upper part of the lower lobe over an area about 3 inches in each diameter was solid, in part indurated, and non-crepitant. The lung tissue here was in the main dark in colour, smooth on section, and traversed by thickened bands of fibrous tissue along the bronchi, vessels, and interlobular connective tissue, and was also studded over with small rounded areas or nodules, some of which were composed of shreddy granular material, others had become purulent. In this consolidated portion of lung, about $1\frac{1}{2}$ inch below the apex of the lobe, was a cavity about 1 inch in diameter, containing broken-down lung tissue and shreds of flaky pus. This cavity communicated directly with a dilated bronchus, the walls of which were thickened, and its mucous membrane ulcerated. Into this cavity the opening made at the operation passed. The necrosed portions of the lung had only a slightly gangrenous odour. The bronchi throughout the lower lobe contained mucus, and their mucous membrane was thickened and deeply congested; but the striæ were visible, and they were not dilated. There were some recent adhesions over the left pleura. The left lung, which weighed 1 lb. 6 oz., was normal. There was slight atheroma at the commencement of the aorta. The liver showed a moderate degree of fatty change. The kidneys were deeply injected, especially the vessels of the cortex, boundary zone, and the Malpighian capsules. The spleen was very soft, almost diffident. The brain weighed 54 oz. The cerebral cortex and grey matter throughout were deeply injected; the other parts of the brain and the meninges appeared healthy. The vessels of the brain were normal and free from clot.

REMARKS.

From the point of view of clinical diagnosis the physical signs indicated consolidation of the upper part of the lower lobe of the right lung, with excavation proceeding in one part of the consolidated area. A most important symptom was the pronounced factor of the breath and expectoration. The quantity of the latter was also large. With regard to the fetid breath and expectoration, it was in the first place obviously due to affection of the lungs, and did not arise from the alimentary canal. Of the pulmonary affections in which this symptom occurs, general bronchiectasis with retained bronchial secretions is perhaps the most frequent, but bronchiectasis could be practically excluded by the history of good health and absence of any disease of the bronchi or lungs before the present illness, the onset of which was very very definite and sharply marked off from previous good health; there was, further, no evidence of aneurysm or tumour pressing upon a bronchus; the history and physical signs also excluded another possible cause—the rupture into a bronchus of an empyema with decomposition of the retained pus. There remained necrosis of the lung. Diffuse gangrene of the lung was negatived by the length of the illness, and the general condition of the patient. Putting all the features of the case together, the diagnosis made was that of localised necrosis with suppuration in the lung communicating with a bronchus. As to the direct cause of this necrosis, the history gave no evidence of lobar pneumonia, nor of inhalation of a foreign body, particle of food, etc., and consequent ulceration of a bronchus, so that it seemed probable that the cause assigned by the patient himself—the inhalation of sewer gas—was the correct one, and the inhalation of poisonous gases is known occasionally to give rise to necrosis of the lung.

The limited character of the disease rendered the case eminently suitable for surgical exploration, and the patient's death in the unexpected manner above related was very disappointing, for there was good reason to hope, as the area of necrosis and excavation had been successfully reached and free drainage established, and as his strength was well maintained and his general condition improving after the operation, that in time the necrosed tissue would have been eliminated and replaced by fibrous tissue, and that the patient would have made a good recovery. In favour of such a termination was the decrease during life in the extent of the consolidated (inflamed) lung around the diseased focus which followed the operation, and the *post-mortem* appearances, showing a limited area of disease confined to one portion of the lung, and the formation of fibrous tissue in and around it, pointed in the same direction.

THE METHOD OF DR. DE BACKER IN THE CURE OF TUBERCLE AND CANCER.

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THIS method is founded upon the discovery that certain of the lower forms of vegetable life, whose sole entity consists of a single cell, the saccharomyces, sugar fungi, or yeasts, possess under certain conditions the same phagocytic power as the leucocytes of the blood.

It was in 1892 that M. Bruhat, an analytical chemist at Paris, noticed, during a microscopical examination of some wine that had gone wrong, sent to him for analysis, that certain of the cells of the ferment (saccharomyces *Pastorianus*) contained englobed within them the bacillus *aceti*. He mentioned this curious fact to Dr. de Backer, and the two instituted a series of experiments with other bacteria, the result being that it was found that young vigorous cells of most species of saccharomyces were energetic phagocytes to all shapes and kinds of bacteria; and that the bacteria so englobed were killed by the nuclein within the cell, and finally digested by it.

It occurred to Dr. de Backer that if Metchnikoff's theory of immunity were the true one, what a splendid auxiliary to leucocytes these cells would be, if injected into the blood of animals, provided that these cells could exist in the blood and were themselves innocuous.

This was tried on guinea-pigs, but the earlier experiments were not encouraging; abscesses resulted, and the experiments were very nearly being abandoned. Fortunately, however, M. de Backer remembered that, up to that time, he had only employed the yeasts of commerce, which when subjected to analysis showed great impurities, upon which he then set to work to breed up a pure strain of one particular kind of yeast. The saccharomyces *cerevisiæ* was chosen for many reasons. A pure culture of this was injected, with aseptic precautions, into a healthy guinea-pig: this produced little or no effect. The next step was to inject a healthy animal with the pure culture mixed with a proportion of fermentable matter, previously sterilised, to see if the yeast cells would be able to multiply and carry out the function of fermentation within the system of the animal. The experiment was carried out in the following manner: An apparatus was constructed in the shape of a box, large enough to hold a guinea-pig or rabbit comfortably, but hermetically sealed except at two points, at each of which a glass tube, provided with a double bulb, was fixed; each bulb was half filled with chromo-sulphuric acid in such a manner that all air passing through the tubes must of necessity pass through the fluid in the bulbs. To one of these tubes a suction apparatus was applied; an animal was introduced into the apparatus and kept there several hours without food; no results were obtained. The animal was then injected with a dose of pure culture of saccharomyces *cerevisiæ* mingled with fermentable matter, and replaced; still without being fed. After some hours the bulbs at the outlet or suction tube showed the characteristic greenish colour of alcoholic reaction, whilst the bulbs of the inlet retained its original golden orange colour, showing plainly that the alcohol did not get in that way; hence the alcohol must have emanated from the animal, by its breath and perspiration, proving that alcohol had been generated by the action of the ferments within the animal economy. The animal itself seemed well after the experiment.

The next experiment that suggested itself was that of trying the injection of such a preparation (this combination of the pure ferment with sterilised fermentable matter soon acquired the name of "Backérine" in the laboratory, and now we generally use the term) into an animal, experimentally infected with a bacterial disease. Accordingly, a guinea-pig was inoculated in the ear with diphtheria, and an injection of Backérine administered subsequently. The results were astonishing—the little animal making a most perfect recovery. In the next experiment a longer time was allowed to elapse before the Backérine was administered; the animal was exceedingly ill, but eventually recovered. A long series of experiments were then made upon guinea-pigs rendered

artificially tuberculous, and here the results were so encouraging that Dr. de Backer determined to try the cure in the human subject.

In order to ascertain the effect of Backérine upon a healthy man, M. Bruhat offered himself for inoculation, and was injected in the flank by Dr. de Backer. At the end of five hours there was marked coldness or rigor, followed by abundant sweating. M. Bruhat went through all the stages of a mild intoxication, owing to the presence of alcohol and carbonic acid in the blood. At the end of three days all reaction had quite ceased, and no harm resulted.

After this, phthisical patients were treated by inoculation, with the result that in early stages the disease has been nearly always arrested. In phthisis of the second stage, with signs of softening, the cure or permanent improvement has been nearly 75 per cent.; in the later stages, the result much depends upon the amount of lung tissue remaining, and the vitality of the patient.

The question naturally arises: How do these ferments act? Are they specific against tuberculosis? The reply to this is negative. These cells come to the support and aid of the leucocytes (the natural phagocytes) and fight side by side with them in destroying the invading bacteria, and to quote M. de Backer's own words, "substitute a healthy, natural fermentation for one that is pathological."

It is not sufficient that the bacillus be only destroyed, for its dead body and its toxins have the power of dissolving the tissues and poisoning the system. The great point is to eliminate the microbe from the system before the bacillary intoxication becomes too much for it. The same principle is seen at work in the industry of wine making. It may happen that many thousand gallons of wine wort have turned sour, owing to the presence of bacilli (acetic, butyric, or lactic) yet all that is necessary to effect a remedy is to introduce a certain quantity of pure ferments into the wort: acetic fermentation is arrested, and the wort brought back to its normal fermentation. In this manner we may conceive the blood to be the wort, "the human must" as M. de Backer calls it, which is disturbed in its functions by Koch's bacillus just as the wine wort is disturbed by the bacillus aceti, and can be restored to its normal condition by a certain quantity of pure ferments.

Against the pathological fermentation in the body by Koch's bacillus no means of arrest has been known until now, but arrest has been effected again and again by means of these pure ferments furnished with proper nutriment.

The great condition of success is that they be absolutely pure, cultivated step by step from single cell, from culture to culture, shielded with all care from possible contact with any other organism, even that of a variety of its own species, carefully oxygenated before its final fermentation, as it will have to live an anaerobic existence in the body. Only young and vigorous cells are selected for the work, and these are furnished with their food supply and stored in specially prepared tubes.

Even if Metchnikoff's doctrine of immunity by phagocytosis be not entirely correct there can be no doubt that it plays a very considerable part, the other part being probably played by the nuclein of the cells. Here again we get an additional reinforcement from the yeast cell whose nuclein yields the same results to analysis as the nucleins of the animal cells.

In regard to cancer, that other terrible scourge of humanity, for which no cure is known, the treatment by pure ferments has given some astonishing results. To quote again from de Backer, "Out of a total of sixty tumours, we have seen eighteen cures lasting over some years. Of these four had been operated on, with rapid recurrence. Twelve cases of very rapid growth also had been very markedly retarded."

It may be asked, In what way do we explain and account for this curative action of pure ferments, there being as yet no evidence to prove that cancer is due to the action of any bacillus? The answer to this may be found in looking at the reasons that led Dr. de Backer to apply this method to such a disease. He found that the guinea-pigs used in a long course of experiments, and which lived together in full liberty during the time that injections of Backérine were being administered to them, by way of testing its innocuity, got fat,

but were generally sterile. In cases where impregnation occurred the foetus did not develop. In some animals that were killed, blighted embryos were found. He then conceived the idea that the sterility was due to "the lessened glycogenous material in the uterus," (a possible cause of sterility in the human being hitherto unsuspected).

It was known that cancer contains a very large proportion of glycogen in its chemical composition, and that this disease occurs in localities in which glycogen is normally present in large quantities (breast, liver, uterus, etc.). Hence the deduction was easy, that if ferments could materially lessen the natural glycogen of the body, they would probably have the power of checking the pathological increase of the same substance, and that the cancer cells which revel and luxuriate in its presence would starve, and the whole tumour shrink. The researches of M. Brault have recently proved that the rapidity of growth in a tumour is in direct proportion to the amount of glycogen contained in it; probably from the fact that the cells are enclosed in a medium too rich in glycogen, and so proliferate luxuriantly without order, symmetry, or selection, and this constitutes a neoplasm.

The whole account of the method, and its application to diseases due to the action of bacteria, may be found in a work by Dr. de Backer in collaboration with M. Bruhat and Dr. Charlier entitled, *Les Ferments Thérapeutiques*, published by the Société des Editions Scientifiques, Paris. A further account of cancer, with cases, is given in a pamphlet by Dr. de Backer, *De la Cancérose et de son Traitement par les Ferments purs*, Imprimerie Daix Frères, Clermont (Oise).

WANDERING OEDEMA.

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THE case described by Mr. Masterman, of Damascus, in the BRITISH MEDICAL JOURNAL of April 3rd, is an interesting and typical instance of an affection which, though by no means rare, in the tropics at all events, has attracted comparatively little attention. It cannot, however, be called "a new disease," for several previous observers appear to have noticed this malady, to have assigned to it different positions in nosology, and to have described it under different names. They have generally taken it to be a variety of urticaria; but, in the absence of more evidence as to its causation and pathology, the term "wandering oedema"—descriptive of the principal and characteristic symptom—is a good one, and none of its previous titles appear to fit it so accurately. Owing to the peculiarity of the oedema, the uncertainty as to its progress, and the anxiety as to its suddenly attacking dangerous and vital organs, the malady is an important one, and merits more attention than it has received.

Four cases have come under my own observation, and in all of them the symptoms were practically the same. The onset of wandering oedema is characterised by pain in one or both feet, which is generally referred to the plantar fascia, and the ligamentous structures about the metacarpophalangeal joints. The pain is described as being of a heavy, dull, burning character, and at first simulates very closely the onset of an attack of gout. After an hour or two, however, the pain subsides, and it is noticed that the foot is swelling round the parts where it has been most severe. Relief is, in fact, afforded by effusion. The oedema is sometimes excessive, but is always, at first, local. Later it shows a tendency to spread up the limb, and, coincidentally with its change of position, the lower swelling subsides. By the time the knee is reached the foot is free from oedema. The skin of the parts that have been affected retains a peculiar boggy feeling, with numbness and loss of sensation for some days afterwards. About twelve hours after the feet have been attacked the knuckles and wrists become painful, and the same train of symptoms occurs in the upper limbs. The oedema is, however, generally less marked, and does not appear to reach the elbow so frequently as it extends to the knee in the lower limb. As this, in its turn, subsides, pains are felt in different parts of the body, which are, in the same way, followed by localised oedemas. The scalp, the cheeks, the lips, the skin, and subcutaneous tissue of the abdominal