

to close the pores altogether, thus acting as a protection from the attack of an enemy. All these muscles are composed of spindle-shaped cells, which are capable of spasmodic motion, but recently in an Australian sponge, the *Bu ponia canalicula*, the lecturer said he had observed muscles approaching very nearly in character those of the human frame.

That sponges have nerves is a discovery of recent date by a member of the Royal Microscopical Society. Dr. Ledenfeld also about the same time found indications of the presence of a nervous system, but the form in which he observed the nerves at first apparently differed from those observed simultaneously. This difference, however, he afterward found to be due to the manner in which the section had been prepared for observation. The nerves consist of two cells at the base of a cone-like projection on the epidermis, and from each cell a fiber runs to the point of the cone, besides several others connecting them with the interior of the sponge.

It is remarkable that here again Aristotle has predicted that sponges have a nervous system, basing his statement on the fact that ancient Greek mariners foretold storms by the alleged contraction of the sponge. The reproductive organs of sponges are also very highly developed, and both ova and spermatozoa are found throughout the sponge, though more concentrated in the interior. The ova consist of spherical cells, while the spermatozoa resemble an arrow-head in shape. It has not yet been ascertained whether two sexes exist in sponges, or whether the ova and spermatozoa are produced at different periods by the same sponge. When the embryo has become partly developed, it detaches itself from the parent sponge, and, issuing from the oscula, propels itself through the water by means of a number of flagella.

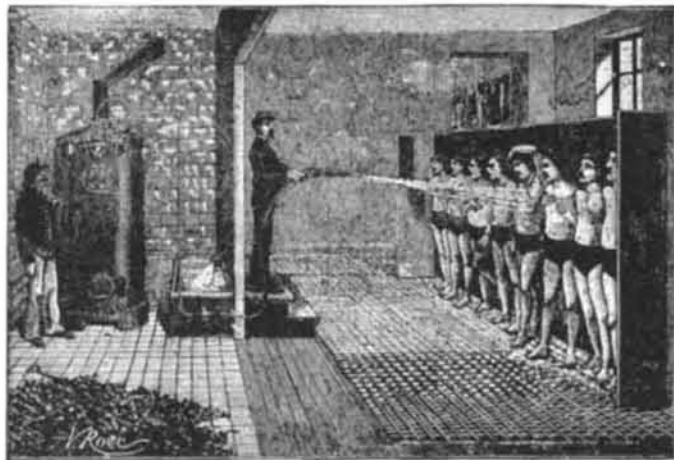
Silicious spicules next appear in its structure, and it then attaches itself to a rock and assumes its mature form. Sponges are most numerous in the waters of the temperate and sub-tropical zones, and the salt-water varieties are by far more numerous than the fresh water. Thus, while there are not more than ten fresh-water species known, Dr. Ledenfeld remarked that about one thousand species of salt-water sponges had been recognized. Each species of the salt-water sponge is, however, generally found only in limited areas, and very few, all of which inhabit deep water, are cosmopolitan. This is the more remarkable as Dr. Ledenfeld asserts that all the sponges inhabiting the rivers of Australia are identical with the fresh-water sponges of Europe, and in order to explain this fact he put forward a rather interesting theory. He assumes that sponge life in rivers has been originally generated by the introduction of a single, or at most two or three germs by means of aquatic birds. The inbreeding consequent upon this paucity of sponge life has produced a certain fixity of character in fresh-water sponges, and is in direct opposition to the effects of hybridization in the salt-water sponges, by which they have acquired the capacity of adapting themselves to local circumstances.

HERBET'S TEPID DOUCHE.

KEEPING the body clean is indispensable for the preservation of good health, through obtaining an operation of the skin and expelling matter whose presence aids in the development of diseases. It is unfortunately necessary to say that, considering the population as a whole, the proportion of those who take baths is very small. This is due to the fact that the habit of cleanliness, which should become a necessity, has not been early inculcated in every individual; and the reason that this complement to education is not realized is because the means of satisfying its exigencies are usually wanting.

We shall not speak of the improved processes that are used solely by the rich or well-to-do, as these become impracticable where it is a question of the working classes or of large masses of individuals. It is, in fact, the last named category that interests us, and we are convinced that if we get young soldiers and children to hold dirtiness in horror, we shall be sure that they will later on take care of their bodies themselves.

The most tempting solution of this question of washing seems to be found in the use of large pools of running tepid water; but such a process is too costly for general use, and the most economical one, without doubt, consists in giving tepid douches.



TEPID WATER DOUCHE.

To our knowledge, the only apparatus in this line that has been devised was exhibited last year at the exhibition of hygiene in the Loban barracks. It has been used daily for six years in several garrisons, and therefore has the sanction of practice.

This apparatus, which is due to Mr. Herbert, consists of a steam boiler and of an ejector fixed to a reservoir of water and provided with a rubber tube to which a nozzle is attached. The steam generated in the boiler passes into the ejector, sucks up the water and forces it out in a tepid state.

The apparatus thus established did not sufficiently

fulfill the purpose for which it was designed. It was necessary to have a means of varying the temperature of the water projected, according to the season and temperature of the air, to have an instantaneous and simple method of regulating the apparatus, that could be understood by any operator, and to have the apparatus under the control of the person holding the nozzle. These difficulties have been solved very simply by causing the orifice of the nozzle to vary. This nozzle, from whence the jet escapes, is formed of rings that screw together. When the nozzle is entire, the jet escapes at a temperature of say 40°. When the first ring is unscrewed, the water will make its exit at a temperature of 38°. In order to lower the temperature still further, it is only necessary to unscrew the other rings in succession, until the desired temperature has been obtained.

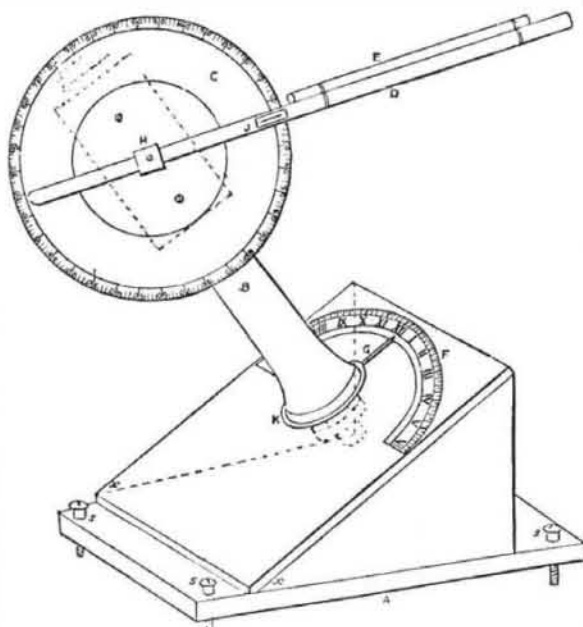
As it is, the apparatus is rendering great services where it has been introduced; for example, at Besancon and Belfort. It serves, in fact, for an entire garrison, while that before, the washing was done in each regiment, thus requiring the use of much space and causing much loss of time.

Eight men are washed at once for five minutes, say 96 men per hour. Every minute the men turn right about face, and when they are in file each rubs the other's back.

Twenty-two pounds of coal and 260 gallons of water are consumed per hour, and the boiler produces 130 lb. of steam.—*Le Genie Civil*.

HOW TO MAKE A STAR FINDER.

BEING all of wood, it is easily made by anyone who can use a few tools, the only bit of lathe work necessary



A STAR FINDER.

ry being the turned shoulder, K, of polar axis. A is the baseboard, 9 in. by 5 in., near each corner of which is inserted an ordinary wood screw, S S, for the purpose of leveling the base, to which two side pieces are nailed, having the angle, α , equal to the co-latitude of the place. On to these side pieces is fastened another board, on which is marked the hour circle, F. Through this board passes the lower end of the polar axis, having a shoulder turned up on it at K, and is secured by a wooden collar and pin underneath. On to the upper part of the polar axis is fastened the declination circle, C, 5½ in. diameter, made of ¼ in. baywood, having the outer rim of a thin compass card divided into degrees pasted on to it. The hour circle, F, is half of a similar card, with the hours painted underneath, and divided to 20 minutes. G is the hour index. D is a straight wooden pointer, 12 in. long, having a piece of brass tube, E, attached, and a small opening at J, into which is fixed the point of a common pin by which to set the pointer in declination. H is a nut to clamp pointer in

position. By this simple toy affair I have often picked up the planet Venus at midday when visible to the naked eye.—*T. R. Clapham in English Mechanic*.

THE best mode of finding or tracing trichinae in pork by means of a microscope is the following: Cut a very thin longitudinal slice of the muscle by means of a very sharp knife or razor. Press it between two glass slips, and examine by transmitted light. The coiled trichinae may be readily distinguished from the muscle fiber.

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