Two months after this date (March 10th, 1860) I was again summoned to see him. He had been the day before attending a fair, and retained his urine for many hours; but, whilst straining and endeavouring to relieve the bladder, he felt sudden ease, though no urine escaped. He now complained of a burning sensation about the perinæum and external organs; the scrotum and penis were exceedingly œdematous; and on each side, above and below the line of Poupart's ligament, a dark erysipelatous looking blush overspread the skin. I had no doubt that extravasation had taken place; and, stating the urgency of the case, I suggested calling in another surgeon in consultation; but so alarmed was the patient, that, although I threatened to give up the case, he refused both another opinion and immediate incision, choosing to die rather than "be cut about." In this dilemma, and finding it impossible to pass a catheter, I enlarged the fistulous opening with a probe, ordered poppy fomentations, gave an opiate, and directed perfect quiet with nothing to drink.

Next day, the œdema had increased; the skin was of a deep purple; the urine had constantly dribbled from the fistulous opening. Small doses of Dover's powder were ordered every four hours, and fomentations were continued. On the 12th, appearances were the same; there was no pain nor feverishness, nor any sign of irritation. On the 14th, the purple hue of the skin had become very much paler. He was allowed linseed-tea to drink, as he had tasted no liquid since the night of the 10th. The iodide of potassium ointment, of double strength, was ordered to be rubbed into the affected parts. From this time the swelling gradually subsided, and the blush faded from the skin; the urine passed through the opening and also by the urethra. On March 19th he returned to his occupation; the only trace of the attack being a brawny thickened scrotum.

Seven months afterwards (on October 19th), he sent for me. He was in excruciating pain, tossing about, and almost delirious. The penis and scrotum were œdematous; but urine passed freely, and no other symptoms of extravasation were present. I administered an opiate, and expressed my determination to have a consultation. The friends suggested a medical man of this town, and I readily concurred; he, however, refused to meet me, and as it was very late, it was arranged to send to the next town early in the morning if the patient were no better. My surprise, therefore, may be imagined when, on going to the house next day, I found that Dr. ——, though refusing to meet me, had offered to undertake the case, and that the friends, against the wish of the patient, had consented. I need not say Dr. —— is not an associate. I regretted thus losing sight of so interesting a case. I can only add that the man was soon again at his daily avocations.

Several questions suggest themselves in relation to this case. Is it an anomalous one? or may we assume that, where extravasation has been gradual and arrested early, the effused urine has not so destructive an effect on the tissues as has been generally attributed to it? How is it that no sloughing or destruction of tissue resulted? In the second attack, when the penis and scrotum alone seemed involved, may it not have been the case that the urine was prevented from following the usual course between the superficial and deep fasciæ, by the deposition of plastic matter consequent on the irritation set up by the first attack?

I am not aware of any similar recorded case; and, imperfect as the above history necessarily is, I have thought it might prove interesting to my professional brethren, if not for its singularity, as illustrating that *vis medicatrix naturæ* which so often comes to our aid in daily practice.

THE STRUCTURE AND GROWTH OF TISSUES:

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

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[*Continued from p.* 194.]

III.—OF THE COMPONENT PARTICLES OF GERMINAL MATTER. COMPOSITION. MOTION. STRUCTURE AND ARRANGEMENT.

Composition. It seems difficult to form an idea of the nature of the complex chemical changes which we know must take place at the moment that an *inanimate* particle of matter becomes *living*, and the moment a *living particle dies;* but, with regard to the chemical changes occurring *during the life* of the particles of germinal matter, nothing whatever is known. During this period, the most powerful chemical affinities are overcome, and decompositions silently and perfectly effected, which cannot be artificially induced. We can, of course, only examine chemically the compounds *resulting from the death of living particles;* and not even these can be formed independently of living organisms.

In living matter, ordinary physical and chemical forces seem to be more or less in abeyance; but the moment life ceases, they again exert their sway, and elements which had existed in different states of combination, or uncombined, rush together, and compounds result, the examination of which affords us but very slight information as to how these component elements were related to each other when they formed living matter.

Motion. I have been led to conclude that constant motion is taking place in each spherule which forms part of every mass of active germinal matter. This motion always takes place in one direction, from centre to circumference. Its rapidity varies much in different cases. I think this movement depends, not upon the existence of a repulsion between the living particles, but upon an active power which each possesses, by virtue of which it tends to move outwards from the centre, where it first became living, and which causes the particle to undergo perpetual division, and the mass of which they are composed to divide. Such tendency to move from a centre, it would seem, must be due to a force very different to that which controls the movements of inanimate matter. While the latter exerts its influence as well on masses of the largest magnitude and of infinite minuteness, through *infinite distance*, the former only exerts its ascendency when the distance is infinitely small and the particles very minute; and it would seem that its influence can only be exerted in a comparatively very circumscribed space which is freely supplied with atmospheric air.

Structure and Arrangement. I have adduced facts which seem to me to justify the following conclusions with reference to the structure of the smallest living particle; but it is very probable that, as investigation advances, these inferences may be modified in important particulars. Its form is spherical, and it consists of smaller spherules varying in size; each spherule being composed of smaller spherules, and these of still smaller ones. The surface of each is composed of a very thin layer of matter possessing different properties from tha within it. Each spherical particle is free to move in fluid, and the intervals between each particle are occupied by a fluid. This fluid contains, in solution—

1. Matter about to become living.
2. Substances which exert a chemical action, but do not necessarily form a constituent part of the living mass, and particles which are rejected, and not capable of being animated.
3. Substances resulting from the changes ensuing in particles which have arrived at the end of their period of existence.

It is certain that the smallest particle of living matter is of complex composition; for it is impossible to conceive the existence of a *living particle* of any simple substance like iron, oxygen, nitrogen, etc. *Living* involves chemical and physical change affecting several elements. It seems to me, then, that the term *living atom* could not with propriety be employed, seeing that *living matter* is of complex composition, while the idea of an *atom* seems to involve simplicity of constitution, and indivisibility. The whole question of the arrangement of the atoms in living matter can at present only be discussed theoretically; and I would now merely remark with reference to this subject, that although all living particles are of complex composition, many different elements may exist in very different proportions in living matter; and that there is reason to believe that the smallest visible particles of *every kind* of living matter are spherical. It is inferred that these particles are themselves composed of spherical particles; but in answer to the questions how and why matter should assume the spherical form, the moment it becomes living, I am unable to say anything. It has always appeared to me certain that, as this investigation advances, it will acquire more and more the same infinite extension which attends every onward step in astronomical science.

[*To be continued.*]

The Musk Deer. At a meeting of the Pharmaceutical Society, Mr. Peake gave the following interesting account of the musk deer:—"In general form and size it closely resembles the common deer, but the hair is thick and strong, and very like small porcupine quills. The habits of the musk deer are a good deal like those of the hare. It is common on the spurs of the Himalayas, at an altitude of from 10,000 to 14,000 feet, and is usually snared by the hunters, but the specimen exhibited was shot. The pursuit of the animal is extremely toilsome, and sometimes hazardous, so that there is no probability of sufficient musk being obtained to cause any great alteration in the price. The musk is found in a thin membranous sac, which lies under the outer skin of the abdomen. The sacs, or pods, usually contain from two drachms to one ounce of musk, according to the age of the animal. At one year old, the pod contains no musk; at two years old, only a yellowish milky substance is found, and it is not until the animal is three years old that sufficient musk is found for extraction. The natives, however, sometimes cut off the young pods and fill them with a mixture of the dried liver and blood of the animal, with some musk, and sell them for full-grown pods. It is difficult to prevent the natives from making additions to the best, and a correspondent of the author mentioned an instance in which musk pods given by a native prince as a valuable present, were nearly worthless from the adulteration which had been practised. The mountains on which the musk deer are found extend from the interior of India towards Thibet and Chinese Tartary, and it was probable that all the varieties of musk known as Russian, Chinese, and Nepaul, come from the same district, and were the product of the same species, the differences in appearance depending upon the age of the animal, and the way in which the pod is dried. The produce of one year received by the correspondent of the author was 120 pods, containing from 110 to 120 ounces of musk.

DR. B. W. RICHARDSON'S

LETTSOMIAN LECTURES

ON

CERTAIN OF THE PHENOMENA OF LIFE.

DELIVERED BEFORE THE MEDICAL SOCIETY OF LONDON, FEBRUARY 1861.

Dr. Richardson delivered his third and last Lettsomian Lecture on Monday evening, February 25th. The subject was the Process of Resuscitation after apparent Death.

In commencing, the lecturer recalled attention to the statement made by him in the previous lecture, that caloric has the power of restoring muscular action; and, in illustration, he performed the following experiment. Into the aorta of an animal which had been previously killed with chloroform, a tube was inserted; and water at 115° Fahr. was slowly injected into the arterial system. As the current passed along, the muscles commenced to contract, and the limbs were thrown into motion. This condition, he said, would continue until the tissues became infiltrated with fluid. For the success of this experiment, certain details must be attended to. As few vessels as possible must be divided; for otherwise the water will not permeate the extreme parts. The current must be pushed slowly, otherwise the cellular tissue is at once infiltrated. And the temperature of the water must not exceed 115°, as, if it be higher, then paralysis from over-relaxation is induced. The same results are produced in animals killed by carbonic acid or by drowning, but in a less marked degree than in those killed by chloroform.

The effect of heat in restoring muscular action has, Dr. Richardson observed, a deeper meaning than the mere effect of the application of a stimulus to a muscle. For, when a muscle has ceased to respond to galvanism, it may be again rendered obedient to this stimulus by supplying it with caloric; so that the caloric exercises a primary and independent power, without which the electrical action is of no avail. In Dr. Richardson's opinion, the phenomena observed approached more closely than any other to an explanation of the cause of muscular motion. It seems as if heat were the relaxing force; and that contraction were produced by the removal of the heat, or its resolution into another force. If the removal of the caloric be prevented, as by enclosing the animal in a warm medium, the action soon ceases; while, if the animal be laid on a cold surface, so that the heat is rapidly removed, then the action is more decided, and of longer duration.

This view of the nature of muscular action, if tenable, goes far to explain what is called rhythmical action, such as that of the heart. On this point, while the lecturer differed from Dr. Radcliffe on some of his views regarding muscular contraction, he agreed with him that the muscular structure of the heart is relaxed by the entrance of blood into the coronary arteries, and that its contraction is incident to the removal or alteration of the expanding force derived from the blood. Dr. Radcliffe believed that electricity is disposed of from the blood