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THE SCIENTIFIC AMERICAN SUPPLEMENT,

No. 338,

For the Week ending May 20, 1882.

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KLINKERFUES' WEATHER COMPASS.

It is well known that the barometer only becomes a guide to forecast the weather when it is taken in combination with the hygrometer. To combine the advantages of both, Professor Klinkerfues, of Goettingen, has devised a new form of instrument, to which he gives the name of "weather compass." Although not without its faults, this instrument, says the *Polytechniches Notizblatt*, is suitable for ordinary use, and will probably supplant the barometer as a weather glass. It is in fact a kind of barometer resembling Bourdon's aneroid barometer combined with a hair hygrometer, which acts upon the pointer that indicates the atmospheric pressure, so as to increase or diminish its motion according as there is a greater or less amount of moisture in the air. Beside this, the direction of the wind is also taken into account according to the influence which experience has shown that the wind has on the state of the sky, and atmospheric precipitation. For example, observations extending over many years have shown that the change from west to east improves the weather prospects on an average about as much as a rise of 9 millimeters (three-eighths of an inch), or a decrease of 50 per cent in relative moisture. A change from east to west has a correspondingly bad effect.

This new weather glass gives us, in the simplest possible manner, information regarding the weather to be expected in the next 12 to 24 hours, whether a clear or clouded sky, dry or wet weather. But this is the most important thing that we wish to know beforehand, if it is only approximately correct and reliable. Out of 100 forecasts about 90 are correct. This kind of prognosis has the advantage of being local, and therefore is especially valuable to farmers.

The weather compass compensates for the action of the barometer and hygrometer in such a manner that a falling of the barometer with a decrease of relative moisture, or a rise of barometer and with an increase of relative moisture, acts upon the pointer in opposite directions, and if one is proportional to the other, keeps it at rest. The basis for the calculation of the dial of the instrument is the simultaneously observed variations of the barometer and hygrometer and the relations between atmospheric pressure and moisture, namely, 1 millimeter of pressure is equal to 6 per cent of relative moisture. Thus pressure and moisture, direction of the wind, and present weather, become factors in determining the weather, and are rated at their proper worth. On the face of the campass is a small revolving disk, on which is marked east, N. E., N. W., S. E., S. W., west, for the direction of the wind. Around the circumference of the larger disk are the words wet, very wet, dry, clear, etc. There is also a pointer or index, which extends inward from the edge of the face. To set the instrument, it is only necessary to turn the two disks so that the pointer will point to the present state of the weather on the weather disk, and to the present direction of the wind on the wind disk. This is evidently necessary, because regard must be had to whether one and the same change will lead to wet or to dry weather. In 10 or 12 hours, if the direction of the wind remains unchanged, the pointer will indicate the coming weather directly. If there is a change in the wind in the meantime, then the outer or weather disk must be turned so that the state of the weather at that time will correspond to the new direction of the wind. This will bring the weather that is to be expected under the pointer. The price of the weather compass in Frankfort is about $12.50.

SUFFOCATION BY COAL GAS.

Cases of poisoning by illuminating gas are sufficiently frequent to make one suppose that greater care would be taken to prevent their recurrence. Not long since a man in thiscity attempted suicide by means of gas which he inhaled through the mouth, but the timely interference of neighbors prevented its having the intended effect. A few days later a Fall River steamer came to her pier with two of her passengers insensible from the same cause. Coal gas contains from 5 to 9 per cent of carbonic oxide, to which its effects are chiefly due. M. Tourdes says that *pure* coal gas is instantly fatal, but the case of attempted suicide, as well as the rare occurrence of fatal poisoning in gas works, where workmen are sometimes exposed to gusts of undiluted gas, makes this seem at least doubtful. The same authority says that one-eighth of gas will kill a rabbit in five minutes, and one fifteenth in ten to fifteen minutes. In one case that proved fatal Dr. Taylor estimated the quantity at 3 per cent. Even small quantities, which are only perceptible by their odor, cause unpleasant symptoms, headache, and nausea, if inhaled for a long time. Time seems to be an important factor in gas poisoning, for in most cases where persons are exposed to its influence for a few hours they can be resuscitated, but ifleft a longer time this is not possible.

Carbonic oxide, as already stated, is credited with being the principal factor in gas poisoning, a question that could be quickly settled by the spectroscopic examination of the victim's blood. Two of the large gas works in this city supply us with gas still richer in carbonic oxide, sometimes reaching 25 or 30 per cent. It was expected that this would prove particularly fatal to its users, but accidents have thus far been fortunately few, which may perhaps have been due in part to its vile odor, which serves as a warning.

One of the most convenient safeguards against possible poisoning by gas is to sleep with an open window where fresh air can always enter to dilute it in case of any escape. A person has been known to sleep in safety the entire night in a room where the deadly (?) water gas was escaping from an open cock at full head, the secret of his escape being the open window. Attempts have been made to construct automatic alarms that should report escaping gas, but none of them are so efficient as might be desired, are liable to get out of order, and are not likely to awake the person who is destined to be the victim.

METALLIC CÆSIUM.

For the past thirty years chemists have been anxiously waiting for somebody to isolate the metal cæsium, which, with rubidium, was the first discovery made by the aid of the spectroscope. Bunsen prepared rubidium, as he has so many other metals, by the eloctrolysis of its salts, but he did not succeed in obtaining cæsium. So great is its affinity for oxygen and the metalloids that it is placed at the positive end of the list, the most electro-positive of all metals. From Liebig's *Annalen* we learn that C. Setterberg has succeeded in preparing metallic cæsium by the electrolysis of a mixture of the fused cyanides of cæsium and barium. It is a silver white metal, very soft and ductile, nearly twice as heavy as water (specific gravity 1·88), and melts at 29·5° C. (85° Fah.), so that it resembles gallium in this point. It takes fire spontaneously in the air, and if thrown upon water burns like potassium and rubidium, to which it is most nearly related. The color of the flame is not stated. If true, this will be the first metal known that takes fire in the air, although all the alkali metals oxidize rapidly.

Ammonia from its Elements.

Numerous methods have been devised to utilize the atmospheric nitrogen for making ammonia. The latest of these is a French process in which metallic zinc is employed to furnish the elements titanic iron to effect their union. Melted zinc falling into water sets free the hydrogen, falling through the air it liberates nitrogen, oxide of zinc being formed in both cases. The nitrogen is passed over titanized spongy iron, and is absorbed by it. When the hydrogen is passed through the retorts containing this spongy iron it will release the nitrogen from the titanium and combine with it to form ammonia. The oxide of zinc is reduced in retorts with carbon, and carbonic oxide is set free, which needs only to be burned in order to convert it into carbonic acid, which is then allowed to combine with the newly-formed ammonia to form a carbonate. Or, platinized pumice or charcoal are substituted for the spongy iron and the gases made to act upon it under 10 to 15 atmospheres of pressure. C. Z.

THE PARASITE OF THE CLAM

BY C. F. GISSLER

We often meet in opening the shells of the "long clam" (*Mya arenaria*) with a whitish, more or less semi-transparent worm, which Professor A. E. Verrill described under the name of malacobdella obesa.

It is about thirty millimeters in length and some thirteen to fourteen millimeters in width. It has a nearly circularly round sucking disk on the under side of its hind or posterior end, resembling, therefore, and is generally taken for a sort of leech. In reality it belongs to the kind of worms called *nemertines*. Its front or anterior end has no sucking disk, as is the case with all kinds of leeches, and its internal structure or organization is also widely differing from that of the leeches.

The under or ventral side of this curious worm is smooth and flat; above the body is slightly convex and transversely wrinkled. Between and on the wrinkles are innumerable very minute spots and rings, looking like openings. Its head or anterior part appears as if cut off and hollowed out to some distance of the body. It moves but very slowly its sides in a peculiar wave-like manner, and occasionally contracts its whole body. Under the microscope we perceive that its whole exterior surface is covered with extremely fine and short hairs or ciliæ, which are seen to move rapidly in certain directions. These fine hairs can only be seen with a compound microscope, and present to the eye a very fine and interesting object; very small pieces cut off from the side of the worm still show the motions of those hairs for some time.

If we place live specimens of the clam parasite into strong alcohol we notice that some of them protrude a small cylindrical organ a little above the mouth on the upper or dorsal side of the animal; this is the proboscis or tusk. Its hinder end is inclosed in a small sac in the body of the worm, into which sac this tusk can be withdrawn. The mouth is situated not in this tusk, but below it on the front or head part of the worm; meandering through the body is the alimentary canal or stomach and intestine. The intestine is convoluted or folded about six or seven times, until it reaches the extreme hind part, terminating in a small orifice or opening on the upper side, just above the sucking disk.

They probably live on the same food the clam lives on; that is, small particles of organic matter, such as the lowest organisms, infusorials, wheel-animalcules, etc., which abound on the bottom of the sea. These clam parasites have no eyes, as do most parasitical animals.

Our parasite occurs in the branchial or gill cavity of the "long clam," and has been found to occur in Massachusetts, Connecticut, New York, and New Jersey. Another different kind, the *Malacobdella mercenaria*, occurs in the "round clam" (*Venus mercenaria*); it is somewhat smaller and narrower, but of the same color and general appearance. Oystermen usually do not throw them away when they find them, as it is positively known that they do no harm whatever in the human body.