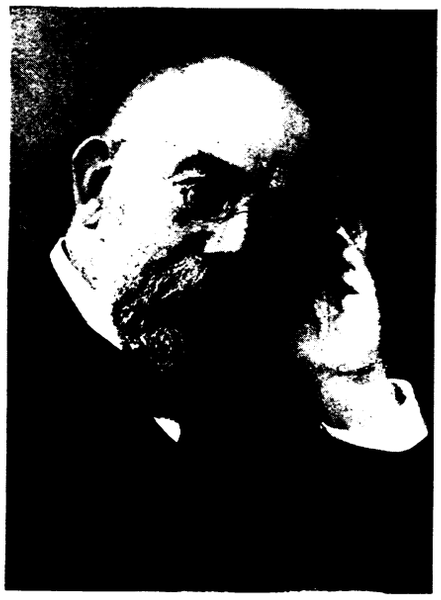

ROBERT KOCH (1843-1910)
German Bacteriologist, discoverer of the tubercle bacillus.

brown and the tubercle bacteria are stained a sprightly blue.

Although the bacteria are not indeed dyed exclusively by methylene blue, but take up other aniline dyes, with the exception of brown dyestuffs, under the simultaneous action of alkalies, yet the color with the others is not so beautifully developed as with methylene blue. Moreover the caustic potash may be replaced by caustic soda or ammonia, from which it appears that the potassium does not play an essential role, but only the strongly alkaline nature of the solution is necessary. Therefore it might be said that with a still stronger alkaline content some bacteria might be colored which in a weaker solution would not appear. But the tissues of the section would shrink and change so much under the influence of a stronger caustic solution that the latter would only occasionally be of advantage.

The bacteria made visible by this procedure show a peculiar behavior in many respects. They have a rod-like shape and so belong to the group of bacilli. They are very thin and from one-fourth to one-half as long as the diameter of a red blood corpuscle, occasionally they may reach a greater length, up to the full diameter of a blood corpuscle. In shape and size they show a striking resemblance to the lepra bacilli. But they may be distinguished from the latter because they are a little more slender and pointed on the ends. Also the lepra bacilli take up the coloring if you use Weigert's nuclear staining, while tubercle bacilli do not. In all places where the tuberculous process is found in fresh onset and in rapid development, the bacilli are found in great numbers; they then usually appear grouped closely together and often tied together in little bundles which many times lie in the interior of cells and here and there present a picture like that of lepra bacilli heaped up in the cells. Nearby also occur many free bacilli. Especially at the edge of great cheesy masses are found only numbers of baccilli which are not enclosed in cells.

Fewer After Crisis

As soon as the climax of the tuberculous eruption is past, the bacilli become fewer, are found only in little groups or entirely isolated around the edge of the tubercular lesion near weakly colored and here and there scarcely recognizable bacilli which probably are in the act of dying or are already dead. Finally they can disappear entirely, yet they are seldom completely missing and then only in places where the tuberculous process has come to a standstill.

If giant cells appear in the tubercular tissue, the bacilli lie chiefly in the interior of these structures. In tubercular infections progressing very slowly the interior of the giant cells is usually the only place where the bacilli may be found. In this case most of the giant cells enclose one or a few bacilli and it makes a surprising impression to keep finding in widely separated thin sections always new groups of giant cells, in which almost every one holds, in the large enclosed space around brown-stained nuclei, one or two tiny blue rods floating almost in the center of the giant cell. Often the bacilli are to be found only in small groups of giant cells, often only in single specimens, while at the same time many other giant cells are free from them. In that case those containing bacilli are the younger giant cells, as may be known from their size and position, while the bacilli-free are older, and it may be assumed that the latter also originally contained bacilli but that they are dead or have gone over into the dormant condition soon to be described. By analogy with the formation of giant cells around foreign bodies, such as vegetable fibers and *Strongylus* eggs, discovered by *Weiss, Friedlaender* and *Laulamié,* one may imagine the relation of the giant cells to the bacilli such that here too the bacilli are taken up by the giant cells (*Please turn page*)

EVOLUTION

Ice Water Possible Cause Of Evolutionary Speeding

ICE WATER in large doses, following the melting of the great continental glaciers, may have been an indirect cause of the speeding up of evolutionary changes that seem to have followed each of the earth's great ice ages. This is one of the suggestions arising out of the researches of T. Cunliffe Barnes of Yale University.

To this might be added the speculation that a like effect may be operative more or less constantly in frosty northern lands, where evolution seems to be more rapid than in the languid, conservative tropics. Each winter, a miniature ice age, may give a little push to evolution, just as a glacial epoch may have given a big push.

The research on which these suggestions are based was conducted with *Spirogyra,* a microscopic green plant common in sluggish fresh waters. Growths of equal size were started in each of three kinds of water. One was water in which most of the molecules of H_2O are free and unattached—a state most nearly fully attained in steam. The second kind was "common" water, in which most of the H_2O groups are bound together in paired molecules. The third was "trihydrol" water, with its H_2O groups predominantly three in a bunch. Ice is richest in trihydrol, but water from recently melted ice also contains large numbers of trihydrol molecules. Mr. Barnes found that by far the most vigorous growth of his *Spirogyra* cultures took place in trihydrol water.

Whether trihydrol consumed by human beings in the form of ice water will make them grow faster, or have any other effect on their health, is not stated.

Mr. Barnes is at present working on the effect of trihydrol on some of the simpler animal forms, and expects to report in a future publication.

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