to me to construct summer-houses in the wall of the same material; and two were successively and successfully constructed of this concrete, one seventeen feet by eleven feet, and one twelve feet by seven feet. The arched entrances are entirely of concrete; and, excepting a few tiles bedded in cement in the roof, there is not a particle of any material in the whole of these buildings but ballast and cement. A very great saving of cost is effected in buildings of this kind, in consequence of the class of labour employed. Ordinary bricklayers' labourers do all the work, under the guidance of one experienced artisan; and, if an arched roof covering a room seventeen feet by eleven feet will carry itself without any wooden support, it is probable that a building of proportionately increased solidity might be constructed on the same principle. For cottages and detached buildings, especially of one floor only, a very great saving of cost may be effected; and, if any of the members should wish to see what I have done, or to obtain any further information as to details, I shall be very glad to see or hear from them.

ABSENCE OF THE UTERUS AFTER REPEATED PREGNANCIES.*

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

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ANN DAWSON, aged 39, was admitted an out-patient of St. Mary's Hospital, on the 11th April, 1872, suffering under general debility and amenorrhœa. Menstruation began at eleven years of age. She was married at 25, and had four children within three years and a half; the first two having been born at the seventh and eighth months respectively, the others at the full term. Flooding took place after the birth of each, especially after that of the last child. On that occasion, she was attended by Mr. Rothwell (late of Bolton), who did not arrive for some hours after the child's birth; the placenta had not come away when he got there, and this he appears to have removed. Hæmorrhage subsequently took place to such an extent, that he found it necessary to remain with her four or five hours, during the greater part of which time she was delirious. Previously to labour coming on, there was milk in the breasts; the following day it had disappeared. After the cessation of the flooding, the discharge does not appear to have had the ordinary character of lochia, but to have consisted of a brown watery fluid, which persisted for a couple of weeks without any change in its appearance. Convalescence was so protracted that, at the end of eighteen weeks, she was unable to stand; but there is no history of her having suffered during this time from febrile or irritative symptoms indicating the occurrence of any acute mischief. From this period, her general health somewhat improved; menstruation, however, has never been re-established, so that it is now eleven years since the woman had any appearance of the usual monthly discharge; and although occasionally menstruation ceases at the early age of twenty-eight, each instance, when it does occur, is sufficiently singular to make it worthy of individual consideration. The interest in this case is further increased by the fact that she has never had the slightest leucorrhœa, a discharge which I have usually noticed to persist for a length of time when menstruation has ceased at an earlier period than usual. Neither has she, since the cessation of the menstrual function, experienced any of the *molimina menstruationis*, which, when in activity, were well marked and characteristic in her case. During this period, also, all sexual desire has become abrogated, coitus being attended neither with pleasure nor with pain. There does not appear to have been any hæmorrhage recurring at regular intervals, which could be looked upon in the light of vicarious menstruation, although four years ago she vomited blood, and once lately she spat a small quantity, and, for the last year, the nasal mucus has been streaked with blood every morning. For four months previously to the birth of her last child, large quantities of blood were passed *per anum*; and, at the same time, she appears to have suffered from an aphthous condition of the intestinal tract; and she states that her child at birth was similarly affected. She is a tall, pale, thin woman, with markedly flabby cheeks, and a commencing arcus senilis; the mammae are shrunken and flat, with apparent atrophy of gland-structure. On digital examination *per vaginam*, no cervix or uterus can be detected, but the finger discovers an opening, of irregular outline, in the position of the os uteri. The speculum reveals the presence of a small growth, of the size of a pea, on the right margin of the opening referred to, and confirms the absence of a cervix. A No. 12 gum elastic catheter passes, without any pressure, and without the slightest resist-

ance, eight inches through the opening. The absence of the uterus is still further confirmed by the approximation of the left forefinger in the rectum to the right hand placed over the pubes, and also by the sound in the bladder with the finger in the rectum. The sound passed through the opening can be felt under the abdominal wall, two inches above the umbilicus; and it can also be moved in a lateral direction for three inches to either side of the centre of the abdomen. The sound, bent at a right angle an inch from its extremity, and passed through the opening, can be rotated so that the angular portion nearly describes a circle immediately within the opening, meeting with some slight obstruction only posteriorly. These methods of exploration have been repeated, and the results generally confirmed by Dr. Thorburn, Dr. Lloyd Roberts, and Mr. Windsor. These various examinations, although apparently rough and dangerous, never appear to cause any distress to the patient, either at the time or afterwards; in fact, she rather attributes an improved appetite to the manipulation she has undergone.

Such is the history and condition of this woman; a case, so far as I am aware, without a parallel in medical literature. The importance of which such knowledge would be is obvious could we determine the precise condition of this woman, and could we further ascertain what cause has effected such changes that an organ like the uterus, after repeated pregnancies, should have disappeared, if not altogether, at least from its usual situation. It cannot positively be asserted, during her life, that the uterus does not exist; but it is quite certain that, if it remain, its situation is either removed beyond reach, or its bulk is so far reduced that it is not detectable by the means which I, and those who have given me the benefit of their knowledge, have employed. There is but one other alternative; and that is to suppose that, by some process, the uterus has been destroyed, and either absorbed or sloughed away. I am aware of the necessity of being cautious in speaking confidently about the presence, or even the size of the uterus; and I still entertain the possibility of the uterus being even now in its usual locality, but that the walls are so attenuated that, although they may exist, they are so thin that, having to be examined through other contiguous structures, they are difficult to recognise—the uterus, in fact, being present in outline, but not in bulk. Supposing, on the other hand, the uterus to have disappeared—and I must confess that, in this case, I feel the supposition to be warranted—how far is it possible to account for such an occurrence? For the solution of this question, the changes which the uterus undergoes in the cycle it performs between impregnation and the resumption of its virgin condition, require to be considered severally in the three stages of development, degeneration, and reconstruction.

It is not necessary to go through the details of these processes, although it is perhaps as well to remark that the stage of development depends less upon the introduction of new elements than on the increase and the higher perfection of its ordinary constituents, and that the degeneration is the fatty degeneration which other tissues in like manner undergo previous to removal. Thus, the pregnant uterus may be compared to a physiological wave, gradually augmenting and steadily subsiding without receiving any perceptible aid from surrounding elements. Of the process of reconstruction we know little; but it will be conceded that it depends upon a healthy condition of the function by which it is brought about; consequently the condition of what is termed superinvolution of the uterus, or atrophy after pregnancy, must depend either upon an excess in the process of involution, an excess of the fatty metamorphosis and subsequent absorption, or on some defect in the development of the new tissues that ought to replace those that have become effete. That one or other of these processes takes place, Sir James Simpson and Dr. Arthur Farre have published cases to demonstrate, and they have both verified by *post mortem* examination that an uterus may become so attenuated that its walls are found no thicker than those of the intestines. The only analogous instance of a body like the uterus spontaneously lessening in bulk is found in fibroid tumours, and here the resemblance is further increased by the similarity in structure of the two. I do not mean to assert that their identity is complete, but that organic muscular fibre is the main element in the composition of them both; and the muscular fibre only differs in this respect—that whereas in the uterus the fibre-cells are large and soft, in fibroid tumours they are small and dense, and consequently less prone to rapid disintegration and absorption. The spontaneous absorption of fibroid tumours is no longer denied, and the number of well authenticated instances of the complete removal of large fibrous tumours by absorption are now sufficiently numerous not to require special mention. The accepted theory of the disappearance of these tumours is that the fibres undergo, in the first instance, a molecular fatty degeneration, and then become absorbed; so that in both respects the processes correspond to those which constitute the involution of the uterus after delivery. We know absolutely nothing definite of the cause which induces those metamorphoses in the intimate structure of these growths

* Read before the Lancashire and Cheshire Branch.

favourable to their absorption, but it appears most reasonable to conjecture that some perversion of nutrition is the immediate step previous to their disappearance, on the universal principle that when nutrition fails, degeneration follows. I have frequently noted that, in cases of spontaneous absorption of fibroid tumours, an anæmic condition has preceded the change; and in regard to the woman whose case I have related, I attribute to her rapid pregnancies, her profuse and repeated floodings, the illness which followed the birth of her last child, and the ulterior mischief which attended her confinement, the present state of her womb.

We have other analogous phenomena in cases of extrauterine pregnancies, where the fœtus has been found reduced to its bony portions by the absorption of the other solid and fluid parts—the consequence of arrest of nutrition. The same thing has also been known to take place within the uterus, where a dead fœtus has been retained for a long time. It is further admitted that the placenta may become absorbed after delivery at term, and still more frequently after miscarriages. In none of these instances does degeneration and absorption commence so long as nutrition continues. How far we have a right to consider superinvolution the result of an inflammatory process—a theory which has been suggested—I am not prepared to say; but we are aware that inflammation causes an arrest of the “retrograde metamorphosis” subsequent to delivery; so that, to reconcile the two extremes, we must attribute to one action opposite effects. In the case I have given, however, there does not appear to have been any inflammatory mischief; and, as inflammation of the uterus is generally sufficiently well indicated, we have a right to presume that it never took place. I would just add that, supposing my explanation to be correct, and it to be a fact that in the case of this woman the usual fatty degeneration has proceeded to the usual extent, but that the process of reconstruction, owing to a poverty-stricken condition of the system, has been prevented, a practical inference is to be drawn from the circumstance, and it is possible that we may make the knowledge applicable to the removal of fibroid tumours by a system of lessening their nutrition by a restricted diet, and by other measures of a depletory nature.

THE GRAFT-THEORY OF DISEASE.*

By JAMES ROSS, M.D., Waterfoot, Manchester.

THE splendid experiments of Dr. Burdon Sanderson and of other workers upon virulent fluids prove that the active part of contagious matter resides in particles less than the one-twenty-thousandth of an inch in diameter, and very similar in their movements and in their physical and chemical characters to the organisms found in putrefactive fluids. The object of the present paper is to adduce some evidence to show that the particles of contagious matter are, notwithstanding their similarity to bacteria, not independent beings, but modified units of the individual from which they have become detached. It is impossible within the limits of a short paper to do anything more than present a small section of the evidence which can be adduced, either for or against such a proposition. It will be taken for granted, in the first place, that it has not yet been proved beyond doubt that the contagium-particles are independent organisms; since, if it were, the opposite hypothesis that they are only detached portions of a living individual would be at once inadmissible. On the other hand, since I cannot give experimental proof that the latter assumption is true, I must present evidence which will give it some degree of probability. The most obvious objection to this assumption is, that it is very improbable that a particle of one living body not larger than the one-twenty-thousandth of an inch in diameter, however much it may have been modified, should produce such extensive changes by its collision with another individual, as occur in the zymotic diseases. But this objection will be very much weakened, if not entirely removed, when it is remembered that the most wonderful process in nature is initiated by particles apparently as insignificant as these. I allude to the action of the reproductive particles in the genesis of new individuals. A closer examination will also disclose analogies between the reproductive and contagium-particles, which will give additional strength to the supposition that the latter are only modified portions of the individual from which they are derived. The contagium-particles, according to this supposition, are derivatives from epithelial cells; and both the germ-cell and sperm-cell, which by their union give origin to a new individual, are merely modified epithelial cells. The pathological changes which precede the detachment of the contagium-particles are such as to diminish

the supply of nourishment to the epidermis; therefore its units lose even the small degree of specialisation which enable them to take a share in the operations of the body of which they form a part, and hence they are cast off. But it has been supposed that the detached and semi-detached portions which are operative in the genesis of new individuals are highly “vitalised” products; and if this be the case, the analogy fails in one essential particular. But Mr. Herbert Spencer has shown that this latter assumption is very doubtful, and that it is probable that the reproductive cells are characterised by being unspecialised or by having undergone very little modification. In many plants, and the lower members of the animal kingdom, whose tissues are the least specialised, a small fragment of tissue is capable of reproducing a new individual. A hydra may be divided into fifty pieces, and each piece will grow into a new and perfect individual. In plants, the reproductive particles arise at the extremity of the axis, where the degree of the organisation is the least; and in the higher animals, the reproductive centres are, as already remarked, merely modified epithelial cells—cells which are remarkable for the simplicity of their structure.

We also find, as a rule, that the lower an organism is in the scale of organisation, the higher is its reproductive power. The fact that epithelial tissue is not highly specialised has just been referred to; yet it possesses the power of reproduction in a very eminent degree, even without concurrence with another organic particle. Mr. Herbert Spencer mentions the fact that a species of *Begonia* habitually develops young plants from the scales of its stems and leaves, and that many plants are developed by a single scale. These facts show that the reproductive particles are not highly specialised, and that in this respect they are similar to the particles detached from the body during the contagious diseases. That the contagium-particles become detached from the body at a time when they are sparingly supplied with nourishment, will not be doubted by anyone; and there is strong evidence to show that this is also the case with the reproductive particles. This is best seen with regard to the latter in those organisms where asexual reproduction takes place. Mr. Herbert Spencer adduces a great mass of evidence to show that, during the transition from asexual to sexual reproduction, there must be relative innutrition of the reproductive particles. When a *polype* is freely supplied with nourishment, it multiplies by a budding process; but when the supply of nourishment begins to fail, reproductive cells are formed, and sexual genesis takes place. A similar fact is known to gardeners with regard to fruit trees. Trees which are freely supplied with nourishment “run into wood,” and gardeners adopt the method of cutting the roots, and sometimes even go the length of “ringing the bark,” so as to diminish the flow of sap to the tree. After this expedient is adopted, asexual gives rise to sexual reproduction, the terminal buds become floral, and finally, the tree bears fruit. The reproductive particles, therefore, which, by their union, initiate the most wonderful process in nature—the evolution of a new individual—are, prior to their union, sparingly supplied with nourishment; and, as just noticed, the contagium-particles are detached from the body from a similar cause. There are, therefore, several agreements between the reproductive and contagium particles, and others might be mentioned; but I shall now proceed to mention one particular in which the analogy between them fails. In the genesis of new individuals by sexual reproduction, an union takes place between two particles detached or semi-detached from two distinct individuals; but in the genesis of a contagious disease, an union takes place between a distinct individual and a detached portion of another individual. But another series of facts is known to biologists where the analogy even in this respect is complete. I allude to the phenomena of grafting, where a portion detached from one individual is grafted upon another; and I shall now proceed to show that some of the phenomena which result from this process closely resemble those of contagion.

It may be remarked, that we must look for the agreements between the phenomena of grafting and those of contagion in the effects which are produced by the scion on the stock, since these are the most prominent features in the contagious diseases. Numerous examples of the effects produced upon the stock by the scion are mentioned by Mr. Darwin in his great work on *Animals and Plants under Domestication*, and in an interesting article in the *Popular Science Review* for April 1871 by Dr. Masters. I can only mention one or two of these examples. “Cases have been observed,” says Dr. Masters, “where, from the stock *below* the graft, fruits and flowers of the same appearance as those borne on the scion have made their appearance. This has been observed in the case of the pear grafted on the mountain ash, and in other cases.” “It is notorious,” says Mr. Darwin, “that when the variegated jessamine is budded on the common kind, the stock sometimes produces buds bearing variegated leaves. Mr. Rivers, on the authority of a trustworthy friend, states that some buds of a

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