temperature, which, however slight, are highly injurious. Thirdly, it mixes a warm steam with the inspired air, by diffusing it for at least a foot or two from the patient. A damp warm atmosphere is of great importance in pneumonia; and you may have observed that I have endeavoured to secure it by having basins of warm water placed about the wards, in addition to the poultices.

John D., aged 39, a dustman, was admitted Jan. 16th. He stated that he had been subject to what he called a little chiselling cough for five years, but never so as to be prevented from working. He was in the habit of taking as much gin as he could get. A week before admission, he went to his labour as usual at 6 A.M.; but at about 9 o'clock he was seized with such a severe shivering fit that he was unable to stand, and was carried home to bed. The dyspnœa was very great, but still he had no medical advice till he came here. The pulse was very weak, irregular, about 100. The face was very livid, and the dyspnœa very urgent. There was high toned sibilant breathing over all the chest, mixed behind with fine râles or fine crepitation; and dulness on percussion beneath both scapulæ. He was ordered—

℞ Antimonii pot.-tart. gr. 1-6; potassæ nitratis gr. x; ætheris chlorici ♏x; aquæ ʒj. M. Fiat haustus quartis horis sumendus.

The chest was enveloped in poultices. The next day the breath was easier; but still, considering the weakness and irregularity of pulse and his alcoholised constitution, he was ordered three ounces of gin daily. On the following day (the 18th), the pulse was stronger and less frequent, being 76. He perspired much, but was not nauseated by the antimony. To-day (the 19th), he is going on well, and will probably struggle through.

In all sorts of pneumonia, but especially in this broncho-pneumonia, the rigors are very strong, and mark distinctly the commencement of the disease. You can date its beginning more easily than other inflammations. I recited this last history to call your attention to the fact. Whenever you hear that a man has had such a severe rigor that he is knocked down suddenly when at work, like John D., or is woke up by it in bed, like Joseph C., you should always suspect pneumonia is coming.

About the other cases of broncho-pneumonia, I have no fresh remarks to make. One has a dilated heart; one albuminuria; and two, who came in moribund, seem to have been starved. Ailments of this severity in remote parts complicate the symptoms more than anatomical changes in the lung itself.

To recapitulate:

1. Certain atmospheric conditions cause inflammation of the lungs.
2. This is apt to be epidemic.
3. The inflammation appears to spread from the bronchial membrane to the pulmonary tissue; it is broncho pneumonia.
4. Those with chronic ailments are first attacked.
5. The inflammatory consolidation appears in scattered lobules, not in masses; and is therefore difficult to detect by percussion.
6. Broncho-pneumonia is not apt to be accompanied by pleurisy: hence the pulse is softer than in other forms.
7. The commencement of the disease may be dated from the first rigor.
8. The treatment of the disease may be active; blood-letting, antimony, and poultices, not being contraindicated by even the existence of old chronic ill-health.
9. An exception must, however, be made in the cases of those of irregular drinking habits.

Original Communications.

THE STRUCTURE AND GROWTH OF THE TISSUES:

A SHORT ACCOUNT OF THE CONCLUSIONS DERIVED FROM SOME NEW OBSERVATIONS WITH THE HIGHEST MAGNIFYING POWERS.

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Under this head, I propose from time to time to give a short account of the general results derived from observations upon the structure and growth of tissues, and of some of the changes which take place in disease. Some of the researches on which the conclusions are based will be found in several papers in the *Archives of Medicine*, in a paper "On the Anatomy of the Liver", and one "On the Distribution of Nerves to Muscular Fibre", in the *Philosophical Transactions*, and in my work *On the Liver*. The subject will be discussed more in detail in a paper which will be published in No. VII of the *Archives of Medicine*.

I.—On the Structure of the Elementary Parts of Tissues.

It seems to me that the elementary parts (usually termed *cells*) of the tissues of every organism consist o matter in two essentially different states. In the firs condition (*nucleus* in some cases, *cell-contents* in others) each separate particle is actually undergoing, or is capable of undergoing, active and incessant changes determined by its own inherent powers, and moves in a definite direction from *within outwards*, or from *centre* to *circumference*. In the second state (*cell-wall, fibre*, etc.), distinct particles cannot be demonstrated. They appear to have coalesced, and are in a state of comparative rest. They have already passed through the active stages of their existence. They have acquired the properties for which they were formed: and, after fulfilling certain ends for a longer or shorter period of time, they will be removed to give place to their successors, which, in their turn, will pass through exactly similar phases of existence.

In the so-called cells of cuticle or of mucous membrane, for instance, the central part, which is ordinarily termed the *nucleus*, is granular, and is composed of the soft material above alluded to, in a state of active vitality. The outer hard portion, consisting of the so-called *cell-wall* and *cell contents*, which in many cases pass by almost insensible gradations one into the other, is composed of matter which has already gone through the above state of active change, but is now quiescent. There are many other points with reference to the nature of *cell-contents*, which will be discussed subsequently.

Matter in the first or active state possesses the same general characters, to our imperfect powers of observation, in every living being, and in every part of each living being, in which it exists. It appears *granular* under moderately high powers of the microscope; but under the

highest power that I have been able to obtain (1800 diameters*) the largest granules are most distinctly proved to be *spherules*, and many arguments founded on recent observations, which I shall adduce in other communications, have led me to the conclusion that this material in which all the wonderful actions characteristic of living bodies take place, consists of spherical particles, which are themselves composed of spherical particles, and so on, probably to a degree of minuteness far beyond that which we can possibly realise. Yet the chemical composition of every one of them must be most complex, and each must be the seat of chemical changes, which, there is reason to believe, will never be effected except by the agency of such particles and their descendants.

The form of the mass composed of these spherical particles is determined by numerous complicated conditions. If free to grow in fluid, it is spherical or circular; but it may be oval or stellate, or it may assume other forms, according to the forces which operate upon it. Under favourable circumstances each mass grows—certain of its component particles increase—each of these reaches a certain size and divides—the whole attains a certain definite magnitude, and separates into two, and thus two masses of matter, the greater part of which is in an active state, while the remainder (nuclei and nucleoli in some cases) is capable of assuming it at a later period, are produced. Each of these little masses is invested on its exterior with a structure, the nature and mode of formation of which will be presently considered. Although it is impossible, in the present state of science, and probably will ever remain so, to point out characters which will enable us to distinguish the smallest particle of this granular matter taken from the body of a man, from a particle derived from one of the simplest living beings, it is obvious that these two particles differ very widely from each other in *power*.

A particle of one of the germs of a fungus, certainly less than the one hundred-thousandth of an inch in diameter (and probably particles infinitely smaller than this) is capable of propagating itself; and in the higher animals it is quite certain that very minute particles of some germs possess the same power; but others do not retain their vitality when removed from the part in which they were developed. Since it can be shown most conclusively, that a particle so minute is capable of carrying on an independent existence, and exhibits all the phenomena characteristic of a living being, while no one has proved that an independent living particle much smaller than this does not exist; while, on the contrary, there are many arguments which almost compel me to believe in the existence of living organisms infinitely smaller,—it seems to me that no good purpose would be gained, in the present state of knowledge, by attempting to discuss what is the size of an *ultimate living* particle, or to assign at present an *arbitrary term* like that of *cells*, or any definite substitute for this, to what appears to us as the ultimate anatomical elements into which the textures of living beings can be resolved.

If, however, a portion of any living structure be carefully examined, it will be found to be composed of matter in two distinct states. The one, as I have already said, having in *all living beings* a granular appearance, being soft, exhibiting no definite structure when examined by ordinary magnifying powers, but made up of minute spherical particles, and having the most marvellous power of infinite increase;—the other, *differing* in different beings, and in *different tissues* of the same individual in the most extraordinary degree, in structure, in physical characters, chemical composition, and endowments. It never possesses the power of growing and multiplying. It may be changed by various circumstances, and destroyed and removed by the growth of other structures, but it is not changed by its own powers. The particles of matter in this state, of which every tissue is formed, have gone through a series of very active changes; they have passed through certain periods of existence, and have possessed the power of animating lifeless particles, but when they become tissues these stages are passed. The living matter has now passed through the last phase of its active state—the object of its existence is fulfilled; it no longer possesses active powers. In some cases it becomes converted into a substance dissolved in fluid, which is devoted to ulterior purposes in the economy, or is at once resolved into simpler chemical compounds. In other instances, it remains for a longer or shorter time as a tissue, having certain physical characters. When soft and yielding, the length of the period during which it preserves these properties depends, to a great extent, upon the composition of the fluid which bathes it. If this be modified, it may soon pass into decay. In other cases, the material is hard and unyielding, and may resist the action of the most destructive agents, and retain its characters unaltered for ages. It can be changed, but it does not change itself. It possesses no longer the inherent power of change, nor is it able to communicate its properties to other particles. White fibrous tissue cannot produce itself, nor can cartilage form cartilage, or the hard tissue of cuticle develop cuticle, but the *particles of soft granular matter*, forming little collections (termed nuclei in some cases, cells in others) in all these and other tissues, may increase in number and give rise to the formation of these tissues infinitely.

The relation of these two different forms of matter to each other is constant. The last is always *external* to the former. It is *formed* from it, and its properties depend upon the powers of the living particles which produced it. Of the outer *formed material*, the *oldest* portion is that which is most distant from the soft granular matter, and the *most recent* that which is nearest to it.

Matter in the first state is undergoing changes which cannot be explained by physical laws, and possesses powers which it has inherited from pre-existing matter which manifested the same powers. As it is concerned in the production of tissue, and as the germs of all embryonic and adult tissues are alike composed of it, I propose to call matter in this state of change, or capacity for change, *germinal matter*.

The *formed material* external to it is the result of changes occurring in the germinal matter by virtue of its inherent powers above referred to. The hard matter of horn, and hair, and cuticle, the fibrous tissue of tendon, the fibre of muscle and nerve, the so-called *cell-wall* of epithelium, and indeed in all cases the investment of the so-called *cell-contents*, be it hard or soft, were, at an earlier period of their existence, in the state of *germinal matter*.

[*To be continued.*]

REMARKS ON OBSTRUCTION OF THE BOWELS: WITH CASES.

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[*Continued from page 36.*]

CASE XVII. *Impaction: Recovery.* Mrs. W., aged about 30, of a weak and delicate constitution, was confined three weeks ago; labour rapid, child healthy. She suffered from obstinate constipation throughout her pregnancy; and since her labour has had trouble with the bowels acting irregularly, and stools lumpy, with nausea, faintness and general debility; but in other respects she has been doing well. This morning (Oct. 25th, 1852) I found her faint and suffering from tenes-

* The 1-26th of an inch, magnifying with the low eye-piece 1800 *diameters*, made by Messrs. Powell and Lealand.