Original Communications.

WHAT IS SCARLET FEVER?*

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THE order of events observed in scarlet fever is as follows. First, fever; secondly, a rash upon the skin, sore-throat, and swelling of the glands about the throat; thirdly, exfoliation of the cuticle, mucous discharges from the throat and nose; and perhaps abscess of the submaxillary glands.

This order or succession is typical of the order of events as they take place in the blood, which we make out to be as follows.

1. Infection of the corpuscles by a miasm inhaled through the lungs. This is announced by symptoms of fever.

2. The corpuscles of blood being disordered by a specific poison, the waste materials which they discharge into air and into the liquor sanguinis, are altered in quality and quantity. Less carbon is expired by the lungs (Graves), and less urea discharged by the kidneys (Simon); but a new contagious poison is developed, which gives the liquor sanguinis pathological properties—renders it impure.

3. Impurity of the fluid of blood excites local inflammation, which in scarlet fever is seen in the skin, throat, and glands about the throat. The local inflammations comprise the production of a vast brood of epidermal and mucous, or of epidermal, mucous, and pus-cells.

4. These cellular productions are discharged from the skin by exfoliation of the cuticle; from the throat, by its mucous discharges; and from the glands about the throat, by abscess and suppuration. That they carry off a *materies morbi* from the blood seems proved; because the exfoliating cuticular cells and the breath of the patient are vehicles of a contagious poison. Moreover, all symptoms of fever and inflammation disappear upon their discharge.

5. The actions in the skin, throat, and glands about the throat, are called *critical*, because, if any interruption or check be given to them, the task of eliminating the poison from the blood is thrown upon the cells of the secreting surface of the kidneys or other internal organs, to the greater danger to life.

The rash and affection of the throat in scarlet fever are forms of inflammation; and the action in the glands about the throat comprises abscess and suppuration? Can these things be beneficial?

If a thorn pierce the flesh and remain there, inflammation and abscess ensue. The action loosens the foreign body, so that it can be easily removed. A slough cannot be detached without suppuration. In a comminuted compound fracture, loose pieces of bone are detached by inflammation, suppuration, and granulation. *Granulations* and *pus* are two forms of cell-growth (inflammation, abscess, and suppuration, are simply words applied to the attendant phenomena).

In severe boils and carbuncles, dead connective tissue lies beneath the living skin; and it is only by inflammation, abscess, suppuration, and granulation, that it can be loosened and discharged. The work is transacted without any loss of blood. Hundreds of blood-vessels are first sealed up; and then these

and other bonds of connexion are severed by the absorptive properties of the cells of granulations and pus; whereupon, the slough is easily removed, and the wound heals or is cured spontaneously.

In necrosis of bone, the meaning of inflammation and suppuration is the loosening and detachment of the dead bone. Here the work to be done lies deep beneath a mass of living muscles, and is necessarily an extremely difficult one, requiring assistance from the hands of the surgeon. Nevertheless, to the philosophical observer, the intent of the natural efforts is plain and evident. In this example, so difficult is the work, that a host of material is spoilt in it; hence the necessity of conduits or sinuses for its escape. Should the surgeon try to close these outlets and succeed, Nature resents his interference and speedily forms others; but if he remove the dead bone—even if it be with gouges, saws, and chisels—his interference is placidly accepted, and the whole chain of phenomena subside into cure, which includes the growth of a new bone.

Without further multiplying examples, it may be said generally: In all parts of the body, if dead and injurious matter is to be got rid of, inflammation, abscess, suppuration, and granulation, are the means. And if they are so, they are the means of cure. It is upon these visible examples of cure that we base the principle of Cell-Therapeutics.

In like manner, in fever, where hurtful matter must obtain outlet from the blood, some more or less pronounced form of inflammation, some unusual cell-production is observed. For what are the facts?

In small-pox, there are hundreds of abscesses in the skin, every one of them a focus of cell-growth. The blood is continually passing the abscesses or pustules; and it improves in quality, or becomes better fitted for its normal purposes, as they increase in size and fulness. Growth of the pustules and a beneficial change in the qualities of blood are concomitant events. For, if the maturation of the pustules be checked, the symptoms of the patient become worse. Therefore we say the cells of the pustules flourish and multiply by the absorption of morbid matter from the fluid of the blood. Similarly, in scarlet-fever, myriads of little foci of an unusual cell-growth are established with phenomena of inflammation in the skin. The exuberant morbid cuticle produced is composed of millions of adherent cells, whose growth is concomitant with a healthy change in the blood. With the change in the blood, the conditions which encouraged preternatural cell-growth are exhausted; the growth ceases; inflammation subsides; the morbid cuticle exfoliates or sloughs off; and the patient is cured.

No distinction can be shewn between the cells of laudable pus—those of a healthy suppuration, which are loosening and fitting for discharge a foreign body, a slough, or dead bone—and the deep cuticular cells of the skin which, in scarlet fever, in their outward progress, multiply and grow upon morbid elements in the fluid of blood. Nor can any difference be shewn between these cells and those which exfoliate in abundance mixed with the mucous discharges from the throat and nose. The doctrine of cell-therapeutics is illustrated and confirmed by phenomena of exanthematous fever.

In scarlet fever, it is exemplified in exfoliation of the morbid contagious cuticle, which is established by rash on the skin; and the rash is a form of inflammation.

These are reasons why no one thinks of curing, in the sense of suppressing, the pustules of small-pox, or inflammation in the skin in scarlet fever. And when the submaxillary glands swell and inflame and tend to abscess, it is well known to be wrong to re-

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sort to strong measures to suppress it. These outward manifestations, so far from constituting the disease, are actions necessary to the cure of the disordered blood. It is in harmony with our doctrine that, in all cases of scarlet fever where there are no complications, experience has shewn that nothing more is necessary in the medical treatment, than :

To keep the patient warm in bed, in a well-ventilated, airy chamber; to relieve him—having reference to the work going on in the blood—from pain, restlessness, and other discomforts;

To take precautions that the diet be cooling and simple;

To watch and regulate the function of all those organs which give outlet to excretory matter from the blood—the skin, kidneys, lungs, and bowel; and to guard against the spread of contagion.

The sequence of events in the blood in scarlet fever, as we have described it, is natural and logical. A poison in the air causes disorder of the corpuscles of blood; disorder of the corpuscles causes distemperature or impurity of the fluid in which they swim; and impurity of the fluid of blood causes unusual cellular growths, with phenomena of inflammation, the cellular growths discharging the impurity.

It corresponds with the order of the symptoms as they come on and as they go off. At the onset, fever precedes the rash, and the rash precedes exfoliation of the cuticle; and, in the going off, fever subsides when the rash is at its height, and the rash subsides when the morbid cuticular growth has performed its task, or is prepared for exfoliation.

But it is to be observed that, in proportion as disorder of the corpuscles diminishes by their throwing off morbid matter, in like proportion impurity of the fluid of blood is increasing, and the fluid of blood recovers its normal condition in proportion to the activity of the local cell-growth which flourish upon the morbid matter in it.

Relief of the corpuscles devolves a pathological state upon the fluid of the blood; and relief of the fluid devolves a pathological state upon the skin, upon the skin and throat, or upon the skin, throat, submaxillary glands and kidneys. That is to say, cure of the corpuscles transfers morbid matter to the fluid of the blood; and cure of the fluid of blood involves the transference of morbid matter from it to some local part by the agency of cells. These statements contain no more than the received physiology of blood. In respiration, the corpuscles transfer poisonous matter—some form of carbon—to the air; and a healthy state of the fluid involves the transference of poisonous matter—urea—to the kidneys. And here is the most important point of this discussion.

We must recognise the mixed character of the actions of cure. They are physiological and pathological at the same time. The pustules of small-pox are physiological to the blood, but pathological to the follicles of the skin; as shown by the deep pits and scars remaining after cure. The rash and double cuticle of scarlet fever may be regarded as disorder to the skin, but healing to the blood.

In fever, one part recovers at the expense of another. The corpuscles of blood infected by an aerial poison recover at the expense of the liquor sanguinis; and the liquor sanguinis recovers at the expense of some local part.

These observations have their bearing upon the affection of the throat in scarlet fever. There can be no doubt of this being part of the critical actions in that species of fever. If so, it is physiological to the blood, but pathological to the throat itself; and we must preserve the power, or relieve the pain, of swallowing. According to our view the object of

gargles, poultices, warm fomentations, leeches, or a blister, as applications to the throat, is not to cure the inflammation, and thereby suppress the increased mucous discharges from it; but to moderate and limit the actions going on with reference to the comfort of the patient in swallowing. This being done, cure of the throat will take place with cure of inflammation in the skin; and cure of inflammation in the skin takes place when the fluid of the blood has rendered up its morbid material.

It would be to ignore the teaching of the microscope, did we hesitate to declare our conclusion. Cure, whether of external injuries or of scarlet fever, is wrought by cells with characters as fixed and specific as any of the other things of Nature. No person, at his will, can command the growth of skin or bone, or furnish a safe outlet for poisonous matter in the blood. Nevertheless, these things are accomplished; and our researches point out the agents employed; viz., various broods of cells.

The physician and surgeon each in his department can watch and, in a measure, regulate the work—remove hindrances; promote or moderate, encourage or discourage, the preliminary actions; but the essential elements of cure—cellular bodies with their rapid multiplication, growth, metamorphoses, and deep interior vital properties of selective absorption—are not producible by manual art or physic.

The orderly course of the majority of cases of scarlet fever—the fixed characters and place of the local actions, and the relief which these afford to the patient when not exceeding their proper limits—demonstrate that the disease has a specific method of cure. It requires vigilant medical supervision, because of the mixed nature of all the actions of cure—partly physiological and partly pathological; and because of the difficulties and complications so apt to arise.

The history of every outbreak of the disorder shews how various these complications are in different persons; how they protract or interrupt the actions of cure; and how often they cause its failure. These complications spring up from various quarters. Usually they will be found based upon one or other of the following grounds.

Because some previous malady in former years has crippled an important organ, and thereby entailed upon the individual what is called “delicacy of constitution.”

Because, from unwholesome diet or overcrowding in unwholesome air, the blood is impoverished and weak at the onset of fever.

Because a chill or other accident has interrupted the specific local action and its cellular exfoliations; or,

Because, from some degenerate anatomical lesion, spoiled matter has ebbed back into the liquor sanguinis, and, redisturbing the corpuscles of the blood, has renewed symptoms of fever.

What is meant by the crippling of important organs as a source of complication in fever?

If a child be severely burnt about the face and neck, the wound occasioned by the injury heals; cure is effected; but an ugly scar remains, which is permanent, and greatly circumscribes the movements of the head or mouth. Similar things may be said of a severe burn at the elbow or upon the fingers.

A comminuted fracture may be cured; but the injured limb never recovers the strength of the sound one. If a fracture pass through a joint, the injury may be cured, but the joint never recovers its natural mobility.

Pleurisy and inflammation of the lungs are cured; but the respiratory organ does not recover its pristine condition.

And so most other internal maladies may be cured, and yet the organ the seat of them never recovers. Cure and recovery are terms of different meaning.

All the most recent pathological investigations demonstrate in every internal malady, particularly in children, that, though one organ or texture has suffered more severely than the rest, from which therefore the disease derives its name and most prominent features, yet it is not there that the whole disorder is found. Anatomical changes are not confined to that organ, but are more or less extensively present in others also. When, therefore, we speak of infants dying of teething, convulsions, or pneumonia, or of youth dying of measles, hooping-cough, or scarlet fever, it is necessary to bear in mind that these designations or words convey no information whatever as to the ramifications of the disorder. It is from examination of the dead that we see, besides the organ from which the chief symptoms of the malady arose, that several others are the seat of minor anatomical changes which contributed to the fatal issue.

This fact being demonstrated in the fatal forms of illness, there is no reason for doubting it in the more numerous cases where health is regained. On the contrary, there is every reason to conclude that what are called complications and sequelæ of fever are the more prominent of these minor anatomical changes gaining strength and evolving symptoms.

When, then, we discourse of infants recovering from teething, convulsions, or pneumonia, or of youth recovering from measles, hooping-cough, or scarlet fever, it must be borne in mind the term recovery can mean no more than the relief of the patient from the chief malady and all its pronounced collateral anatomical lesions. Things latent—anatomical changes which give no sign—may, with the recovery, return to their natural state; but it does not necessarily follow they do so. On the contrary, the permanent scars and crippling which remain after the cure of severe burns or other surgical injuries, and the pittings of the skin in small-pox, render it almost certain that what is called "delicacy of constitution" is the expression of the non-recovery of one or more important internal textures which have been cured of the malady that affected them, but which have not been restored to their free natural state. As when pleurisy has been cured, but the lung does not recover, it remains adherent to the wall of the chest; or as when rheumatic fever is cured, with permanent thickening of the coverings of the heart, or pneumonia cured, with consolidation in some part of the lung. All these and such like conditions are positive grounds for more or less constitutional infirmity; they are important items in the history of future fever, and give aptness to the popular saying: "he has never been well since the measles, hooping-cough, or scarlet fever." Organs in these weakened conditions may not betray their weakness by moderate using, but if put to the slightest unusual stress, the defect is proclaimed.

"I do not exaggerate," says an eminent pathologist, "when I state that four-fifths at least of the old men, whose organs I examine after death, present evident incontestible traces of disease, not of recent disease, but of a former malady." Again, another says: "It is not after birth only that man, for the first time, experiences those maladies which afflict his race. Their origin must be sought in a remoter source. They commence with organisation; and the annals of medicine present a number of facts which attest that children may be born healthy, sick, or recovered from former disease." In the Children's Hospital at Vienna, it is calculated that not more than 20 per cent. of the inmates are free from some

form of constitutional infirmity. Whenever the nutrition of the child has been imperfect, disorders associated with poverty of blood become widely diffused, materially influencing the mortality at an early age, and if the age of childhood be survived, affecting the future health of youth and manhood.

When, then, we speak of a patient being cured, or of his recovering, it is necessary to agree upon what is meant by the words. Cure does not mean that all the organs or textures implicated in the disorder—all the anatomical changes incident to it—have returned to their natural state; for, though we may presume, we cannot know in the living body that such is the case. No affirmation can be made respecting thickenings, scars, puckering, and cicatrices, in internal organs, which have no present symptoms other than those comprised in the terms delicacy of constitution.

The term recovery is applied to persons who have regained health sufficiently to return to their accustomed avocations; and the physician dismissing his patient hazards no opinion about the state of organs which give out no symptoms, but which, nevertheless, may be a source of complication, should hereafter scarlet fever make its attack. These observations receive illustration from the history of scarlet fever itself. It frequently happens the patient to all appearance has recovered, but the kidneys have not regained their natural state; a little time elapses, and their weakness is proclaimed by dropsy—the dropsy depending upon the enfeebled condition of the kidney, and the enfeebled condition of the kidney arising from the just passed fever.

Lastly, as regards these internal anatomical disablenents, it has been remarked of external wounds which have healed and cicatrised—that is to say, have been cured—that when subsequently fever or other maladies arise, the scar of the old wound is very apt to become painful, and a focus of renewed inflammation. Forms of inflammation are necessary to the cure of exanthematous fevers, and an internal puckering or cicatrix may complicate the course of scarlet fever, by taking on some irritative morbid action. Sanitary proceedings and dietetic rules will not efface the permanent marks of the cure of former maladies, nor restore to their natural vigour damaged organs.

MR. LAWRENCE AS SKETCHED BY SIR B. BRODIE. From that time to the present, Lawrence and myself have been moving in parallel lines; and it may be regarded as somewhat to the credit of both of us that there has never been any manifestation of jealousy between us. When a young man, he had some faculties in great perfection, and he has them still, but little (as far as I can see) impaired by the addition of fifty years to his age. He has a great memory. He has considerable powers of conversation, but without obtruding himself to the exclusion of others, as is the case with too many of those who are reputed to be good talkers. What he says is full of happy illustrations, with, at times, a good deal of not ill-natured sarcasm. In public speaking, he is collected, has great command of language, and uses it correctly, but not equal to what he is in the ordinary intercourse of society. In writing, his style is pure, free from all affectation, yet in general not sufficiently concise. His reading has been extensive; he is well acquainted with modern, and moderately so with the ancient, languages. His professional writings contain a vast deal of information, but it is more as to what he has taken from other authors than as to the results of his own experience and observation. (*Sir B. Brodie's Autobiography.*)