HEALTH MATTERS.

An Industrial Use of Microbes.

DR. NEILSON of Norway says that the Norwegian fisher-folk have for more than five hundred years used pathogenic bacteria in catching whales. A few miles from the town of Bergen there is a narrow inlet of the sea, into the mouth of which whales make their way every season. As related in the *Sanitary Inspector*, when a whale is discovered in this place, the alarm is given, and the fishermen put out in their boats, drive the whale farther up the narrow bay, and stretch a net across the mouth of the inlet. Through this the monster could easily break, but he does not. Then they proceed to capture him and bring him to land. The animal, however, is twenty or thirty feet long and very strong, and with their primitive implements alone this cannot be done. They therefore inoculate the whale with the poison of an infectious disease, and only after he is weakened as the result of the disease do they try to kill him. After the whale has been enclosed, the bowmen put out, and, when he comes to the surface to breathe, they shoot infected arrows into him and withdraw. After twenty-four or thirty-six hours the whale becomes less lively in his movements, and comes to the surface often to breathe. Then the real battle begins, and, after driving ten or twelve harpoons into the whale, the fishermen are able to land him. An examination of the places where the arrows were shot into the whale shows, in the immediate vicinity of some of them, a hemorrhagic infiltration of the muscular tissue, resembling very much the disease of land-animals called "sympathetic anthrax." The internal organs are normal. Once only Dr. Neilson found a bacillus in the blood-vessels of the spleen. Around the poisoned wounds vast numbers of a bacillus are found closely resembling that of sympathetic anthrax. When the arrows are pulled out of the wounds, many of these bacilli cling to them, and thus render them effective as "death-arrows" when further used. And thus the catching of whales goes on year after year, and has gone on for five hundred years. Dr. Neilson inclines to the opinion that the infection is the same as that of sympathetic anthrax, and hopes that later investigations may clear up the point.

Cocoanut-Water as a Culture-Fluid.

Dr. George M. Sternberg, writing in the *Medical News* of Sept. 13, 1890, says that he has used the juice of the unripe cocoanut as a culture-fluid, and found it very satisfactory. The idea occurred to him during a visit to Cuba that this fluid might be a useful culture-medium for bacteria, and upon making the experiment it was found that various species grew in it most luxuriantly. As it is contained in a germ-proof receptacle, no sterilization of the fluid is required when it is transferred with proper precautions to sterilized test-tubes, or is drawn directly from the nut into the little flask, with a long and slender neck, which is used for fluid-cultures. In these it may be preserved indefinitely, remaining perfectly transparent and ready for use. Heating the fluid causes a slight precipitate. In the investigations which have been made in Havana during the past two years, this fluid was used very extensively, and it was found a great convenience to have a sterile culture-fluid always at hand, ready for use at a moment's notice. Moreover, it has certain special advantages for the study of the physiological characters of various bacteria, and for the differentiation of species. It contains in solution about four per cent of glucose, in addition to vegetable albumen and salts, which alone would make it a useful nutrient medium. Certain micro-organisms multiply in it without appropriating the glucose, while others split this up, producing an abundant evolution of carbonic acid, and giving to the fluid a very acid re-action. As obtained from the nut, it has a slightly acid re-action, which makes it unsuitable as a culture-medium for certain pathogenic bacteria, but when desired it is a simple matter to neutralize it. For a large number of species of bacteria, and for the saccharomycetes, it constitutes a very favorable medium.

Micro-Organisms in Great Cities.

Professor Tarnier, in a course of lectures in 1890, referred to M. Miquel's researches on the relative abundance of micro-organisms in different places (*The British Medical Journal*). One to the cubic metre of air is the proportion at the top of a high mountain. It is stated in the *Medical Record* of Feb. 7 that in the Parc de Montsouris, in the south of Paris, M. Miquel found 400 micro-organisms to the cubic metre of air, while in the Rue de Rivoli the proportion was 3,480. In a new room in the Rue Censier he found 4,500 to the cubic metre; more, that is to say, than in the centre of Paris in the open air. In a room in the Rue Monge he counted 36,000, in the Hôtel Dieu 40,000, and in the Pitié, an older hospital, 319,000, micro-organisms to the cubic metre. At the Observatory, Montsouris, 650,000 microbes were found in a gram (15 grains) of dust; in the room in the Rue Monge the amount was 2,100,000. In the hospitals the proportion was so high, that counting the number of microbes in a whole gram of dust was found to be impossible. The dust is the great conveyer of micro-organisms. A 2 A.M., when a city is most quiet, the fewest germs are to be found in the air; at 8 A.M. the industry of domestic servants and dustmen has already made the air teem with germs; at 2 P.M. the proportion has again greatly fallen; at 7 P.M. it is once more high, for many houses are being "tidied up;" besides sundry kitchen operations are unhygienic. Thus the "small hours," unfavorable in many respects to patients hovering between life and death, are the least septic of the twenty-four. The day proportions indicate that household duties cause more septic diffusion than is excited by traffic and industry.

The Milk of the Egyptian Buffalo.

According to the researches of Messrs. Rappel and Richmond, of the Khedival Laboratory, Cairo, the milk of the Egyptian buffalo, or gamoose (*Bos bubalus*), presents several characteristics distinguishing it from that of the cow, which may well be remembered by medical men who have to treat patients, especially infants, in Egypt or in other countries where this animal is common. The amount of fat, as we learn from the *Lancet* of Aug. 23, 1890, was found to be a good deal larger than in cow's milk, the percentage in the specimens examined varying from 5.15 to 7.35. The sugar, which appeared to be a hitherto undescribed variety, differing from milk-sugar, was also found to be of larger amount than that in cow's milk, the average percentage being 5.41. It is suggested that this sugar should be called *tewfikose*. The fat, too, was found to differ from that of cow's milk, containing minute quantities of sulphur and phosphorus, and yielding four times as much caproic acid as butyric acid, whereas in cow's milk the quantity of caproic acid is only double that of butyric acid. The milk was also found to contain a small quantity of citric acid.

The Chemistry of the Tubercle Bacillus.

At the clinic of Professor Nothnagel a very interesting investigation on the chemical composition of the tubercle bacillus, says the *Lancet*, has been carried out by Dr. Hammerschlag, who had commenced his studies on the bacillus at Professor Nencki's chemical laboratory at Berne. Two analyses of two different culture series were made. The cultures were 0.2 to 3 months old, and 7.5 and 2.2 grams moist bacteria were obtained for the analyses. They contained between 88.7 and 83.1 per cent water, between 28.2 and 26.2 per cent substances soluble in alcohol and ether; i.e., lecithin, fats, and a poisonous substance which, injected subcutaneously into guinea-pigs, produced clonic spasms of the muscles, acceleration of pulse and respiration, and finally general convulsions and the death of the animal from twelve to fifty-one hours after the injection. The residue which remained after the extraction with ether and alcohol contained an albuminoid body and cellulose: therefore the tubercle bacilli seem to differ from other bacteria by the high percentage of substances soluble in alcohol and ether, as they contain between 26 and 28 per cent, while bacterium termo contains only 7.3, Friedländer's diplococcus only 1.7, and the bacillus anthracis only 7.8 per cent. It has been found that the presence of carbohydrates and glycerine is necessary for the growth of the bacilli, and that albumens alone are not sufficient as nourishing media for the tubercle bacillus, which differs thereby from the other bacteria. By experiments on rabbits, it was proved that a poisonous albuminoid body

is formed in the cultures by the bacilli, which (the dose used varied between 0.2 and 0.4 of a gram) produced, a few hours after the injection, a rise of temperature amounting to 1° or 2° C., lasting for one or two days, without any other effect even after repeated injections. The glycerine bouillon cultures lost their virulence on being kept for eight months at a temperature of 39° C., but they retained their vital activity. In experiments made on animals with such cultures of eight months' standing, only negative results were observed with regard to the production of immunity in animals by such cultures; and Hammerschlag, Falk, and Charrin have failed to produce a protective inoculation.

Physical and Chemical Changes in the Blood in Disease.

Dr. Sciolla of Genoa, at the Congress of the Italian Society of Internal Medicine, reported some interesting experimental researches on physico-chemical changes of the blood in different morbid conditions. He stated, according to the *Lancet*, that the density of the blood diminishes during acute febrile states and the first stages of convalescence, increasing afterward with greater or less rapidity according to the nature of the disease. The same thing is always observable in the density of blood-serum, with this difference, that it begins to increase as soon as there is any improvement in the condition of the patient; sometimes, indeed, a short time previously. The density of the serum is increased in malaria, while that of the blood is diminished. Tuberculous affections, unaccompanied by serious alterations of the blood, only slightly modify the density of blood-serum and blood. The densities of blood-serum and blood are both diminished in catarrhal jaundice, probably owing to defective assimilation of food. The density of the blood is almost normal, while that of the serum is increased, in cirrhosis of the liver and in cancer of the gall-bladder. The densities of blood and serum are not sensibly diminished in benign forms of diabetes. The greatest diminution in the density of the blood is observable in diseases accompanied by grave morbid changes of the blood. The most striking examples were those seen in three fatal cases of pneumonia. Dr. Sciolla also observed the chemical modifications of the blood in pneumonia, typhoid-fever, malaria, anæmia, and in leucæmia. About the fourth or fifth day of croupous pneumonia there is a marked diminution in the albuminoid substances of the blood, especially the globulin. The extractive matters increase during the febrile period. In convalescence the quantity of albuminoids, especially of the globulin, and also that of the serin, increased. The dry residue of the blood is not much diminished during the first stage of the disease, but it so during the second stage, and continues less until convalescence. In typhoid-fever the albumens of the blood diminish progressively (unless the diarrhœa is excessive), and this diminution occurs at the expense of the serin. The extractive matters gradually diminish during the whole of the febrile period, and even during the early stage of convalescence. In malarial fevers the amount of the albuminoids in the blood-serum (especially the serin, and in a less degree the globulin) and the dry residue of the blood diminish rapidly, while the dry residue of the serum and the extractive matters of the serum increase with the duration of the fever,—the former in a slight degree, the latter enormously. In chloro-anæmia the albumens of the serum (especially the globulin) and the dry residue of the blood diminish, while the dry residue of the serum increases. In leucæmia the amount of dry residue of the serum is very high, and the albuminoids of the serum are also above the normal, the serin being especially increased.

NOTES AND NEWS.

THE expedition which is to be sent in the spring to the west coast of Greenland, by the committee of the Karl Ritter Endowment, is likely to be one of considerable importance. The chief of the expedition, as we learn from *Nature* of Feb. 5, will be Dr. E. von Drygalski; Dr. O. Baschin will accompany it, defraying his own charges; and there will be a third scientific expert, who has not yet been selected. Dr. von Drygalski proposes to establish a station near the Umanackfjord, in about 70° 30′ north latitude, where Dr. Baschin will carry out a continuous series of meteorological observations, and from which he can make long or short excursions inland to study the interior ice. It is expected that the party will remain in Greenland about a year.

— Two Frenchmen, Dr. Besson and Père Tulazac, have succeeded in making the first ascent to the summit of Ambondrombo, dreaded by the Betsileos as sacred, or *tabu*. They, however, found five Betsileos willing to accompany them to the top. According to the January "Proceedings of the Royal Geographical Society," the party started from Amboasary, the nearest village to the mountain, and reached the summit in seven hours. Axes and knives had frequently to be used to clear the way. The mountain is rugged and wooded, reaching a height of 6,234 feet. The party had to cross many ravines during the ascent.

— From Dorsetshire, England, a singular instance of starlings being eaten by rooks is reported (*Nature*, Feb. 5). It seems that during the very severe weather there this winter, a flock of starlings was observed on a farm at West Stafford, near Dorchester, followed by a number of rooks in hot pursuit. The larger birds soon came up with their prey, and quickly despatched them, and, after stripping them of their feathers, devoured them then and there. When the scene of the occurrence was inspected just afterwards, the ground was found to be strewn with their feathers, but beyond these not a vestige of the starlings could be discovered. It seems that the rooks, from sheer hunger, must have been driven to this extremity, owing to the scarcity of other kinds of food.

— A method of repairing incandescent lamps, the invention of a M. Pauthonier, is described in a recent number of *L'Electricien*. The lamp to be repaired is first taken to a glass-blower, as quoted in *Engineering* of Feb. 6, who pierces a hole in the bulb sufficiently large to allow of the old filament being taken out and a new one inserted. From the hands of this workman the lamp passes to a second, who cuts off the ends of the broken filament and removes it, taking care, however, at the same time to leave about one millimetre of the filament at each of the platinum electrodes; and it is to these short lengths of the old filament that the new one is welded. This is done by filling the bulb with a liquid hydrocarbon, after which the new filament, which has been previously standardized, is introduced. One end of the filament is then pressed against the fragment of the old one already referred to, and a current passed through the joint. The hydrocarbon is decomposed, and a deposit of solid carbon occurs round the joint, and securely fastens the new filament in place. The other end of the filament is joined to the other electrode in the same way. The next process is the bleaching of the glass, which is so thoroughly done that the glass of the repaired lamps is said to be more brilliant and transparent than that of perfectly new ones. The repaired lamps are said to last quite as long as new ones, to which they are in no respect inferior. The process is said to be peculiarly adapted to the repair of lamps of the "Sunbeam" type.

— To stimulate the collection of photographs to be used in showing the need of improved roads in the United States, the Connecticut division joins the New York division of the League of American Wheelmen in offering three prizes aggregating $100, as follows: one prize of $50 for the best collection of not less than three photographs, one prize of $30 for the second best collection of not less than three photographs, one prize of $20 for the third best collection of not less than three photographs. There are wanted photographs showing the common spectacle of the farmer's team and wagon, hub-deep and knee-deep in the muddy road; photographs showing rough, rutty, and muddy roads in their worst condition; photographs showing the every-day break-down caused by rough or muddy roads or steep grades; photographs showing smooth, hard-surfaced roads and (if possible) teams hauling loads over the same; and other pictures illustrating the goodness of good roads and the badness of bad roads. The prizes will be awarded before May 15, 1891. Further information will be furnished on application to either Isaac B. Potter, 278 Potter Building, New York, N.Y., or Charles L. Burdett, Hartford, Conn.