpleasant task she had performed with untiring zeal and faithfulness, when one morning, eight days after the commencement of the turpentine administration, she noticed in the sputa, which had been got rid of by an unusually severe fit of coughing, a small dark object, which she immediately removed, and presented to me on my next visit a few hours thereafter. The object thus handed to me possessed the same offensive odour as the expectoration and breath of the patient, was sodden in character, and appeared to be a twig or minute branch of a shrub or tree.

Fig. 1.

Retained for a short time, it became firm, and ultimately hard, and was then readily enough identified as a small twig of a thorn-bush (Fig. 1). Almost immediate relief succeeded the discharge of this foreign body from the lung, and the patient made a rapid as well as complete recovery. When I examined him some months after the illness now briefly narrated, and some little time after he had resumed his old occupation, I could discover very little wrong with his chest; a degree of dulness on percussion, and feebleness of respiration, alone indicated the site of his very serious lung disease. The

narrative would be incomplete without the statement made to me by the patient, after the discovery of the "corpus delicti" in the sputa. He called to remembrance the sudden occurrence of a violent fit of coughing and choking, which was produced by something entering his mouth and passing downwards, when he was riding pretty rapidly through a dense wood in Aberdeenshire, with the wind in his face. This happened nearly six months before the commencement of the illness for which he requested the attendance of Dr. Rutherfoord Turnbull.

It may naturally be asked how the notion of the disease in this case, being dependent on the presence of a foreign body in the lungs, suggested itself to my mind? So interrogated, I have to reply, that there appeared to me something unusual in the whole history of this man's illness. The symptoms did not indicate the original occurrence of pneumonia which had terminated in gangrenous abscess, while the previous healthy condition of the patient, and the entire freedom of the left lung, and no inconsiderable portion of the right, from disease of any kind, made it evident that he laboured under no constitutional dyscrasia, of which the lung disorder was the prominent local manifestation. Further, I was from the first impressed with the very peculiar odour of the breath and expectoration. That differed from the strong and disagreeable smell attaching to both in ordinary pulmonary gangrene, and at the same time irresistibly reminded me of the odour which I had perceived in a case of pulmonary gangrene caused by the presence of a chicken-bone in the lung, under Dr. Bennett's care in the Royal Infirmary, in 1848, and of which a very interesting narrative has been published by Dr. Struthers, of Leith.[1] Small as the foreign body in the case now narrated was, there are instances on record in which bodies equally minute entering the bronchi have given rise to alarming symptoms. Our late lamented friend, Dr. James Duncan, in his interesting probationary essay for the Royal College of Surgeons, on 'Foreign Bodies in the Air-passages,'[2] mentions one which

[1] 'Edinburgh Monthly Journal of Medical Science,' 1852, p. 449.

[2] Op. cit., p. 14.

Note.—The portion of mutton-bone (Fig. 2) which is now exhibited to the Society was expectorated by a lady, a patient of Dr. Struthers, to whose kindness I owe the opportunity of referring to it. In November, 1869, this lady,

occurred to Dr. Donaldson, of Ayr, in which an ear of grass entering gave rise to intense bronchitis, which continued for seven weeks, when the body was expectorated, and the person recovered.

The preceding observations appear to me to warrant the following conclusions:—(1) That turpentine is a powerful stimulant, capable of rousing in a very remarkable manner the vital energies, while it, at the same time, produces a soothing influence on the nervous system. (2) That, in all probability, we possess in turpentine an antiseptic agent, powerful in arresting, it may be in preventing, those morbid changes in the system which are evidently of a septic nature.

while taking mutton-soup at dinner, and being at the same time engaged in speaking to her niece, a little girl, suddenly choked. The disagreeable and painful sensation then excited lasted for fully fifteen minutes, and gradually subsided, leaving her, however, satisfied that a piece of bone had entered the windpipe. On the Tuesday following the Sunday on which the accident took place, the voice became husky, and cough occurred. These symptoms, however, after the lapse of a few days, passed away, but she became subject to attacks of difficulty in breathing, some of which were very severe in character. They occurred at intervals, which rarely exceeded ten days. After some months she became weak, and the cough, which had returned, proved very irritating, and was attended by a scanty expectoration of phlegm. She had consulted medical men in different parts of the country, who regarded her case as one of ordinary bronchial disturbance, and listened incredulously to the tale of the choking fit and passage downwards of the bone. From Dr. Struthers, for reasons of her own, she had purposely concealed all knowledge of the accident. Under his advice, she had, in the summer of 1870, gone to Crieff, and there, being seized with a severe fit of coughing, had brought up the portion of bone. For some days before this took place, she had observed her breath to be very offensive, and likewise the expectoration, which had then greatly increased in quantity. Dr. Gairdner, of Crieff, who had visited this lady when suffering from the severe spasmodic difficulty of breathing which preceded the discharge of the bone, had prescribed some medicine, which she believed to have facilitated its exit. Dr. Struthers has informed me that, on careful examination of the chest, he had detected a roughness of the respiratory murmur, accompanied by wheezing sound, a little below the right sternal clavicular articulation. On the 26th of May, 1871, ten months from the happy event just recorded, I had the opportunity of seeing the patient with Dr. Struthers, and, on examination, failed to discover any evidence whatever of pulmonary affection; her recovery, which was rapid, had evidently also been complete.

FIG. 2.

The other actions and uses of turpentine—its cathartic, anthelmintic, and hæmostatic virtues, have already been signalised, and I need not again refer to them here.

I am specially anxious to insist on the action turpentine possesses on the nervous system, by which it is rendered a powerful remedy in fevers of the adynamic type, in neuralgia, and not unlikely also in certain cerebral affections, including those of an inflammatory character; also on its antiseptic action, as evidenced by its remarkable influence on pulmonary gangrene and bronchial abscess. It appears to me as not improbable that pyæmia may be favorably influenced by turpentine, and that in this way its action in some cases of puerperal fever may be explained.

I am sanguine enough to believe that, in some cases of diphtheria and of putrid sore throat, we possess an available remedy in turpentine; and already I have seen it employed in the former, not, however, under circumstances which would justify me in drawing at the present time any decided conclusions from its use.

XXIII.

NOTES ON ALOPECIA AREATA.

(*The following observations are taken from a letter addressed to myself, and seem to me worthy of record in this volume.*—EDITOR):

Edinburgh, May 4, 1872.

"ALOPECIA AREATA" (Celsus' "Area") is by no means an uncommon disease here. I meet with it occasionally in hospital practice, but have much more frequently seen it in the better classes.

I have grave doubts of its parasitic nature, and do not believe it to be contagious. I have seen it occur in its most distressing form, affecting the scalp in small detached patches, which generally enlarged, and finally, notwithstanding treatment, local and general, led to baldness—complete, but for a few straggling uncoloured hairs—loss of eyebrows, in the male of all hair from the face, and in both sexes from armpits, pubes, &c. In one gentleman the loss of hair was very rapid and succeeded an injury.[1]

Injuries of the nervous system cause alopecia.—I am strongly disposed to the opinion that alopecia areata depends on a lesion of nutrition, profound in its nature; that in most cases of the kind there is a nervous lesion. This has led me to prescribe in the very earliest stage of the disorder nervine tonics, strychnia,

[1] *Vide* 'Lancet,' 1869, vol. ii, p. 41; also 'St. Bartholomew's Hospital Reports,' vol. viii, 1872, p. 159.

&c., and a generous diet, a plan which has, I think, been followed by good results. I do not question the utility of local applications, but these signally fail in some cases.

In the less grave instances of the affection cantharidine lotions and corrosive sublimate washes do good, and I have seen the disease checked in a very short time. This holds good of young girls and boys. I dread its more serious results—a true alopecia, and a general loss of hair over the body—in young adults, females more than males. But both sexes suffer this really very trying deprivation."