

is not obstructed by land, and therefore spreads more readily, leaving open water for the ships to pass through. Whalers and sealers are carrying on a successful hunt in the Antarctic Ocean, and undoubtedly an expedition would open new grounds to them. It is to be hoped that the interest in antarctic exploration which manifests itself in all parts of the world will lead to a new period of discoveries in the ice-bound seas of the south pole.

HEALTH MATTERS.

Distillery milk.

THE raid made by the officers of the New York board of health, on the cow-owners who bring milk to the city from animals fed on distillery swill, has awakened a new interest in this subject, which *Science* has discussed for the past two weeks.

For the benefit of those who are not informed, it may be well to explain what distillery swill is, and why it is regarded as objectionable food for milch-cows. In the manufacture of whiskey from rye, wheat, or Indian-corn, the ground grain, together with malt, is placed in a tub with hot water. The diastase present in the malt, acting as a ferment on the starch of the grain, changes it into glucose. After cooling, yeast is added, and fermentation takes place, resulting in the conversion of the glucose into alcohol and carbonic acid. The contents of the tub are then placed in a still and the alcohol is distilled off. The refuse is distillery waste or swill. In the above process, most of the starch has been changed into glucose. The swill contains a small amount of starch, together with cellulose, gluten, and some dextrine. The quantity of water in swill is very large, varying from seventy-five to ninety-five per cent.

It will be seen from the above statement, that, in order to get a sufficient amount of nutriment, a cow feeding on distillery swill must take into the stomach a very large amount of this waste, so large a proportion being water, and that in so doing the amount of carbohydrates taken is entirely inadequate to the demands of the system; and this want must, of necessity, result in a deterioration of the animal's health, and indirectly of the milk which it produces. It is an unnatural food for cows, as is shown by their dislike of it when first it is given them. In fact, in order to make them eat it, they must first be starved. Hassall quotes Harley as saying that "brewers' and distillers' grains and distillers' waste make the cattle 'grain-sick,' as it is termed, and prove injurious to the stomach of an animal. It has been ascer-

tained, that, if cows are fed upon these grains, etc., their constitutions become quickly destroyed."

The effect of taking so large a quantity of fluid by the animal is to increase the quantity of the milk-secretion and at the same time to cause diarrhoea. We have stated that the quality of the milk produced from cows fed on distillery swill is very inferior. In support of this statement, we quote some analyses made by Dr. E. H. Bartley, chief chemist of the Brooklyn board of health. In a report made by him he says, "The effect upon the composition of the milk, of feeding cows on distillery or vinegar swill, is shown by the following analysis of three samples of swill-milk recently made by me, as compared with normal milk of cows fed on ordinary food:—

	First.	Second.	Third.	Average of 300 analyses of normal milk.
Specific gravity	1,030.50	1,030.10	1,031.60	1,031.00
Water.....	89.46	88.68	87.56	87.41
Solids.....	10.54	11.32	12.34	12.59
Fat.....	2.03	3.02	2.55	3.66
Sugar.....	2.83	2.74	4.11	4.82
Caseine and ash	5.78	5.66	5.68	4.46

It will be seen from these analyses that the fat and sugar are both deficient in the milk of the cow fed on distillery swill, while the caseine is increased. This is just what would be expected from the character of the food. When it is remembered that human milk contains more sugar and fat than normal cow's-milk and much less caseine, we can readily understand what the effect of such milk must be upon small children fed upon it. The amount of caseine being great, the curd of the milk is increased and the digestion made more difficult. When such milk is rendered slightly acid, or is allowed to coagulate spontaneously, a marked difference is noticed in the character of the curd formed, from that produced in normal milk. In the former the curd is tough and hard, and shakes to pieces with greater difficulty; so much so, that I have been able in a few cases to identify swill-milk by this property of the curd. In order to make such a milk agree in composition, even roughly, with human milk, one and one-half quarts of water must be added to one quart of milk, and then cream and sugar added to supply these ingredients; for, after the water has been added to dilute the caseine, the mixture would contain about one-fifth the necessary quantity of sugar, and about one-fourth the

necessary fat, to say nothing of the normal inorganic salts. It must be remembered that those milkmen who keep cows have a large demand for 'one cow's milk' to supply food for small children, and consequently this milk is more likely to be given to children than to adults, with all the evil consequences which must follow. This fact makes it imperative that such milk should be strictly kept from the market."

In support of the statement which we have made, that distillery milk is injurious, the following history is given. In August, 1882, a child four months old died in Brooklyn. At the autopsy the stomach was found to contain coagulated milk and a firm lump over three inches in diameter. The stomach was reddened. The intestines contained a pale slimy material characteristic of inflammation. Its membrane was studded with enlarged glands. In the opinion of the pathologist who made the autopsy, Dr. Leuf, death was due to exhaustion, — a result of gastro-enterocolitis, augmented by the presence in the stomach of the firm clot of coagulated milk, which was too firm for the child to vomit up or pass down into the gut, and therefore acted as a foreign body and irritant. The mother said the child was fed on 'one cow's milk.' Dr. Bartley analyzed the milk, and found it to be 'swill' milk. Its analysis was, water, 89.46; fat, 2.03; sugar, 2.83; caseine and salts, 5.74

In commenting on the above fatal result, Dr. Bartley says, "Swill-milk does not coagulate as readily as ordinary milk, but the curd formed is much firmer and less easily disintegrated in the former than in the latter. In most cases the flavor of the swill can be tasted in the milk after it has stood some hours in a corked bottle." Dr. Bartley, as a result of his study of the subject, says in regard to the feeding of swill to cows, "It is a practice which we cannot condemn too strongly, a practice which undoubtedly adds largely to the digestive troubles of infancy and childhood, and especially to the cases of cholera infantum so called, in the summer months."

In the first annual report of the New York state dairy commissioner, E. W. Martin, chemist, says, "Various kinds of unhealthy foods will produce milk not only abnormal in the proportions of its constituents, but in its reactions; and such milk must be considered unhealthy, although produced by an apparently healthy animal: as, for instance, the use of distillery swill."

In connection with this subject, it may be of interest to consider for a moment the mortality among infants, and its principal factor. In five months from June 1, 1884, 259 children under five years of age died in New Haven, of which num-

ber, 111 were from diarrhoea. The particulars of thirteen cases were not ascertained; but of the 98 cases whose histories were obtained, 14.3 per cent were children nursed by their mothers; 77.5 per cent were bottle-fed wholly or in part from the time they were two months old; 8.2 per cent were children who were longer nursed than the others, but were bottle-fed at the time they were taken sick. Published statistics seem to show that a large majority of those who die in infancy are fed by hand, that is to say, on cow's-milk. In countries where the death-rate under one year of age is least (under 15 per cent in Norway, Sweden, and Ireland), the practice of hand-feeding is almost unknown; while, on the other hand, where hand-feeding is the rule, as in Lower Bavaria and the Palatinate, 50 per cent of the children die before reaching the age of one year. From this view of the subject, the importance of the purity of the milk-supply cannot be exaggerated, and all public-minded citizens can do good service by fostering a public opinion which will sustain boards of health in their efforts to suppress traffic in swill-milk.

ANILINE TREATMENT OF CONSUMPTION. — A new treatment of consumption has been proposed by Professor Kremianski of Russia. It having been demonstrated that the most dilute solutions of aniline were fatal to the tubercle bacillus, Kremianski suggested that aniline might be inhaled so that it would enter the circulation and also come in contact with the diseased pulmonary tissue, and destroy the bacilli wherever they might be. As a result, the cavities in the lungs would be converted into healthy granulating ulcers which might be expected to cicatrize. The Russian commission which was appointed to investigate the claims of this new method of treatment has experimented on a number of animals, which were fatally affected by small doses of aniline. The commission has concluded that aniline is not harmless to animal life, but, on the contrary, very poisonous indeed, and that it also exerts no beneficial effect on phthisis. Dr. Nesteroff tried this treatment upon a consumptive, with the result that he became rapidly worse, and died in a fortnight. It is more than probable, that, after this report, the aniline treatment will be abandoned.

SCARLET-FEVER-INFECTED MILK. — The health officer of Edinburgh has recently submitted a report of the facts connected with an epidemic of scarlet-fever in that city. His inquiry was with special reference to the connection between this outbreak and the milk-supply, and has resulted in showing that the affected district was supplied

from a source which was contaminated shortly before the commencement of the epidemic. The farm where the disease existed was daily sending to the city one hundred and twenty gallons of infected milk. This subject has been considerably discussed in Edinburgh recently, and a letter from a physician which appeared in the daily press, recommending that all milk should be boiled five minutes, has resulted in the general adoption of the suggestion throughout the city. Scarlet-fever appears to be very prevalent in Edinburgh, there having been at one time one hundred and ninety-nine patients in the city fever-hospital.

YELLOW-FEVER INOCULATION. — Dr. Urricoechea, surgeon of a battalion in Colombia, inoculated five of his soldiers for the prevention of yellow-fever. Twenty minutes after the operation the temperature gradually ascended to 40° C., accompanied with all the symptoms of yellow-fever. This lasted forty hours, at the expiration of which the fever and all attendant symptoms had disappeared. At the present time the inoculated soldiers are exposed to the infection. Dr. Bustamente, a physician of Cucuta, Colombia, reports that he has inoculated forty persons, and in many of them a fever, with many of the characteristics of yellow-fever, has presented itself; this fever, developed by inoculation, varying several tenths of a degree, and in some cases ascending to 41° C., but never presenting the most grave symptoms of yellow-fever. Dr. Bustamente says that the result of his observations justifies him in stating positively that the fever produced by inoculation is attended with no danger, and that it is safe to inoculate, as he has already done, persons from the age of two years upwards. Many of the persons inoculated by him have been exposed to yellow-fever, and in no case has the fever attacked them.

GELATINE LIQUEFACTION BY BACTERIA. — Dr. Sternberg has been studying the liquefaction of gelatine by bacteria, and has ascertained that it is due to a soluble chemical product which is formed during the active growth of the liquefying organisms, and that a comparatively small amount of this substance will liquefy gelatine quite independently of the living organism. Dr. Sternberg expresses the hope that some chemist will take up the question with a view to ascertaining the exact nature of this substance.

WATER-FILTRATION. — A very interesting series of experiments in the filtration of water has recently been made by Dr. G. T. Swarts, and reported by him to the Rhode Island medical society. He finds that, when first used, some filters successfully remove some of the organisms which

the water contains, but that tests made seventeen days later showed in every instance a marked increase in the number in the filtered as compared with the unfiltered water. In one case the unfiltered water contained thirty-six colonies, and after passing through the filter there were 2,000; in another case the number was 10,000. An examination made on the seventieth day showed the number of colonies increased to 117,000. The explanation of these results is, that, in passing through the filter, some of the micro-organisms present in the water are retained in the filter, and at the same time some of the albuminoids which are present are also retained. These latter serve as pabulum for the micro-organisms, and the latter increase enormously under these favorable conditions, and water subsequently passing through the filter takes them up in large numbers. With every possible precaution in sterilizing and cleansing the filter, the number of organisms in filtered water exceeded those in unfiltered by several thousands; especially is this marked if the filter is in a warm room or in proximity to a hot-water pipe. While the bacteria ordinarily found in water are harmless, still it is possible that those of cholera or typhoid-fever might be present in drinking-water; and the practical application of these observations of Dr. Swarts is, that such germs would not only not be filtered out in the process of filtration, but that their number would probably increase many times in the filter itself. The filtration of water is therefore of no use when the presence of pathogenic organisms is suspected; and recourse should, under such circumstances, be had to boiling, it having been abundantly demonstrated that all organisms in water are destroyed at the boiling-point, if that temperature is maintained for one hour.

THE HUMAN FACULTIES.

Mind and muscle.

THE full significance of the modern view of the relation of body to mind is well brought home by the success of a recent experiment upon a dozen dull, sluggish, shiftless, illiterate inmates of the Elmira reformatory. The men were not exactly feeble-minded, but were dull and stupid, had made no progress in school-work, and seemed incapable of a prolonged mental effort. The class was formed on June 5 of 1886, when the men were, on the average, 22.9 years old; they had been committed for rather low orders of crimes, for which the law would have imposed an average sentence of about seven years; had one and all never learned a trade; and exhibited the usual amount of intemperance, hereditary taint, and lack of moral