mentioned what he had observed in practice—that, in scrofulous families, one member will die of consumption; another will escape it, and die of cancer; whilst a third shall not succumb to either, but be plagued with lepra. With regard to scrofula, I shall have occasion, in my next lecture, to discuss this matter fully; but I may here mention that there are certain differences in the distribution of these causes of death which require much careful attention. I may, however, state here that the groups of high and low mortality in the scrofula-map have very similar sites to those in that of phthisis. In fact, a general resemblance obtains—accompanied, however, by some marked exceptions.

The Distribution of Phthisis in Relation to the Winds.—We have seen that the elevated districts of Wales, Lancashire, and Yorkshire, exposed to the direct influence of the north-west wind, have a very high mortality; whilst these very districts are the most free from cancer. Again, in the south-east of England, we find that the elevated ridge which surrounds the Thames valley, and is exposed to the easterly winds, has an almost uninterrupted series of high mortality districts.

The south-westerly wind has, coincident with its range over the western counties, and up through the two great red sandstone valleys of England, an extensive and continuous group from the mouth of the Severn to that of the Tees. Deprived of its dynamical element, this wind exercises a most genial influence, from its purity, on some localities, although its tonic powers are not so great as those winds which blow over the German Ocean and the Irish Sea. Whenever the prevailing wind rushes over the country in strong currents, as it does in Wales, persons having delicate lungs seem unable to withstand its effects. The wind may be pure, but it is too strong; and thus it is that, in valleys protected from its force, but which are supplied with abundance of its purity from above, we find a low mortality from phthisis. It is a significant fact that, where the wind rushes up the Severn valley with such force as to diminish the amount of rainfall* in this part of Gloucestershire, its course is marked out by a line of three high mortality districts.

The Distribution in Relation to Geological Site.—I have already alluded to the high mortality of the heights around the London basin; the dryness of the cretaceous soil is not likely to be a cause. I believe here that *aspect* has more to do with this high death-rate than soil. I believe that, were these heights surrounded by a higher ridge of hills and thus sheltered, their mortality would have been the reverse of what it is, inasmuch as the porous character of the chalk-soil admits of ready drainage.

Dr. Buchanan, of the Medical Department of the Privy Council, has elaborately worked out the effects of dampness of soil on phthisical subjects; and his conclusions are, that the drainage, either natural or artificial, and the natural covering in some districts, by gravel, of the clay, produce marked results in the mortality from this cause. I perfectly endorse what both Dr. Buchanan and Dr. Bowditch have emphatically urged in their respective papers: that dampness of soil is a grand exciting cause of phthisis. The sequence will be as follows: a damp clay soil, such as we find in the wealden and gault districts of Sussex and Kent; a damp house, especially the kitchen; damp cupboards; damp sheets; damp clean linen; which ends generally in what is described as *catching a chill*. Now there are some houses that for generation after generation have killed off members of the families occupying them, and yet they are allowed to stand undrained and unheeded, ready to kill the present and the next generations.

I will now draw attention to the Y-shaped tract of new red sandstone which extends from the mouth of the Severn up the valley of this river and over the heights which separate it from the watershed of the Weaver and the Dee; and from Gloucester through Warwick, Leicester, Nottingham, and Yorkshire, to end in the valley of the Tees. This extensive tract of red sandstone forms the site of a continuous group of low mortality districts. Let us compare this formation with the irregularly square shaped mass of carboniferous limestone and coal-formations which form the most elevated part of Yorkshire, Lancashire, and Derbyshire. Note its form, and then compare it with the high mortality group which is coextensive with it. This mass is skirted with low red sandstone, Permian, and new red marl valleys and flats; and coincident with this change in the geological character of the soil is a lower mortality.

Dr. Moffat of Hawarden has kindly furnished me with his views on this subject. In a recent paper read before the British Association, he made some very forcible remarks on the difference in the amount of iron grown on carboniferous limestone and that produced from a red sandstone soil; and he computed that a person eating bread made from the latter took into his system *four grains* more iron than he would had it

been made from the former. This is a most important practical hint, which is valuable to the practical student of medical geography.

The remarkable series of low mortality districts along the coast of Yorkshire and Northumberland has already been alluded to. The districts, although apparently close to the full influence of the sea-winds, are yet protected by the precipitous coast; they receive the *pure air* without its dynamical element. It is noteworthy that Pickering, well known for its damp clay and iron soil, has a higher mortality from phthisis than the surrounding districts.

Recapitulation.—1. The districts show that, coincident with sheltered positions, is a low rate of mortality from phthisis: they therefore confirm what was found among the counties and divisions.

2. The distribution of phthisis is almost the converse of that of cancer, and differs remarkably from that of heart-disease.

4. The easterly ridges of the south-east of England are characterised by high mortality; and this high death-rate is coincident with a general aspect favourable to the malign influence of the east wind.

5. Damp clayey soil, whether belonging to the wealden, the oolitic, or the cretaceous formations, is coincident with a high mortality, especially in the south-west of England, as shown by Dr. Buchanan.

6. The warm, fertile, ferruginous red sandstone tracts of country are remarkable for forming the sites of the most extensive series of low mortality groups throughout England.

7. The high elevated ridges of non-ferruginous and infertile carboniferous limestone and coal formation, and the elevated, hard, unfertile, and non-ferruginous Silurian formations, form the sites of the most extensive series of high mortality districts.

8. The elevated parts most exposed to the westerly and north-westerly wind, and to the easterly and south-easterly, are characterised by high mortality.

9. A sheltered position, a warm, fertile, and ferruginous soil, well drained, are coincident, as a rule, throughout England and Wales, with low mortality from phthisis.

A CASE OF GANGRENE OF THE LUNG: WITH REMARKS.

By J. CRICHTON BROWNE, M.D., F.R.S.E.,
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C. H., a Moravian schoolmaster, was admitted into the West Riding Asylum on January 22nd, 1867. No information as to his previous history could be obtained, except that he had resided for some time in New Zealand, that he had been eccentric in his habits for several years, and had been long and inordinately addicted to onanism, to the exhausting effects of which his mental infirmity was supposed to be attributable. When received here, he was in a state of melancholia, characterised by delusions, such as that he was watched and persecuted by devils, because of his devotion to the Christian faith; that his salvation was endangered by their machinations; and that he was bound to guard against their attacks by sleepless vigilance, by having his eyes constantly fixed on heaven, and by swearing in the most choicely blasphemous terms at all who approached him. In conformity with these ideas, he refused to go to bed, and desired to stand perpetually with his hands crossed and his eyes turned upwards, in an attitude of rapt ecstasy, except when he glanced anxiously and furtively around, as if fearing the assaults of his enemies. He was an emaciated, care-worn looking man, with a severe expression of countenance, a pale complexion, a feeble pulse, cold extremities, and a peculiar tendency to profuse sweating from the axillæ. Whenever he was stripped and subjected to examination, the perspiration rolled down his sides in large beads, while none appeared on his forehead or any other part of his body.

During the first six months of his residence in the Asylum, no material change in his condition occurred, except that, as is so often the case when religious delusions are present, morbid sexual ideas took possession of his mind. He fancied that he was the one righteous man left in a modern Gomorrah, and that all his fellow-patients were incarcerated because of horrible and unnatural offences. At the same time, his conversation became obscene, and his deportment in the presence of females lascivious and disgusting.

In January 1868, he suffered from dysentery, after which he enjoyed fair bodily health and comparative mental tranquillity till January 1870, when he was prostrated by a severe attack of pleuropneumonia; from which, however, he made an excellent recovery. After this, he seemed to gain ground in strength and rationality until the 14th of July

* remarkable fact has been noticed by G. J. Symons, Esq., F.B.M.S., so known for his many and able works on the British Rainfall.

last, when a sudden and unaccountable change for the worse took place in his mental state. He passed instantly, and without warning, into a paroxysm of mental agitation, manifesting, by his groans and gesticulations, an intense degree of anguish. At first, he declined to converse with any one; but, when pressed, explained that his tribulation was due to the discovery that until that hour he had laboured under a dangerous heresy in believing that there would be marriage and generation in heaven. He now abandoned his occupation, and gave himself up to remorse and prayer, refusing all food so obstinately that he had to be fed with the stomach-pump for ten days. On July 28th, he began to partake of food from the hands of an attendant, although he exhibited improvement in no other respect, being sleepless and greatly distressed, and spending much of the night kneeling by his bed in fervent supplications for mercy. He derived no appreciable benefit from small doses of ergot, which were then administered to him. On August 6th, he was still restless and despondent, and was ordered twenty grains of chloral hydrate three times a day, four ounces of whiskey daily, and a liberal diet. On August 24th, the chloral was omitted, as only transient relief had been procured from it when it was first administered, and as its continued use had been followed by an increase of mental perturbation and persistent insomnia. On September 1st, he was losing flesh rapidly, and had produced inflammation of the bursæ patellæ of both knees by his frequent kneeling in prayer. He was then ordered sixty minims of liquor opii sedativus three times a day. A week later, a large carbuncle appeared on the back of the neck, and a small one on the wrist; while his urine was found to be of specific gravity 1020, and to contain a large proportion of albumen. Under the use of the tincture of the muriate of iron, the carbuncles pursued a favourable course, and healed satisfactorily; while all traces of albumen disappeared from the urine. During October, November, and the early part of December, a decided amelioration took place in the mental symptoms. Although the mind was still occupied by painful delusions, similar to those already described, it was less harassed and unhinged by their presence; it seemed to be accommodating itself to them, and to be permitting of a restoration of bodily vigour, as weight was slightly regained at this period. On December 27th, however, after a few days of aggravated taciturnity and dejection, a new train of symptoms set in. Towards evening, an attack of hæmoptysis occurred, unaccompanied by feverishness, and unexplained by any previous pectoral disorder or unusual exertion. While sitting in bed, he began to cough, and expectorated slowly, in a couple of hours, about an ounce and a half of dark coloured frothy blood. Sulphuric acid and opium checked the hæmorrhage; and he passed a quiet but sleepless night, partaking freely of food and stimulants. The next morning, the hæmoptysis recurred, accompanied, moreover, by a peculiar sickly fetor, which enabled the medical officer in attendance at once to diagnose gangrene of the lung. The pulse was 105, and very feeble; the respirations 30 per minute; and the temperature in the axilla 98.4. On both sides of the chest, there was tubular breathing in front, with coarse mucous râles behind. The face was pale, pinched, and haggard. The patient's feelings could not be ascertained, as he would not answer any questions. The treatment adopted consisted of the inhalation of carbolic acid with the steam of hot water every two hours; nitro-muriatic acid with cinchona every four hours; and as much whiskey and nourishment as the patient could be induced to swallow. On December 29th, the breath had almost entirely lost that horrible gangrenous odour, which had been almost insupportable by those around during the afternoon of the previous day; while the sputum had also undergone a change, having diminished in quantity, and become of a dirty yellow-brown colour. On examination, it was found to consist of altered blood and broken down lung-tissue. There was dulness on percussion anteriorly on the right side, and posteriorly on the left, with cavernous breathing on auscultation towards the left apex. The pulse was 110, and the temperature 99.2. On December 30th, the expectoration continued as on the 29th, as well as the other symptoms; the respiration in the upper part of the left lung being more distinctly cavernous. He expressed himself as grateful for the carbolic acid inhalation, and desired to have it more frequently. On December 31st, the breath had again become more offensive, although not approaching to its fetor at the outset of the attack. The pinching of the face and hollowness of the eyes were remarkable. On January 1st, 1871, the sputum again diminished in quantity, being now of a dirty olive-green colour. On January 2nd, the pulse was not perceptible at the wrist; and the breath had an exceedingly putrid odour. Death took place at 9.45 P.M.

At the *post mortem* examination, which took place forty-one hours after death, the body was found to be emaciated. There was no rigor mortis. The pericardium contained half an ounce of clear straw-coloured fluid. The heart weighed eighteen ounces, and presented two irregular white glistening patches on the front of the right ventricle.

The valves were competent; but there was enormous thickening of the walls of the left ventricle, with dilatation of the cavity. The left lung was generally attached to the thoracic walls by old fibrous adhesions of great strength; it weighed forty-eight ounces. In its upper lobe, towards the apex, there was a large gangrenous cavity, capable of holding an orange. This cavity contained fluid resembling coffee-grounds, with masses of *débris* floating in it; and had very rough, irregular, eroded walls. The surrounding lung-tissue was of a dark purple-brown colour and exceedingly soft consistence, emitting an intolerable stench when broken down between the fingers. The lower portion of this lobe was in a state of grey hepatisation, but much more friable than pulmonary tissue ordinarily is when in this condition. The whole of the lower lobe was in a state of red hepatisation. The right lung, which was also strongly adherent to the thorax, weighed twenty-six ounces, and was congested and consolidated towards its base. The liver weighed sixty-three ounces, and was pale and of soft consistence. The other abdominal viscera were normal. The skull was very thin and unsymmetrical, bulging posteriorly to the left. The brain seemed to swell out on the opening of the skull, as if it had been compressed in the cranial cavity; it weighed fifty-three ounces. There was no thickening of the membranes, and only slight wasting of the convolutions adjoining the fissure of Rolando. The cineritious substance was pale, the medullary dusky and mottled; and both were denser and harder than usual. The ventricles were empty; and the velum interpositum and medulla oblongata were intensely congested.

REMARKS.—The case just described, which presents many points of interest, appears to me to be a typical instance of gangrene of the lung as it occurs in lunatic asylum practice. Out of about 600 *post mortem* examinations of the bodies of insane persons which I have witnessed, I have noticed this destructive lesion in three other cases, in all of which the history of the disease had been almost identical with that given above. In all, the previous mental derangement had been melancholia, with occasional acute exacerbations; in all, signs of general deterioration of bodily health had been for some time present; in all, there had been abstinence from food at some stage of the mental disorder; in all, one lung only was affected by gangrene; in all, distinct physical signs and a characteristic breath-fetor and physiognomy were present; and in all the result was death in less than a week from the commencement of the malady. In none of these cases was there any record of epileptic fits, so that my experience in this respect does not correspond with that of Cruveilhier, who directed attention to the frequency of pulmonary gangrene in this class of cases.

Trousseau has adopted a prevailing opinion in intimating that gangrene of the lungs amongst the insane is sometimes due to inanition, and has, I venture to think, fallen into error in so doing. His statement that that affection is a common cause of death in lunatics who have long refused to take food, is not borne out by our observations in this asylum. Amongst the numerous disastrous consequences of insane abstinence from nourishment, gangrene of the lung has not been recorded, while in each of the cases in which this form of sphacelus occurred an abundant supply of aliment had been secured. C. H. had not missed a meal for five months before his fatal illness; and indeed particular care had been taken to see that his diet was liberal and varied. Yet it is worthy of remark that in C. H., as in each of the other cases, food had been at one time pertinaciously declined, so that the stomach-pump had had to be resorted to. I am disposed to think that in all such cases the refusal of food and the pulmonary gangrene, instead of standing in the relation of cause and effect to each other, have a common centric nervous origin. It is not unreasonable to suggest that a grave cerebral disorder may at one time manifest itself in an abolition of the alimentary appetite, or in positive aversion to all food, and may then travel on into such an interference with the production or distribution of nerve-force as to result in the local disorganisation which we have been considering. Be this as it may, I am quite satisfied that gangrene of the lung, as well as gangrene of other parts, amongst the insane is generally attributable to defective nerve-supply. I have at present under my care a girl, M. H. (Ward 24), aged 23, who has never refused food, but is suffering from acute dementia, or universal impairment of nervous energy—"cerebral chilblains", as I sometimes diagrammatically term it—and who has lost the little toe of the left foot from indubitable *senile* gangrene, and who has now gangrenous spots of a similar character upon three toes of the right foot. In her there can be no suspicion of vascular degeneration, embolism, or any other cause of gangrene, except that defective nerve-supply of which her whole appearance and manner give unmistakable evidence. In connection with this subject, it may be important to note that in the case of C. H. there was intense congestion of the velum interpositum and medulla oblongata. It is also of moment to remember that diabetic patients are especially liable to suffer from gangrene of the lungs.

The case of C. H. confirms the opinion of Laennec, that pulmonary gangrene does not follow ordinary, but a septic, type of pneumonia, as it also verifies his observation that it is often preceded by anthrax. The comparative lowness of the temperature throughout the disease, and the pathological appearances of the lung, sufficiently indicate the character of the inflammatory process which had preceded the gangrene.

C. H. undoubtedly experienced relief from the inhalation of carbolic acid vapour, which also afforded much comfort to those who had to wait upon him, and who were at first terribly inconvenienced by the odour of his breath. It is probably to pulmonary admittaria that we must look for alleviation in this intractable disease.

MUCOUS DISEASE.*

By WALTER WHITEHEAD, F.R.C.S.Ed.,

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THIS disease has been noticed by some of the ancient, and described by a few of the more modern, physicians, but owing to those two prominent, yet opposite errors, for ever being repeated throughout medical literature—the classifying a number of diseases under one genus, and the giving to one disease a multitude of names, this disease has been more frequently concealed under the name and description of other disorders; and, consequently, it has been imperfectly handed down, and received but occasional recognition even in the best of our standard works on medicine. In proof of this, I may state that out of the one hundred and twenty writers on this disease I have been able to collect, I cannot refer to any half dozen who have described it by the same name. The disease has been principally observed in connection with the intestines, the colon being by far the most frequent portion affected; and the remarks I have to make will refer principally to this form of the disease.

Before I enter into a general consideration of the disease, I will endeavour very rapidly to give you, in somewhat chronological order, a brief review of the labours of our predecessors in this field of inquiry. Amongst the earlier writers on this subject, I may mention Celsus, Fermelius, Van Swieten, Morgagni, Berengerius, Gabucinus, Platerus, Sennertus, Tollincoferus, Bonnet, Vesalius, Hoffmann, Trælingius, Brunner, Marcard, Stoll, Theden, and others, who evidently recognised, though with an imperfect light, the nature of this disease, as well as its grave importance. Celsus has described the pathological products of this disease, under the name of pituitous and viscous matters; and we find Morgagni, in his thirty-first letter, which treats of fluxes of the belly, saying:—"For, as the glands of the bladder when irritated secrete a greater quantity of humour, and not of the same nature with that which they secrete in perfect health, so the glands of the intestines likewise secrete a greater quantity of humour, and of a different nature; for which reason, in both cases, a white and mucous matter appears." He states that in this manner may be understood "the shreds of membranes, and even of large membranes that are said to have been discharged" by the bowels. He goes on to say—"That which we now call a mucous, or polypous matter, the ancients were in general accustomed to call pituitous, and viscid." He observes that Jacobus Berengerius has written the following words:—"and I myself have seen that concretions, like pieces of thick leather, have been generated in my intestines from pituita." Fermelius supposed the matter of a firm body which was a foot in length, and pierced through the middle with a duct, to be of the same kind; which body was discharged by the Ambassador of the Emperor Charles the Fifth, who was by that means restored to his former health. Lancisi confirmed, in many different ways, that the pituitous concretion which Justus Lipsius discharged by stool, in the shape of the intestines, and believed to be the very intestines themselves, belonged to this class of disorder. Tollincoferus was also of this opinion. In further discussing these pituitous or mucous humours, he (Morgagni) informs us that Lentilius has exceedingly well determined what intestine it was whence the membranes proceeded, which was excreted in the stools at intervals with or without blood, and in a greater or in a lesser number, "and when dried, they resembled the pellicles of a hog's bladder when shrivelled up with heat."

But Johann Maurice Hoffmann, when he examined very attentively membranes that were excreted by a woman, which every other person had taken for the internal coat of the intestines, found them to be a viscid mucus "coagulated upon the valvulæ conniventes, and condensed into the form of a membrane." Nor does the opinion of Trælingius, in the fifth volume of the *Acta Naturæ Curiosorum*, differ from this; for he, on examining a kind of tube or sheath, discharged by the

wife of a peasant, found it to be not really membranous, "although it resembled the figure of the colon, with its valvulæ conniventes." Again, the celebrated Verdriesius, having examined very closely one discharged by another patient, found it evidently to be nothing else but "a fistulous pituita which had concreted together, and accommodated itself to the figure of the intestine wherein it was contained." Apinus also mentions a patient who discharged membranes "of a form exactly tubular." Gabucinus, Platerus, and Sennertus taught that certain worms belonging to the bowels were not in reality worms at all. Kämpf, a Dutch physician, was the first to establish this morbid condition, under the title of Infarctus, as a particular disease; and he appears to have written a book with the express object of proving that there were few diseases which were not originally referable to infarctus. His exaggerated conclusions were, however, by no means warranted by his previous propositions.

Referring to more recent authors, Dr. George Man Burrows gives an account of a lady of phlegmatic temperament who voided by stool, some hours after the cessation of an extraordinary attack of pain, a white opaque substance resembling a piece of tape folded like a skein of thread, and weighing nearly an ounce; but it was believed twice that quantity, which had been thrown away, had passed with the stool. This lady had suffered from frequent pregnancies and repeated abortions. This substance was analysed for Dr. Burrows by Mr. A. T. Thomson, who concluded that it consisted of animal mucus combined with a small portion of albumen. The pathological opinions expressed in reviewing the complaint of this lady are well worthy of record, especially when we take into consideration the period of the writing. The writer says—"perhaps a conjecture might be advanced that it originated in a retrograde action of the lymphatics."

Next in order of time, we find a paper read by Dr. Powell at the College of Physicians, on the 17th of May, 1818. From this paper we gather that in all the cases to which he refers the leading symptoms were similar, and led him to suspect the passage of biliary concretions; but instead of finding, as he anticipated, gall-stones passed with the motions, he discovered a large quantity of flakes, mostly torn into irregular shapes, and appearing to have formed parts of an extensive adventitious membrane of no great tenacity or firmness. Dr. Powell considered it perfectly fair to suggest that they might be poured out from the exhalants. He further observed that the most remarkable circumstances in the history of his cases, was the production of an effect usually ascribed to inflammatory action without its previous existence.

We next refer to Dr. Good, who states, in his *Study of Medicine*, under the title of Diarrhoea Tubularis, and also Tubular Looseness:—"I have never hitherto seen this species arranged, and not often described, but it occurs frequently in practice." He describes the dejections as consisting more or less of membranous-like tubes, whitish, viscous, and inodorous. Dr. Good mentions the examples of the disease given by M. Bauer in his letter to M. de Hahn, and also that Spindler in his 45th Observation describes a like case, in which the secretion was worked up into a "materia alba longa compacta." Dr. Good considers that the disease appears to depend upon a peculiar irritability of the villous membrane of the large intestines, which, in consequence, secrete an effusion of coagulating fibrin, fibrin mixed with albumen instead of secreting mucus, occasionally accompanied with some degree of chronic inflammation.

About this time, Gendrin, in his *Philosophical Treatise of Practical Medicine*, tom. iii, p. 23, observes that the mucus which is deposited and agglutinated on the gastro-intestinal mucous membrane sometimes forms concretions of a pseudo-membranous appearance, which are excreted with the stools, and the same that one meets with in the intestines after death. These concretions, he says, never present the least trace of organisation, which authorises us to distinguish them from organised pseudo-membranous concretions which are formed on inflamed surfaces.

In order of time, we now come to, perhaps, the most perfect record of this disease in any language, with one exception, shortly to be mentioned. I allude to the paper contributed by Dr. Todd in the *Cyclopedia of Practical Medicine*, on Follicular Duodenal and Follicular Colonic Dyspepsia. Dr. Todd, as it appears from his titles, looked upon the disease as a form of dyspepsia, and he attributed it to a morbid condition of the mucous follicles.

Dr. James Simpson, in 1846, stated, that from observations he had made, he was convinced that this disease, which he termed chronic pellicular intestinal inflammation, and also eruptive inflammation of the intestinal mucous membrane, was often met with in practice. He considered the passing of shreds or membranes as a characteristic symptom, and that these substances as shown by the microscope consisted of plastic or coagulated lymph.

* Read before the Medical Section at the Annual Meeting of the British Medical Association, in Newcastle-upon-Tyne, August 1870.