

Ichneumonidæ.

Dr. David W. Flora, of Newyago, Mich., sends us the following interesting particulars:

The SCIENTIFIC AMERICAN of January 31 contains an article on "The Mason Wasp," which brings to mind some observations made twenty years ago. On the half grown, wrinkled body of a "tomato worm" hung fifty or more little oblong pearl colored balls about the size of small rice grains. Placing the mass under observation, about three days thereafter a little lid or cap was raised from the larger end; out came a fiery, active, dark bluish-green fly. I was able readily to place it in the large family of *Hymenoptera*, and very soon saw enough of its habits to class it according to Cuvier as a member of the *Ichneumonidæ*. A few days after the advent of the little fly, I saw one alight upon the half grown body of a tomato worm, and in spite of its squirming, sputtering of green saliva, and striking out with that formidable "horn," our plucky little one kept on striking its stinger, or *ovipositor*, deep into the body of the worm, at every stroke depositing an egg. Some ten or twelve days thereafter there was an eruption all over the skin of "Mr. Worm." The surface seemed alive with little worms, which were larvæ of the ichneumon fly.

Instead of seeking some other spot in which to pass the "pupa" stage, it fastened a thread to a hair or spiracle of the "worm skin," and then and there proceeded to spin itself a cocoon. These threads were so fine that when magnified 2,500 times they were not much larger than No. 30 sewing thread. Under the magnifier I saw the cocoon completed in about two hours and our larva retire from sight, to reappear after fourteen days as already described.

Baron Cuvier says: "They are so called from the Egyptian ichneumon, which was supposed to deposit its eggs in the entrails of the crocodile, which the larvæ afterward devoured."

"In Europe alone, there are more than 1,650 species of this family, and there are more than 6,000 species already known."

What a conservative influence this host of insects must exert upon the vegetable kingdom! Every species has many varieties, and this myriad host wages perpetual warfare upon the caterpillars and larvæ of the *Lepidoptera* generally.

This tiny insect cannot carry away bodily the great bulky tomato worm, nor even the smaller larvæ and spiders which the mason wasp does to feed its young, but it provides for its progeny by depositing the egg in the large succulent bodies of other insect larvæ, there to hatch and feed.

But so skillfully does the young ichneumon feed that neither the digestive nor ganglionic system of the victim is injured. Only the chyloferous vessels are sucked dry. Something like the fable of Prometheus, only the liver and vital organs are spared.

Our vast lumber interest is under obligation to the *Ichneumonidæ*. It seeks out by some subtle sense the location of the "wood borer," and with its long flexible ovipositor deposits its eggs in the body of that larva. I have seen it pierce the seasoned hickory wood nearly two inches to reach this matrix for its young.

From the description of the "mason wasp" given in the article referred to, and from my own study of its habits, I think it ought to be classed with the ichneumon family.

To make a "rope of sand" is conceded to be a feat impossible to accomplish, and the mud wasp in my opinion is not more likely to build its cell of sand, as stated in the article referred to. I have invariably seen them make their lump of the best, most tenacious blue yellow or other colored clay, of which they built their cell.

Red Ants.

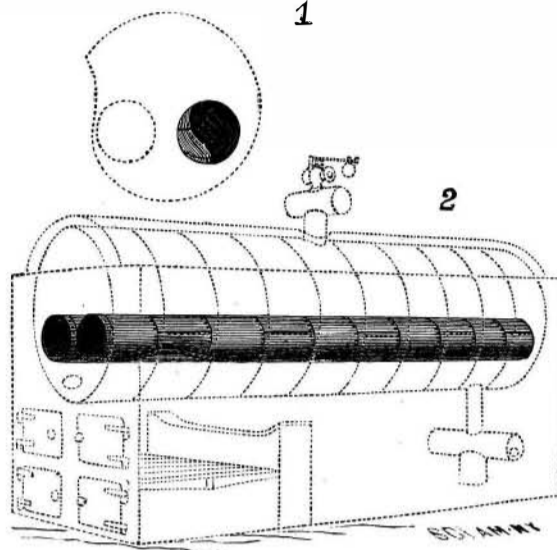
The following by Prof. C. V. Riley will be of interest to housekeepers:

The small red ants are undoubtedly the most troublesome of the insects infesting houses, and to destroy them or even to keep them in check appears to be nearly a hopeless task, owing to the countless numbers of specimens and the remarkable persistency they exhibit in their attacks. All that can be done is to carry on an incessant and untiring warfare against them by means of liberal and frequent applications of pyrethrum powder, kerosene or kerosene emulsions, hot water, naphthaline, etc. Shallow dishes half filled

with sweetened water and placed at suitable places will also attract multitudes of ants, which may be easily destroyed from time to time. Should the hole by which they enter the house be discovered (a matter of no small difficulty and sometimes even impossible), they can be more readily kept out by a good dose of kerosene poured across their path. A sponge saturated with sweetened water will soon teem with them, and if repeatedly cast into hot water when charged with the ants, will help materially to abate the nuisance.

A BOILER EXPLOSION AT CINCINNATI, OHIO.

The boiler at the Cincinnati Sheet Lead and Pipe Works recently exploded, doing no damage to the pro-



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perty and causing no loss of life; it is somewhat of a curiosity, as a great many attribute the cause to shortness of water, the usual scapegoat in such cases.

The boiler is shown in Fig. 1 by dotted lines, except the flues, and part of the bottom, which were damaged. The appearance of the collapsed flue from the end is shown in Fig. 2.

The boiler was 42 inches in diameter and 26 feet long, with two 15 inch flues, and was made of 1/4 inch plates.

The furnace was under the forward end of the boiler, the frame passing for 26 feet under the boiler and for 26 feet back through the flues, 52 feet in all; the right hand flue collapsed at the second or third ring from the front and upward; it also split along the under side of the longitudinal seam.

The theory of many was, at first sight, that the water became low and the flue then collapsed, of course by becoming overheated.

An examination into the whole conditions will show, I think, the true cause; the boiler was very old, and the flues according to modern practice very large; a de-

the rear end of flue, and on the top, and also both flues would have been damaged.

This must, I think, be classed among accidents from a defective flue. A. R. P.

Indefinite Cost of Electric Lighting.

It has always been a difficult matter to get anything like a reliable estimate of the cost of electric lighting. The conditions of the problem vary according to the source of power, the number of lamps in use, the average time they are burned, etc., etc., so that electric lighting may prove to be economical in one mill or workshop, and more expensive than gas in another. Still it would be possible, no doubt, to ascertain the average cost of producing a certain amount of light under ordinary conditions, if the lighting companies were disposed to furnish the public with such information. That they do not want to do so was shown in the recent Electric Light Convention in Chicago. A committee had been appointed to ascertain the relative cost of producing the light by water power and steam power, but on second thought the Convention determined that it would be unwise to publish the figures. The committee was therefore discharged before any report was presented, and this for the avowed purpose, the *Phila. Ledger* thinks, of keeping the public in ignorance of the cost of electric lighting. It is doubtful whether such secrecy pays. It gives rise to the impression that the profits on present rates are enormous, and so encourages the formation of rival corporations.

PRACTICAL STUDIES OF MAN'S LOCOMOTION.

Our readers already know about the Paris Physiological Station,* and some of the experiments that have been performed there, and they have been enabled to see, by means of a series of instantaneous photographs, how we analyze the complicated mechanism of walking, running, and leaping, and how motions so rapid that the eye can scarcely seize them are fixed in a sort of diagram which faithfully reproduces their least details.

Such experiments, which are interesting to the physiologist, whom they permit to understand the mechanism of motion better and better, have, in addition, from a practical point of view, a utility that it will perhaps be not without interest to give prominence to.

Good walkers, good runners, and agile leapers are not only men who are endowed with special aptitudes, or who, by frequent exercise, have acquired muscular strength, but they are also *professionals*, that is to say, by the unconscious work that accompanies every frequently repeated act, they have gradually found a means of managing their forces so as to produce the best effect possible. Although every one has the pretension of knowing how to walk and run, there are, among walkers and runners, virtuosos after their kind, who exert no useless stress, and who regulate the rhythm and length of their step according as the stretch is to be a long one or the gait rapid. These

professionals would be incapable of transmitting the secret of their skillfulness, since they know it not themselves, having scarcely reflected upon the acts which they perform, after a manner, mechanically. But this secret may be taken by surprise. For this purpose, I propose, as soon as fine weather sets in, to submit the motions of remarkable walkers and runners to photographic analysis. There is nothing rash in discounting the success of these future experiments, for the peculiarities of the improved gaits will certainly reveal themselves in the photographs. Finally, it is allowable to hope that, from the time when the characters of a correct gait shall be well known, it will become possible to teach the principles of walking, running, and leaping, and of all exercises of the body generally, in a methodical manner.

From a military standpoint, the question of man's walk is of peculiar importance, but presents likewise special difficulties. As the exercises of the soldier do not address themselves to men of polish, they must be regulated for individuals of medium strength. Experience alone must decide in such a matter, so it is after laborious researches that the length of the soldier's step has been fixed, as well as the rhythm of his walk and the load that he must carry, in order to utilize his forces in the best manner

* See SUPPLEMENT, Nos. 408 and 414.

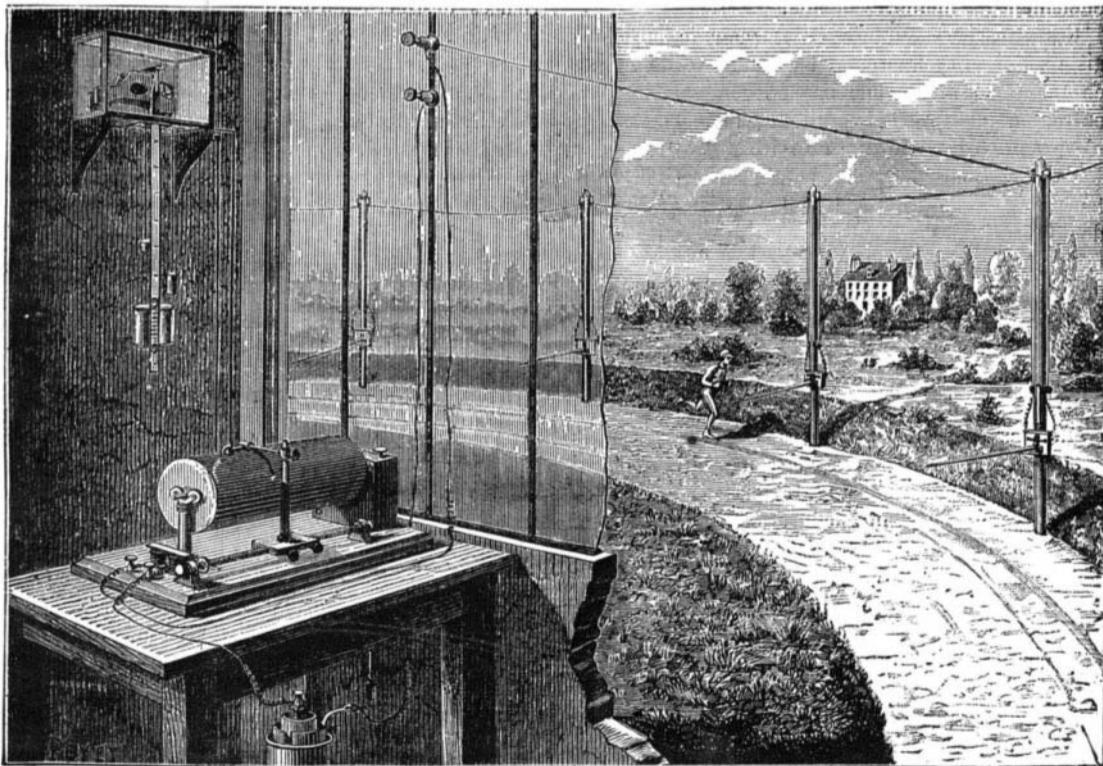


Fig. 1.—GENERAL ARRANGEMENT OF THE TRACK AND APPARATUS AT THE PARIS PHYSIOLOGICAL STATION

fect occurred at the seam in the flue, gradually increasing till it so far weakened the sheet that it gave way along this seam, and the flue collapsed at this point, when, of course, the water went out (indeed, this may have been leaking out all night, the accident occurring at 10 A. M.); the boiler being empty, or nearly so, the bottom sheets would become heated and bulged, as shown.

If the boiler had been short of water, and the flues collapsed from that cause, it would have done so at