include the first three processes, so that we cannot regard any one growth or formation as a basis of tubercle; it is rather a combination of several processes—adenoid growth, epithelial proliferation, and exudation from the blood-vessels—each playing its part, and giving place in time to necrobiotic changes.

Having now before us the pathological agents concerned in a case of phthisis, let us inquire the conditions of their action. These are three:—1. Predisposition. The patient must be predisposed, not necessarily through hereditary or family taint, for this does not exist in more than half the number of consumptive patients, but there is generally some depressing cause, such as hard work, insufficient food, or great anxiety, which weakens him, and renders him more liable to the action of exciting causes of disease. 2. Irritation. This is generally manifested in the lungs, either on a portion or on the whole, by various exciting agents, such as bronchial catarrh or inflammatory attacks, involving the various pulmonary tissues, causing epithelial proliferation, exudation from vessels, followed by necrobiosis. 3. Infection; or, as Dr. Sanderson defines it, the property by which, if a chronic induration due to overcrowded corpusculum exist in any organ, it is apt to give rise to similar processes elsewhere. The process of infection varies in degree, and may be well studied in phthisical lungs. The simplest form of infection which we see is where a caseous mass is surrounded by a zone of miliary tubercle, the granulations being arranged in a circle around the caseous focus, or in lines radiating from it. In these cases, the infection has been traced to the lymphatics, sometimes those of the alveoli, and sometimes those of the bronchi.

Where only small areas are involved, and where the disease does not extend beyond the lungs, it is likely that infection takes place through the lymphatics; but, where both lungs, or where other organs are attacked, the vascular system is probably the path of infection.

Why, it may be asked, are some lesions infective and others not so? This is often the result of their position in the lung, and, therefore, to a certain degree, accidental. When a caseous mass is encapsulated in fibroid tissue, and thus shut out from the vascular and lymphatic systems, it is not likely to give rise to infection; but if, on the other hand, it be in connection with one of the numerous sets of pulmonary lymphatics, or, again, if it be surrounded by a zone of vascularity, it is very likely to become the focus of tubercular infection.

[To be concluded.]

ON URÆMIC ASTHMA.*

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THE affection upon which I venture to speak to-day is one of very great interest to us both as scientific and as practical physicians. Its phenomena are as striking and strange in themselves as they are inexplicable; and, on the other hand, the affection itself is one of the most agonising by which mortals are afflicted. I am not sure, indeed, from my own experience, whether the existence of a certain dyspnoea dependent directly upon uræmia, or connected directly, at any rate, with renal disease, is generally recognised by medical practitioners.† That persons having renal disease have therewith pulmo-cardiac and pleural affections, mostly of a secondary kind; and that such persons suffer from more or less dyspnoea is, of course, familiar lore. What I mean is, that I do not find it to be by any means familiarly known that the subjects of Bright's disease are liable to definite seizures, mainly consisting in intense dyspnoea, coming and going as ordinary asthma comes and goes, and depending as little as this does upon any permanent disease of the lungs.

First of all, then, I will describe the affection as I understand it, and, in doing so, I will keep to clinical facts as nearly as possible. Uræmic asthma is seen in its simplest and, I think, also in its worst form, in that kind of Bright's disease which is known as chronic granular kidney. It may be seen in any state of uræmia, whether this be dependent upon permanent or transient renal disorder; but, in the subjects of granular kidney, the affection is often very severe and very recurrent, and is often dissociated from pleuritic effusion, valvular disease of the heart, and other permanent causes of dyspnoea. How in-

sidiously granular renal disease, with the constitutional state which belongs to it, or to which it belongs, may creep on is well enough known. For months, or even years, it may betray itself only by some loss of flesh, by some fading of the skin, by unusual fatigue after exertion, and so forth. During this time, vascular tension and cardiac hypertrophy are slowly advancing and establishing themselves unknown, it may be, to anyone. One day may then come when such an one has an unpleasant interview with his solicitor, a warning from his doctor, or a quarrel in his home, and that night he is suddenly seized by a dyspnoea so terrible that he has to spring from his bed and strive for his very life, as it seems, for one, two, or three hours before peace brings sleep to his pillow, or rather to his pillows, for never again perhaps will he sleep with less than three or four pillows under his head and shoulders. Not that uræmic asthma always occurs at night any more than epilepsy does, but, like epilepsy, its first attacks are often nocturnal, and often seize the patient in his sleep. Indeed, throughout the malady, the asthma is more terrible at night, as cardiac dyspnoea generally is likewise; still, in its repetition, uræmic asthma becomes more and more irregular in its recurrence, and finally may not wholly disappear for one hour out of the twenty-four. What happens is something as follows. The patient, if awake, becomes aware that his respirations are quickening and are shallower. The distress increases, and a throbbing labouring action of the heart intensifies it. The countenance now becomes anxious, apprehensive, or even terrified, and a somewhat peculiar general muscular restlessness comes on, which seems to be something more than the mere striving for breath or air. Now, with this intense distress, which anon becomes more than this—an agonising, almost mortal conflict—the face is not puffed, congested, and blue, but nipped and pale, and the very lips themselves are blanched. This, in my experience, is always the case, and the observation is a very instructive one. Moreover, in many instances, though by no means in all, a more or less profuse sweat is of the essence of the attack, comes on, that is, with the primary phenomena, and not as a mere consequence of effort or fear. In two cases, I remember that an outbreak of perspiration upon the usually harsh skin was the very first symptom in the train of symptoms which constituted the attack. In other cases, sweating is unimportant in degree, or is even absent. To the ordinary observer, then, the patient is alarmed, and his aspect is apprehensive and pallid; he is extremely restless; he sits upright and breathes shallowly and rapidly; he speaks in gasps or makes rapid fretful signs, and not infrequently he is covered with profuse cold perspiration. To these observations the physician will add as follows. The temporal arteries stand out like pulsating cords, the radial and tracheal arteries are of tendinous rigidity, and the blood-stream is forced into these and other arteries under great pressure; the big overwrought heart heaves over a wide area of the left chest and seems to threaten to burst its bonds. There is as yet little or no cough, and but little sound of phlegm in the air-passages. The chest expands duly, and, on listening over the lungs, the air is heard to enter freely and rapidly over the whole of them, unless their capacity be lessened by some previous disease. After this contest has gone on for a longer or shorter time, the attack relaxes its hold, the respirations become easier, words and sentences are spoken, the face recovers some tranquillity, and there is usually some expectoration. This expectoration is frothy mucus, often tinged with blood; and, in one case under my care, every violent attack was followed by distinct pulmonary apoplexy in patches large enough to be mapped out by physical examination. In this case, the hæmoptysis was, of course, considerable. In all cases, the lungs fill with râles before the termination of the attack. Such are the characters of pure uræmic dyspnoea as seen apart from complications.

Let us now ask ourselves what explanation we can find as we sit watching this awful suffering. The first thing that strikes us is, that the condition is not one of cyanosis, but rather of pallor, shrinking, and incipient collapse; it so much resembles an attack of ordinary asthma in these respects, that the name uræmic asthma may properly be given to it. It is on listening to the chest that we find the most remarkable contrast with common asthma, in the perfect permeation of the pulmonary tissue by the inspired air. It is very strange to witness this strife for breath, as it seems, while, at the same time, we hear the air passing freely throughout the lungs. Indeed, the patient tells us, and we ourselves may see that he is not, as in asthma, unable to draw his breath, but that the drawn breath brings him no relief. It is clear that the air and the blood do not meet in the air-cells, but that the fault does not lie with the air. It must be the blood, then, which does not keep its appointment. Now, in an uncomplicated case, there is no permanent obstruction to the passage of the blood through the lungs; indeed, we know that, in a short time, the air and blood will come again together and the patient will find peace. How is this? Our thoughts now turn to asthma again, and we think of

* Read before the Yorkshire Branch.

† Not only in my own intercourse with my brethren do I find doubts or hesitation about this symptom of uræmia, but I find in medical literature that the true nature and importance of these attacks is only recognised in the latest works on the subject. Dr. George Johnson has recently described uræmic asthma in this JOURNAL; and Dr. Dickinson describes it plainly in the new edition of his work. Uræmic asthma is, however, not mentioned in his first edition (1868); and it is referred to very doubtfully by Dr. Roberts in the chapter on Uræmia in his edition of 1872.

paroxysmal disorders in general, and analogy gradually leads us to suspect that, as in these so in uræmic asthma, the nervous system must in some way be concerned. We are confirmed in this suspicion by the undoubted fact that the paramount causes of the accessions of uræmic asthma—the determining causes, I mean, of the times of their recurrence—are almost wholly of the kind which influence the nervous system. Although locomotion is not without some effect in disturbing respirations, yet, as I have already hinted, perturbation of mind rather than of body is the potent antecedent. In one of the worst cases I ever saw, the attacks were always brought on or greatly aggravated by such kinds of excitement. The needful strain of making his will, the painful visits of dear friends, the annoying visits of business people, or even the reception of more than a very few persons of any kind during the day, were the efficient causes of renewed seizures. On the other hand, perfect tranquillity in one chamber, and the remission of all calls and messages postponed the attacks more or less completely. Again, one lady who had lost a friend in Bright's disease, and knew, therefore, but too well the meaning of albumen in the urine. She had her first asthma on the night of the day when I had unwittingly revealed to her the same terrible diagnosis of her own case also. In a third case, the first asthmatic seizure came upon a patient in the night of the day on which his partner had selfishly and rudely complained to him of his absence from business; and such instances I need not multiply.

How, then, can such irritations of the central nervous system determine the occurrence of this asthma? Before the Medical Section of this Association, at the meeting in Sheffield and on previous occasions, I expressed an opinion that mental distress or anxiety is a potent cause of chronic granular kidney.

Can, therefore, the cause which, when protracted, sets up granular kidney be, in its fluctuations, the cause of the asthmatic attacks? I think not. There seems to be a want of explaining hypothesis in this direction. It would seem rather to be some irritation descending directly upon the heart or pulmonary vessels and stopping or hindering the pulmonary circulation in such a manner that the air entering the air-cells finds no blood to meet it. This seems to me, on the whole, to offer a more likely explanation than the humoral hypothesis; namely, that these asthmatic attacks are evidences of efforts of nature to eliminate blood-poison by the pulmonary mucous membrane. We cannot well conceive of nature striving to push out an offensive tenant; the conception would rather be that, under conditions of osmosis, some ingredient of the blood was escaping upon the pulmonary tract. But the auscultatory phenomena do not support this view; they do not suggest asphyxia by infiltration of the air-cells, nor is the aspect of the patient the aspect of pulmonary congestion, with distribution of un-aërated blood in the systemic vessels. A more likely hypothesis is, that the transient hindrance to the arrival of the blood at the air-surfaces is in the pulmonary vessels themselves. As the bronchioles, by a spasmodic contraction, prevent, in ordinary asthma, the passage of air to the blood, so it may be imagined that like cramping up of the pulmonary arterioles, on the other hand, in uræmic asthma could prevent the passage of blood to the air, and thus the one disease would be a tolerably precise counterpart of the other.*

So far, the hypothesis runs on four legs; but some difficulties still remain. The chief of these is the occurrence of pulmonary hæmorrhage as an integral part of the seizure. This seems to point to a repletion of the pulmonary vessels, and of their relief by bursting or transudation. Moreover, the establishment of some mucous exudation in all cases points in the same direction. Another difficulty lies in the relief often obtained by the use of digitalis. If digitalis contract the blood-vessels, it might rather aggravate than diminish the distress; now it does the reverse. If Dr. Johnson's belief in the opposition between the arterioles and the heart be correct, it may be that the administration of digitalis confirms the heart more than it increases the vascular resistance. If, as some other physiologists believe, the heart and muscular arterioles are consentaneous, the good effects of digitalis would be more easy to comprehend; but the explanation of the attack would be discredited. From this discussion we may pass onward to treatment; for the effects of drugs upon the condition may help us to some assurance of the nature of the complaint.

As the good effects of digitalis are in some degree opposed to my hypothesis of a spasm of the pulmonary arterioles, so again, in its failure, nitrite of amyl offers a like opposition. When I had guessed that the attacks depended upon such spasm, I turned with much hope

to this drug and with slight hopes to aconite. From neither of them, however, have I found the least aid.* In large and increasing doses of digitalis, on the other hand, I have found a means of permanent alleviation of the condition. By large doses, I mean doses between ten and thirty drops of the tincture repeated under careful observation. The essentially neurotic origin of the attacks points to a like direction of the means of relief, and points correctly; for in nervine sedatives we have most potent means at hand. Unfortunately, it is in chronic nephritis of all diseases that sedatives are least admissible; and, although in this disease sedatives often pass away, leaving the patient unharmed, yet in other cases the lightest doses of them cause serious or even fatal lethargy. The patient who in one week has had a quarter of a grain of morphia injected under his skin without harm, in another week dies of an eighth of a grain in his cough-mixture. Nor have we, so far as I know, any trustworthy guide to the state which permits and the state which forbids the opiates. Strangely enough, opiates by the stomach, with the gradual absorption of which the damaged kidneys would seem more able to compete, appear more harmful than morphia suddenly introduced into the circulation by the skin. To my great surprise, I have repeatedly seen subcutaneous morphia used for the breast-pang sometimes seen in chronic nephritis, as well as in uræmic asthma, without ill effects and with ease so precious that I have not dared to forbid its repetition. In no such case have I happened to see it cause danger, though I have never myself dared to prescribe it. To chloral and the inhalation of chloroform a like objection exists, but these means I do venture carefully to prescribe, and with some success. Bromide of potassium is not strong enough to produce rapid effects, but, in full doses, is much safer than stronger sedatives, and is a valuable adjunct to these. Finally, a few leeches to the sternum are often efficacious in giving some relief to the labouring chest.

To sum up, then, we must use all those well known means which prevent or diminish uræmia; we must guard the patient from annoyance and even from pleasurable excitement. If, in spite of our care, the attacks recur, we must give a mixture containing, say, twenty minims of tincture of digitalis, thirty or forty grains of bromide of potassium, and ten grains of chloral, with a liberal addition of ether and cardamoms, and we must repeat this after a due interval. If, nevertheless, the attack hold on its course, we may administer a little chloroform upon a handkerchief, so as to relax the spasm and dull the *besoin de respirer*. Perhaps we ought, in extreme cases, to inject a little morphia under the skin; but this I dare not recommend.

THE MECHANICAL AND OPERATIVE TREATMENT OF PROLAPSE OF THE UTERUS.†

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IN the present communication, I do not intend to attempt a full consideration of so important a subject as that indicated by its title, but only to give a short account of two cases of unusually severe character, and deduce from them some practical conclusions as to the treatment of the affection.

CASE I.—Ann M—, aged 36, was admitted into Guy's Hospital under my care on June 27th, 1874. She had been married four years, and had one child two years before. The menses were regular and profuse. She never suffered from prolapse until six months previously, when the womb came down during a severe fit of coughing. This had continued ever since, and latterly she had been unable to restore it. On admission, the vagina was completely inverted, and its mucous membrane converted into a dry skin-like substance, its circumference being more than twelve inches. The proident tumour was found to contain not only the whole of the uterus, but both ovaries, which were recognised by their size and position, and by the pain produced on manipulation. The fundus uteri was directed backward and downward, and the sound passed into it to scarcely more than the normal length. Posterior to the cervix was a large triangular ulcerated surface. The uterus was restored, but became prolapsed again on the slightest muscular effort. The perineum was found to be very deficient. The patient was kept in bed, and astringent injections were used for about six weeks, at the end of which time the ulceration was completely healed. I then put the case into the hands of one of my surgical colleagues, and on August 7th, Mr. Bryant undertook a plastic operation. This was performed while the uterus was completely external. Two triangular pieces of mucous membrane were removed at the sides of the vagina,

* This hypothesis has been proposed by Dr. Dickenson in his edition of 1877 (p. 446), and also by Dr. George Johnson in his lectures recently published in this JOURNAL. Dr. Johnson pursues the comparison with other apnoeas, in a very complete and interesting way, as my readers already know. He also offers a likely explanation of my difficulty in understanding the occurrence of pulmonary hæmorrhage.

† It appears, as regards nitrite of amyl, others have been more fortunate than I.
‡ Read at the West Kent District Meeting of the South Eastern Branch.