

surface, and just below the surface, very many different kinds of organisms even if it is visibly clean, and the number and variety of the possible germs is increased enormously if the skin be dirty. Then the pin itself may harbour microbes, and it is in this case pushed through the hair which is always teeming with them.

Some germs, however, are worse than others. Those which are known as streptococci, are not only very objectionable creatures, but are found almost everywhere, and we can have also such deadly organisms as the bacilli of tetanus or lock-jaw, which grows well in ordinary earth, or even of anthrax, which comes originally from animals, and may be found in infected hair and hides or wool. But whatever the nature of the germ, the most important factor is the degree of resistance that the body is capable of making to that germ. If the resistance be good, even very virulent germs may be killed or scotched before they can do any harm, and in weakly or unhealthy subjects even comparatively innocent organisms may give rise to a good deal of trouble.

We will assume, then, that the patient scratches his finger and that germs get in and begin to multiply. What happens? Well, there is a fight, and the organisms multiply and manufacture poisons, or toxins as they are called. To meet them, white blood cells, or leucocytes, are called up from various parts of the body, wherever they may happen to be, and are hurried to the affected part, by means of the excellent telephonic system of nerves with which the body is supplied. The fight takes place both at close quarters and from a distance. In the former method the germ and the blood corpuscle come into contact and one of them breaks up the other. More frequently, however, the duel is a chemical one. The germs produce a toxin and the blood cells an antidote to it, or antitoxin, and these neutralise one another, and any excess of either that remains goes on to poison either the germ or the leucocyte, whichever it may be. So the affected part is a battlefield, and the patient feels there the signs of the process that we know as inflammation, namely, redness, swelling, heat and pain. Now, one of two things happens. This first battle of the campaign must be won by one side or the other. If the blood cells win, the inflammation subsides and the rest of the body is unaffected. If the slaughter has been great the dead bodies of germs and leucocytes are cast out in the form of pus or matter, which breaks out through the skin and all is over.

But the germs may win the first battle, and we then have two results. Firstly, there is an

army of victorious germs ready to attack further and to penetrate deeper into their enemy's country—the system of the patient—and then there is a quantity of toxin which is poured into the patient's blood and makes him ill. The sign of the first process is that the inflammation is no longer limited to the original wound, but spreads to neighbouring parts and becomes more intense; there is more redness and swelling, and the pain probably (though not invariably, for a reason which we need not now enter into, as it is rather complicated) increases. Then, as a consequence of the entrance of toxins into the circulating blood, we get a rise of temperature, and, it may be, rigors—which are attacks of shivering together with a sudden rise in temperature to a considerable height—and such signs of general illness as headache, and, it may be, vomiting and diarrhoea also.

More leucocytes are now called up, and we get another series of battles, in which again either the germs or leucocytes may be victorious. If the body wins, the patient recovers after a good deal of local inflammation, and, perhaps, the formation of a larger quantity of pus, so that we get an abscess. If the germs win, we ultimately get such a quantity of toxin formed that the whole body is poisoned, and the patient dies from septicæmia, or blood poisoning, as it is commonly called. The series of battles may be either rapid or prolonged, so that the patient either dies straight off from a large dose of toxins or later on of exhaustion from the products of many different abscesses in various parts of the body, the latter condition being known as pyæmia.

Such is the general outline of the process. We will now study the details of the phenomena that take place on the battlefield. These vary a little according to the nature of the germ; if streptococci are present we may get one or more of three things. Either the skin itself suffers most, and we have the disease known as erysipelas (which, as we now see, is not so much a specific complaint as one sign of wound infection), where the skin is reddened around the wound, and this redness may spread like a wave from one part to another (often leaving abscesses behind it as it goes), or the germs multiply mostly in the loose tissue underneath the skin, and we have what is known as cellulitis. This is a far more serious condition than erysipelas, because inflammation is no longer limited by the hard skin itself, but can run riot in the loose connective tissue, where there is very little mechanical resistance, and can thus reach other parts of the body; moreover, the pus that is formed has to break through

[previous page](#)

[next page](#)