the deformity and obtaining a useful limb for the patient, with bony ankylosis in a normal position; and to such a result I would advise, in all future operations, that our expectations should be limited.

With regard to the subcutaneous operation, which, so far as I know, was first suggested and performed by myself, and which I have now brought before the British Medical Association, I would only observe that the subcutaneous division of bone—subcutaneous osteotomy, as it may be called—has proved itself to be as simple and harmless an operation in its immediate effects as subcutaneous tenotomy, with which, in its essential characters, the operation may be compared.

Since this paper was read at the Association meeting, this operation has been successfully performed by Mr. T. R. Jessop of Leeds, who on the 17th September, 1870, writes as follows. "Three weeks ago last Thursday, I performed the operation upon a young woman whose right thigh was fixed by bony ankylosis at a right angle with the pelvis. By practising upon the dead subject, I had previously found that the best spot at which to make the puncture was about an inch behind the posterior margin of the great trochanter, near its upper border. The division we made without any difficulty. The operation and the subsequent dressings were performed after Professor Lister's method. The wound healed at once without a single drop of pus. For a fortnight I kept the patient in bed, with the limb stretched by means of a weight slung over a pulley attached to the ankle. Since the expiration of a fortnight, I have had the woman up, walking about on crutches, and swinging the leg in all directions, with the view of procuring a false joint. The limb measures barely an inch shorter than the sound one; and the patient makes complaint only of a little pain in both hip and knee. Crepitus can both be felt and heard very distinctly. I will have the result duly reported." The operation has also been successfully performed by Mr. F. W. Jowers, of Brighton, and Mr. Furneaux Jordan, of Birmingham. No inflammation or suppuration followed the operation in either case. The details of these three successful cases will shortly be published; and the fact that this operation has been successfully performed in four cases, goes far to establish it as a surgical procedure.

SUBCUTANEOUS SECTION OF THE NECK OF THE FEMUR.

By FURNEAUX JORDAN, F.R.C.S.,

Surgeon to the Queen's Hospital; Professor of Surgery in Queen's College, Birmingham; etc.

EMMA H., aged 16, from Wales, had had hip-disease for six years. She had had several sinuses opening and closing during that time. On admission into hospital, there was a little oozing from one near the perineum. The thigh was flexed at right angles to the trunk; and there was unmistakable osseous ankylosis of the hip-joint, as revealed by examination under chloroform. I divided the neck of the femur by the method and with the instruments devised by Mr. W. Adams. The sudden mobility of the joint when the section of the femur was completed was very striking. The adductor longus and long head of the rectus femoris required tenotomy. The limb was then put into a position which promises a very useful result. It is now three weeks since the operation, and the progress has been most favourable.

In this case, the naturally short femoral neck of early life, made shorter by caries and ankylosis, combined with a very fat gluteal region (since ankylosis, the patient has become very stout), required more than ordinary care in every step of the operation.

ON SCARLET-FEVER, WITH SPECIAL REFERENCE TO PATHOLOGY AND TREATMENT.*

By ROBERT RENFREW, M.D., Glasgow.

SCARLET FEVER is one of the zymotic diseases. These diseases are now generally believed to be produced by a specific organised substance entering the body, either by the stomach or lungs, or by both; when it has entered the system, it has the power of developing and multiplying itself, as seen in inoculation and vaccination. The process of multiplication deteriorates the blood, deranges the nervous system, quickens the circulation, causing rapid disintegration of the tissues, as evinced by the increased temperature, and altering the secretions from the secretory and excretory organs. Disintegration goes on with such

rapidity that the normal physiological and chemical changes cannot take place, and disintegrated substances are floating in the blood, still further deteriorating the vital fluid.

The morbid matters of the zymotic diseases are not eliminated by the usual eliminating organs. Each poison is thrown off by a distinct and separate part of the body: small-pox, by the skin; cow-pox at the point of introduction; measles, by the mucous membranes of the eyes, nose, fauces, and lungs; whooping-cough, by the mucous membranes of the respiratory organs and stomach; enteric fever, by the lower third of the ileum; cholera, by the stomach and bowels; scarlet fever, by the fauces, nose, and perhaps by the stomach. In typhus fever, the eliminating part is not so obvious, but, perhaps, it is done by the lungs. The parts specified above, however the poison may have been introduced into the blood, are always those affected. That the poison of enteric fever is thrown off by the intestines, and cholera by the intestines and stomach, there can be no doubt, for it has been proved that persons drinking water containing the discharges from these diseases have been seized with similar disorders.

It has been said that "it seems probable that in all varieties of scarlet fever a primary effect is suddenly and violently to stimulate the natural cell-growth of all the secreting organs." We have no evidence that this takes place anywhere else than in the parts pointed out; for in scarlet fever we have very seldom any disease of the lungs, liver, or bowels. Sometimes the kidneys show signs of congestion, but not more so than in pneumonia, typhoid, and typhus fever. In parts where we have always irritation or inflammation in zymotic diseases, I believe they are always caused by elimination or absorption of the poison.

The severity of the symptoms, whether general or local, in the zymotic class of diseases, depends upon the power of the system to develop the poison in the blood. For, if a number of persons be inoculated from the same person, there will be found a great variety in the number and character of the pustules. If several children be vaccinated with the same lymph, and with equal care as regards the number, depth, and extent of the scratches and quantity of matter applied, you will have a great diversity in the number of the vesicles and amount of lymph produced. In one child you may only have one vesicle, in another two or three, and so on, until you have a cluster of the size of a shilling.

At one time I thought that the small number of vesicles after vaccination depended on some imperfection in the introducing of the lymph, until I tried—when there was only one vesicle—vaccination on the other arm, and failed; showing that, however small the amount of lymph eliminated, the purpose had been accomplished, and that the power of multiplying the poison had been weak.

In every case of scarlet fever the throat is affected. The rash may be absent, but the throat-affection is never. In the mild form the fauces are red, somewhat swollen, and the secretion increased in quantity and altered in character. In scarlatina anginosa and maligna these appearances are all greatly aggravated, and they have extended themselves into the nose, and sometimes even into the Eustachian tube, causing great pain in the ear, and often suppuration. In these two forms the tonsils are found to be greatly enlarged, but in scarlatina anginosa they are often covered by a yellowish white exudation. In scarlatina maligna we have in addition ashy-coloured sloughs, and some of these sloughs go so deep into the tonsils that, when they break up, we have sometimes an artery of considerable size opened, causing alarming and dangerous hæmorrhage. In these forms pain of the throat is so great that deglutition is performed with great difficulty, and in some cases it cannot be performed at all. Secretion is greatly increased, so that it flows out of both mouth and nose, its character being so much altered that it irritates and excoriates the parts over which it flows.

I believe that in some of the zymotic diseases, where the poison can be reabsorbed, the disease is aggravated and prolonged. In enteric fever I have observed that where there was diarrhoea—although otherwise this indicates greater severity in the general and local symptoms—the course of the fever was generally shorter than where there was very little or none. The diarrhoea hurried the poison out of the bowel; but where there was no purging, or very little, it remained to be absorbed, prolonging the fever.

After these general remarks, I will now call your attention to some special points in the pathology of scarlet fever and the treatment.

A poison enters the blood, capable of extensive multiplication. After a shorter or longer period the tonsils and parts already mentioned, by some physiological law, take on the process of eliminating the poison, producing the local symptoms already stated. A great part of the eliminated poison must be swallowed, to be reabsorbed by the stomach, intensifying and prolonging the disease. In connection with this view, I will state a pathological condition of the stomach, which may, in part, be caused by the poison passing from the throat and other parts into it.

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

It has been said by Dr. Fenwick—"With regard to the stomach, the blood-vessels get congested, the epithelium is stripped from the tubes, and the tissues become softened; the tubes are found distended by granular matter or by cells mixed with granules."

In support of this view, I would refer you to the local pathological conditions of enteric fever, which are almost identical with those of scarlet fever. We have the irritated inflamed condition, with ashy sloughs over the glands, which, when separated, leave ulcers, from which hæmorrhage often takes place. The adjacent glandular organs—mesenteric glands, liver, and spleen—are also affected.

In his article on Enteric Fever in Reynolds's *System of Medicine*, Dr. Harley says (although I do not agree with him in regard to his general views of the pathology of the disease), in speaking of the nervous symptoms, that, "if the poison be arrested by and thrown out from the liver, no general blood-poisoning, and therefore no grave nervous symptoms, are met with. If the liver be unequal to the arrest and elimination of the poison, it passes unaltered from the portal into the general circulation, and symptoms of general blood-poisoning at once appear."

There can be no doubt that the blood is deteriorated in scarlet fever; for, however bright the skin may be at the first, it soon becomes purplish, and, in bad cases, of a very deep purple colour, as if it were venous blood that was circulating, showing that the red blood-discs are in a deteriorated condition, unfitting them for their functions in the economy. It is also in a superalkaline condition. Here I will give a quotation from Dr. Chambers's *Lectures*. "Ammonia, which is always being formed and given off from the animal body, is found much more abundant in certain conditions than in others; and that these conditions are those in which nutritive metamorphosis or growth was deficient, as compared with destructive metamorphosis." He goes on to say: "For it is not shown that there is more alkali in the body than there ought to be, but more than there is acid to neutralise. Subacidity would be a synonymous term, and more suggestive of the means we have at our disposal for remedying the defect." If alkaline conditions out of the body favour the development of zymotic poisons, the same conditions in the body are likely to do the same.

With these views which I entertain of the pathology of scarlet fever, I will now give you the treatment based upon them.

In the treatment of scarlet fever, agents should be given that will prevent the reabsorption of the poison, hinder its formation, moderate and assist physiological and chemical actions and changes.

The medicine which I have used for these purposes for nearly eight years is a mixture containing tincture of steel and chlorate of potass. In this mixture we have chlorine, muriatic acid, iron, and chlorate of potass. The chlorine acts upon and destroys the poison in the stomach; and probably some of it is taken into the blood, producing the same effect there. The muriatic acid, Dr. Chambers says, "is such a large constituent of the body, that it might almost be called a food, instead of a medicine; and that it is a powerful arrester of decomposition of animal matters." He also says about the ammonia, "Very difficult indeed would it be for the eliminator to get this alkali out; but it is easy for the restorers to get acid in." By getting the acid in, we lessen the alkalinity of the blood, and neutralise one of the conditions favourable for the development of the poison. The red discs of the blood are the carriers of oxygen; but, in their "black and melanosed condition," they are not in a condition for accomplishing this function. The iron supplies that which is likely to improve the deteriorated discs, and we give that which we know rapidly increases their number. The chlorate of potass supplies oxygen to the blood—which must be very deficient, from the condition of the red discs and the rapid disintegration that has been going on—to enable the physiological and chemical changes to take place, and oxidise the disintegrated substances that are floating in the blood.

Gentlemen, these are my views of the pathology and treatment of scarlet fever. I would not have brought them before you if it had not been that I have not seen, in the communications to the medical journals, anything like a fixed and rational method of treating scarlet fever. Before I began this treatment, there was no medicine that I believed did any good. It has been very satisfactory to myself; for, from the painful and irritated condition of the throat, it was very difficult to get children to swallow any medicine. In many instances, they could not be made to swallow even cold water; but I have no difficulty with this medicine. It is taken so readily by even the youngest child, that it seems to supply a want. The pain is very soon relieved; the exudations and superficial sloughs disappear; the throat improves in appearance; the swelling, both internal and external, diminishes; the secretions become lessened, and lose their irritating character; and refreshing sleep is enjoyed. I never have hæmorrhage from the throat, nor an abscess in the ear or neck.

The forms in which I give the medicine are the following

1. For a child two years old : $\mathcal{R}$ Tinct. ferri perchloridi $\mathfrak{z}$ ss vel $\mathfrak{z}$ ij ; potassæ chloratis $\mathfrak{z}$ j ; glycerinæ $\mathfrak{z}$ iss vel syrupi simplicis $\mathfrak{z}$ j ; aquæ q. s. ad $\mathfrak{z}$ iv. Two teaspoonfuls to be taken in water every hour or two hours.
2. For an adult : $\mathcal{R}$ Tinct. ferri perchloridi $\mathfrak{z}$ iv ; potassæ chloratis $\mathfrak{z}$ iiij ; glycerinæ vel syrupi simplicis $\mathfrak{z}$ iss ; aquæ q. s. ad $\mathfrak{z}$ viiij. One table-spoonful in water every hour or two hours.

ON THE SULPHOCARBOLATES AND THE ANTI-SEPTIC METHOD IN MEDICINE.*

By A. ERNEST SANSOM, M.D. Lond., M.R.C.P.,

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THERE is scarcely any subject which possesses a greater interest at the present time to practitioners of medicine than what is known as "The Germ Theory of Disease." Warmly espoused by some observers, the doctrine is actively repudiated by others. Whilst some have pointed out certain definite living organisms which they have alleged to be the actual causes of transmissible disease, others have scouted the word "germ" as implying the existence of something for which not a shadow of evidence exists. Can there not be a golden mean between these expressions?

Let us first consider those points on which there can be mutual concord. There is scarcely any possibility of doubt that the transmissible diseases, such as fevers, syphilis, etc., are due each to the operation of a material poison. No one attributes them to the influence of mere conditions of force. There is abundant evidence that the physical causes of disease do not belong to the inorganic world. By exclusion, therefore, we conclude that these are material and organic. But does our knowledge of organic substances help us much in the elucidation of the problem? We know of no organic substance which can induce a train of symptoms resembling in kind and in mode of sequence the phenomena of any infectious disease; still less any poison the fatal dose of which is so minute as to be imponderable and invisible. Furthermore, we are acquainted with no simply organic material which can be, as we know the *materies morbi* to be, self-multiplying. If, then, the prime causes of disease be material organic particles, they must possess powers far transcending those with which we are ordinarily acquainted. With organic matter in a certain state, however, the effects of the contagia of disease show a strong analogy. It is not strange that from Hippocrates downwards they should be likened to leaven, and their operation to the process of fermentation. The resemblance was great, but there was no perfect understanding of the first causes of either the one process or the other. At very early times, the "peculiar condition" of the minute portion of organic material which induced the phenomena of fermentation or of disease was supposed to be a condition of motion of its particles, which motion it could communicate to the fermentescible liquid in the one case, or to the fluids of the body in the other. (See *A Mechanical Account of Poisons*, by Richard Mead, M.D., London, 1702, p. 81; see also pp. 13-15.) This is none other than the hypothesis of Liebig, which has so largely prevailed at the present day. It is needless to say, that at the present time there are two opposing views as to the nature of the first cause of the process of fermentation—the one holding that it is due to the effect of an unexplained catalytic action communicated to fermentescible material by an organic substance undergoing change; the other, that its phenomena are due from the very beginning to the acts of life of developing, growing, and multiplying organised particles. The upholders of these two views may, I fancy, be considered as nearly equally divided. There is, however, one point on which there is a pretty obvious agreement, and that is a point of great importance in regard to this question. It is that, whatever may be the *initial* cause of the changes in fermentation, the process, as soon as it becomes capable of discernment by vision, however highly aided, is seen to be most intimately connected with the development of living forms.

Let us turn for collateral evidence to the observations which have been made on the causes of cognate diseases. No one doubts now that animal and vegetable organisms, at one time enjoying separate existence, can enter the living human organism, and there initiate and continue the phenomena of disease. Well marked in cases of diseases due to parasitic animals and plants, this mode of causation has been attributed in other transmissible diseases to organisms with more and more obscurity, till it has almost reached to a *reductio ad absurdum*. Thus, cholera

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