

## RABIES IN DOGS.

THERE are no mad dogs at the Cape of Good Hope, or anywhere in southeastern Africa, although some of the Kafirs will own more than a dozen worthless-looking curs. There are other places in this wide world which are also exempt from the prevalence of rabies in the canine species, such as Egypt and Syria; and we are told by an eminent medical man, Dr. Hamilton, that curs of the most wretched description abound in the island of Madeira—that they are affected with almost every disease, tormented by flies, by heat, thirst, and famine, yet no rabid dog was ever seen on the island, and therefore we are led to the conclusion that madness in dogs has a climatic origin, or has become a peculiarity in European breeds. The South African people attribute their immunity from this most alarming and incurable disease to the fact that there is more electricity in the air of their climate than in England, where the atmosphere is murky and sluggish, affecting indeed the human species by producing a great depression of spirits. The difference of atmosphere is the first thing an Africaner, or even a colonist, notices on his arrival in England. He tells us that although it is hotter in South Africa, yet there is an openness or expansion of the air which prevents any feeling of oppression; whereas in England the clouds seem to press the air downward, producing a sensation of closeness. The same kind of feeling is experienced even in cold November, to obviate which a visitor from South Africa will, when in England, open wide the windows of his room, preferring to suffer from cold rather than to experience the intolerable sensation of having no air to breathe. The result is he takes a thorough English cold, and is down with bronchitis or something of the kind before Christmas.

There can be no doubt that some animals are more affected than human beings by these atmospheric conditions and climatic phenomena. It is said that a thunder-storm in South Africa will curl the manes of horses, and always has a peculiar effect upon dogs. The question therefore forces itself upon us—Is it our peculiar climate which is the cause of rabies in dogs? The disease affects well-fed hounds in the nobleman's stables and the pet dog brought up on our hearths. The disease is not confined to the ownerless and famished cur. These poor brutes seem merely to be the means of carrying it about. Let us notice a few instances: A man while shaving himself slightly cuts his chin. He afterward takes a little pet dog upon his knees. The animal, according to its custom, licks his hands, and unfortunately licks the newly-made cut on his master's chin. The result is that the dog being affected with the rabies, though unknown to its master, communicates the disease, and its owner in the course of a few weeks dies under all the frightful symptoms of hydrophobia. In another instance a little terrier dog is kept by a family residing in the suburbs. The children play with it, and are slightly bitten by it, while the animal is in a diseased condition. The bites, which mark the flesh, are not thought much of, because they are supposed to be done in play, and besides that, there is a feeling that "everybody's dog can be mad but ours—our 'Tiney' is a harmless little thing and would hurt nobody." But, alas! in how many cases like this have children and young ladies who play with such dogs had to pay the penalty by a frightful death. In despair the head of the household shoots the dog, and resolves never to keep another. The fact is owing to the great habit of association in dogs; one animal afflicted with rabies can easily bite a score of others in the course of a few days. If people would not allow their dogs to run about, and would always lead them with a chain, infection by association might be greatly diminished. Last summer two young ladies, residing in the country, took out with them, as usual, a large dog. They had no string attached to the animal's neck, and, indeed, took the dog with them with a view to their own personal safety. During the outing the dog ran into the company of several others, and was evidently bitten by some of them, for in a few weeks one of the young ladies, who was much addicted to tease the dog in a playful way, died of hydrophobia, having in the severe paroxysms of her disease to be strapped down to her bed. We thus see that dogs ought not to be allowed to roam about, but always be conducted by a chain. The lives of their owners require this precaution.

As to the origin of the rabies in a dog, it is strongly argued by some men that it does not always proceed from inoculation, but that it arises spontaneously at any season of the year; indeed, experience proves that dogs are fully as liable to the disease in the coldest part of the winter as in summer. Hence persons who keep a dog have an animal to watch which may become as great a foe to their household as a boa-constrictor. If the disease arises in a dog from inoculation it may manifest itself in a few days, but its appearance is often weeks, or even months, after the animal has been bitten. The symptoms are as follows: At first the dog loses his appetite, becomes sullen, fidgety, has a vacant gaze, licks or gnaws the injured parts, laps any liquid that comes in his way—for he has, unlike man, no dislike to water, although he has a difficulty in swallowing it—eats wood, straw, hair, and other indigestible substances, and in a day or two becomes quarrelsome and bites at anything that comes in his way. His bark is more like a howl during this period, particularly if he be tied up; and in the course of five or six days death puts an end to his sufferings.

It would not be well to conclude this article without saying a few words about the prevention of hydrophobia after a person has been bitten. Twenty persons may be bitten by a mad dog, but only two or three of them take the infection. These, most probably, will be those who were first bitten, as when the teeth of the dog are cleaned of saliva by passing through the clothes worn by persons there is little danger. It would still, however, be wrong to delay or refuse treatment from a hope of this kind. When Sir Astley Cooper was bitten by a dog which he suspected as afflicted with rabies, he immediately took a knife from his pocket and cut out the part of his flesh which was bitten. It would not be expedient for persons unacquainted with surgery to do this, as they might cut through arteries. But the person bitten should run immediately to a surgeon. It would be half a cure to get into a good perspiration, as experience shows, both in cases of dog bites in this country and snake bites in India. The surgeon should be asked to cut the flesh away which has been bitten. A cut will heal up in a few days, while burning by caustic or a hot iron produces a painful wound, with much less certainty of a cure. If the patient is nervous let him take a little chloroform; but no time must be lost if there be a desire to avoid a most dreadful death. As an instance of the pernicious effect of the saliva, it may be mentioned that a surgeon was bitten by a woman while treating her for hydrophobia in one of our London hospitals. He immediately had the flesh cut away, and on being reproved for showing unnecessary fear, he took a portion of the patient's saliva and put it on a cut made on the leg of a

rabbit. The result was the rabbit soon showed symptoms of rabies and had to be killed.

The only cure for hydrophobia is said to be an infusion of *Datura stramonium*. A handful of the leaves were boiled in a pint of water till they had shrunk to one-half their original bulk, and the water, when strained off, was poured down the patient's throat. After a violent paroxysm a profuse perspiration came on, which was followed by a deep sleep, lasting eight hours. When the patient awoke there was no sign of the disease. This case was published by Mr. Laporte, Birkdale Park, Southport; but probably the real merits of the remedy are not yet sufficiently established. *Datura stramonium* leaves, it will be remembered, are smoked by asthmatic patients.—*Magazine of Pharmacy*.

## ORGANIC MATTER IN POTABLE WATER.

By G. BISCHOF.

A NUMBER of observations point to the conclusion that those low forms of organic life which in all probability form the specific poison of cholera, typhoid fever, and other diseases, by gaining admission to drinking water polluted by putrescent matter, are the causes of derangements of the human system, and that these organisms or their germs are not infectious as long as surrounded by fresh organic matter, but show their poisonous virulence as soon as fermentation sets in. As chemical analysis is incapable of discriminating between living or dead, fresh or putrescent organic matters, and as it is difficult to decide with a microscope the existence or non-existence of putrefaction bacteria or their germs in water, the author devised an indirect method based on the fact that the presence or absence of putrefactive agencies in water may be determined by their action upon organic matter. The test which he selected is fresh meat, as the slightest putrescent changes in it can most readily be detected by its smell. The experiments, which were originally made with a view of determining the improvement of water by certain filtering media, were carried out in the following manner:

Some fresh meat is placed on the perforated bottom of a stoneware vessel, which is filled two-thirds with the materials to be experimented upon, and, lastly, with water. At the upper part of the vessel an inverted U-tube is fixed, which prevents any bacteria or their germs from passing through the outlet tube into the bottom of the vessel. A tube which is sealed at the bottom passes down through the material experimented upon, to allow of the temperature being measured in close proximity to the meat. The apparatus thus prepared is immersed in a boiler filled with cold water, which is gradually heated and kept boiling for several hours. The object of this is to destroy any germs adhering to the meat. The temperature at the bottom of the sealed glass tube during the boiling in each of the following experiments was 93°-95°. After cooling, the Chelsea Company's water was constantly passed through the vessel. It is thus evident that any putrefaction bacteria or their germs in the water would after a time render the meat putrid, or, if it remained fresh, they must have been absent, or at least inactive, when the water reached the meat.

*Experiment I.*—The vessel was filled with spongy (metallic) iron and treated as before described; after a fortnight the meat was perfectly fresh.

*Experiment II.*—The vessel filled with animal charcoal; after a fortnight the meat showed strong evidence of incipient putrefaction.

*Experiment III.*—Water continuously passed through a vessel filled with spongy iron for four weeks; even then the meat was perfectly fresh and hard.

*Experiment IV.* was a repetition of II., the filtration being continued for four weeks. The meat was soft and quite putrid.

*Experiment V.*—In order to determine whether (in I. and III.) bacteria were merely mechanically retained, the vessel was charged with spongy iron from which all the finer particles had been separated by a sieve with thirty holes on the linear inch. After four weeks the meat was perfectly fresh.

*Experiment VI.*—In the former experiment the meat was in contact with water from which the iron in solution had not been separated. With the view of ascertaining whether the iron in solution was the preserving agent, a stoneware vessel was charged underneath the spongy iron with pyrolusite and sand, so as to abstract the iron from the water before it came in contact with the meat. After four weeks' filtration the meat was found perfectly fresh.

*Experiment VII.*—By a separate experiment the author ascertained that oxygen is completely abstracted from the water during its passage through spongy iron. In order to determine whether the absence of oxygen be the cause of the preservation of the meat, an evaporating basin was inverted over the meat. This must have retained a quantity of air in its cavity, the air being gradually dissolved by the water in close proximity to the meat. After four weeks' filtration the meat was perfectly fresh, and the small quantity of gas still in the cavity of the basin was perfectly free from oxygen.

*Experiment VIII.*—Fresh meat was placed at the bottom of a glass vessel and left standing, covered with about four inches of spongy iron and water. The water in this instance was not boiled. After three weeks the meat was very bad, showing that the action of the putrefaction bacteria adhering to the meat was not prevented by the spongy iron above; and if, during the previous experiments with spongy iron, agencies capable of causing putrefaction had at any time come in contact with the meat, the latter must, as in this last experiment, have shown marks of their action. It therefore appears that bacteria are permanently rendered harmless when passing into water through spongy iron. This conclusion is further corroborated by the observation that even effluent sewage-water, after passing through the spongy material, has remained perfectly bright for now five years, when exposed to light in a half-filled stoppered bottle.

The author believes that the action of spongy iron on organic matter largely consists in a reduction of ferric hydrate by organic impurities in the water. It is, moreover, quite certain that a reducing action also takes place when ordinary water is passed through spongy iron; this is clearly indicated by the reduction of nitrates. The ferrous hydrate resulting from the reduction by organic matter may be reoxidized by the oxygen dissolved in the water, and thus the two reactions repeat themselves. This may explain why the action of spongy iron continues so long.

In conclusion, the author states that our knowledge of those low organisms which are said to be the cause of certain epidemics is as yet too limited to allow of direct experiments upon them. Should those specific contagia not be destroyed when passing in water through spongy iron, then

the separation of bacteria by spongy iron may afford means of isolating those germs of disease. Should it be favorable, then we shall have found in spongy iron the material to prevent the spreading of epidemics by potable water.—*Chem. News*.

## INSUFFICIENT SUPPLY OF LIME.

By J. FORSTER.

THE author adduces some experiments on the dog, made by him in 1869, to show that with a diet containing an insufficient quantity of lime, but sufficing to sustain the albuminous constituents of the organism, all the organs, more especially the muscles, but also the skeleton, become partially impoverished in lime, without any diminution in the organic substances of the body taking place. He finds that the quantity of lime contained in a diet consisting exclusively of meat does not suffice to sustain the amount of lime in the body, although its albuminous constituents may remain unchanged.

He explains Weiske's inability to observe, on an insufficient supply of lime, either a partial loss of lime in the skeleton or the occurrence of disease of the bones by the following considerations:—(1.) Conclusions with regard to the composition of the whole skeleton must not be drawn from an analysis of individual bones. (2.) It is necessary that the nourishment of the animals be such that while losing lime they may not suffer a diminution in combustible substances. For with a generally insufficient supply of nourishment besides the want of lime, both soft parts and bones diminish, and the ash-components which are thus set free may, under certain circumstances, be used again without being excreted from the body.—*Zeitschr. für Biologie*.

## REMARKABLE EFFECTS OF PLASTER AND CLOVER.

WE know that plaster produces wonderful results, but how we cannot tell. That 100 pounds of a certain kind of rock ground to powder and spread evenly over an acre of clover will add 2,000 pounds (dry weight) to the yield is incomprehensible; I might add, it is "unknown and unknowable," yet it is none the less true that it does cause such and even greater results, as can be attested by farmers all over the country; and there are thousands of farms that would not pay the cost of cultivation but for clover and plaster. Plaster shows the best results when applied to clover, though it proves beneficial on many other crops, such as corn, barley, oats, and potatoes, and even wheat, if applied in the Fall. But plaster does not always produce the same result; very much depends on the soil and the season. As to soils to which it was best adapted, I have noticed that it has much the best effect on land deficient in vegetable matter—theories to the contrary notwithstanding. On what we in this State call timbered lands, in contradistinction to the oak lands, plaster does not seem to do much good; neither does clover seem to be necessary on such land, especially when it is first brought under cultivation. But oak land cannot be kept in a productive condition without clover, certainly, and I might as well say plaster, for I have never seen a real gloriously rank field of clover that had not been treated to at least fifty pounds of plaster per acre. I am speaking now of land in this, my own State. There may be, and probably is, land in other parts of our country which will grow clover without plaster, and perhaps bring good grain crops without either, and blest is the man that owns such land, other things being equal.

In some seasons the effects of plaster are not nearly so great as in others; its best results are seen in a dry season, provided always that it is sown before the ground gets too dry, or before the rains cease entirely. Here I know I shall be opposed by a great many farmers, but, nevertheless, I am bold to say that plaster sown in a dry time will do no good until there is a soaking rain, and I ask those who disagree with me to take notice, and see if I am not correct. It should be sown before the Spring rains are over, so as to give clover a good start before the dry weather sets in; no drought after that can stop its growth. Water seems to be absolutely necessary to plaster in carrying on the chemical changes, whatever they are, which cause the wonderful growth it effects in clover and other plants, and yet plaster does little or no good on naturally wet lands. The timbered lands, or lands covered with a natural growth of timber of various kinds, and which I have said are not much benefited by plaster, certainly not until they have been much reduced by cultivation, have been, since time immemorial, accumulating mould from the shade of the forest, and the annual fall of leaves retained so much moisture that fires seldom swept over them. But the oak lands, which at best are sparsely wooded, and sometimes are only treeless plains, with a soil naturally dry, have been swept over by annual fires since, for aught we know, the days of the Mound-builders. There has been, consequently, very little accumulation of vegetable matter. These are the lands on which clover and plaster work such wonders. But these oak lands have a great variety of soils; they range from heavy clay down through clay loam, sandy and gravelly loam, to light sand, with no timber but scrub oak and pine; yet these soils are about equally benefited by clover and plaster, though it is thought that plaster does the most good on light sand.

Now, any intelligent farmer will conclude at once that these oak lands cannot be very productive until they have in some way been supplied with vegetable matter; and such is the fact, as has been abundantly proved by the experience of many. In the early days of Michigan farming, clover was not very well known, and neither clover nor plaster was much used. The first settlers were generally poor; many of them were mechanics who knew very little about farming, and thought when they had cleared a piece of land it ought to continue to produce well under constant cultivation. Thus the soil was speedily exhausted of the little mould it contained—I am speaking now of the oak lands—the crops grew less, and unpleasantly less, every year, until in time they did not pay the cost of cultivation. At length, farmers began to come on from the East, where land was high and the benefits of clover and plaster were well known; they came with money to purchase those worn-out lands, and with the knowledge and enterprise to restore them. They succeeded so well that they soon worked a complete revolution in the manner of farming in the State, for many of the old inhabitants, looking on, first in surprise, soon caught at the new ideas, and some of them fairly outdid the new comers. Clover and plaster were the great agents in producing this revolution. Before, scarcely a farm could be found with clover growing on it; now a farm worthy the name cannot be found on which clover is not grown, and where plaster is not used extensively; before, the average yield of wheat was ten to fifteen bushels per acre; now it is twenty to twenty-five; last year it was thirty, at least, in all this part of the State. —GORHAM SMITH, Ionia Co., Mich., in *N. Y. Tribune*.