

show that certain tissue cells—of the liver, brain, etc.—elaborate them. It may be that in tuberculosis the muscle cells play some part.

So now to return to the case of pneumonia. Let us try to translate what happens there. Through some lowering of vitality the tissues of the air sacs, which in health can destroy individual bacilli, finding an entrance into the lungs, are overcome and the bacteria multiply and set up disturbance. Then the second line of defence comes into action—not so much the lung tissue itself as the leucocytes which belong to the general circulation blood. They make their way into the damaged area, are unable to take up diplococci in sufficient numbers and destroy them; on the contrary, they themselves tend to be destroyed, and the diplococci continue to multiply. In the meantime the poisons from the diplococci have diffused out of the air sacs into the blood and so are carried all over the body, and with this we have the development of high fever. And now the cells of other parts of the body take up these less concentrated poisons or toxins and taking them up proceed to manufacture counteracting bodies which neutralise, or help in the process of neutralization of the poison, and once they start to do this they continue and produce more of the antitoxic bodies, so much in fact that the excess passes into the blood and from the blood passes into the damaged lungs until the moment is at last reached when sufficient of these antitoxic bodies are present there to reinforce the action of the leucocytes and with this all the diplococci are killed and recovery ensues. I say reinforce the leucocytes for the leucocytes are developed largely in the marrow of the bones and the later relays of young leucocytes have, before they reach the lungs, become accustomed and adapted to the bacterial poisons, and thus are much more powerful than the earlier drafts of leucocytes which passed into the lung. These, aided by the fluid of the blood, are effective, the former were not. Hence it is through the general adaption of the tissues in the organism and not merely through local efforts that the body overcomes infectious disease.

Once one realizes that it is all so clear, and, if I may express it, so very human—so like, for example, what happened in the Boer War. There we had local irritation in one part of that vast organism, the Empire; local efforts were unable to quell the disturbances, and war flared up and there was great local damage and arrest of the normal local activities. It looked as though the part might be completely lost. The effects of this local disturbance rapidly diffused through and influenced the whole Empire and, like the leucocytes, soldiers were drafted to the seat of the irritation from all parts of the organism, even from distant por-