

THE SCORPION FLY.

The return of warm weather and the awakening of the insect world are usually simultaneous; and our farmers and gardeners are on the alert, ready for battle against their puny but powerful enemies. The enormous fecundity of insects is, however, somewhat offset by the great appetite for mutual destruction which characterizes many species; and some of the most pestiferous of them are useful, as they frequently destroy myriads of creatures against which human ingenuity can avail little. The scorpion fly, which we herewith illustrate, while in its larval state burrows under the surface of the earth, and is supposed, with apparent reason, to prey on the roots of plants: but no sooner does it develop into a fly than it becomes carnivorous, rapaciously devouring any live insect that it can catch. Its appearance reminds us of the dragon fly; and although it is not so murderous as that celebrated marauder, it does good by destroying the leaf-rolling caterpillars which destroy the foliage (and the vitality) of so many currant and gooseberry bushes, depositing their eggs in the curled-up leaves, and so enabling their offspring to defy hellebore, salt, and other foes to their peace.

History carries back the name of scorpion fly to the days of Aristotle, who fancied these insects were winged scorpions of diminutive size. The joints of the abdomen do suggest a comparison between the two. Other observers have seen a resemblance between the shape of the head (in one species at least) and that of the horse. We miss the brilliancy and lustrous beauty of the eyes so observable in the dragon flies; but yet these organs are keen enough in the scorpion fly tribe. The wings are gauzy, as in the dragon flies, and spotted with shades of gray and brown, while the forceps at the tail of the male fly indicates another resemblance; this is said to have strength to pierce the human skin, but we incline to doubt this. The females, unlike the dragon flies, have an ovipositor or egg placer, rendered necessary by the mode in which the eggs are deposited; otherwise they are equipped as are their partners, and they subsist in the same manner. The legs of these insects, to which allusion has already been made, are well worth looking at under a moderate magnifying power, as they are surrounded with finely cut spines arranged in rings; while the knee joints are fringed and spurred, and the extremity of the foot bears toothed claws, which have been compared to those with which some spiders are furnished.

The larvæ of the scorpion flies are cylindrical in shape, studded with tubercles, and with short fore legs; the head, somewhat flattened, facilitates the burrowing operations that are essential in their mode of life. Having reached maturity, each one scoops out for itself a cell, and there becomes a singularly squat pupa, exhibiting not much resemblance to the perfect insect that is to appear from it. It should be noticed that, if one of these flies is laid hold of, it executes such contortions that some persons are alarmed and speedily let it go.

THE DEATH'S HEAD MOTH.

Among the *lepidoptera*, an order which includes the butterflies and moths, the tribe of *sphinxina* is in many ways remarkable. Its specific title is derived from sphinx, and is attributable to a habit of the larvæ, of sitting with the head and forepart of the body raised, in some resemblance to the well known recumbent images of ancient Egypt. The hawk moth is one of the largest species of this order.

Another and well known member of the tribe is the death's head moth, dark brown in color, variegated with yellow, which has on the back of the thorax a deep orange mark, bearing considerable resemblance in shape to a human skull. This was once regarded as ominous, and the appearance of many of the moths was taken for a warning of an approaching pestilence. The omen is certainly portentous, but only to the potatoes, the larvæ being very fond of the plant; and the pupæ are frequently turned up in digging potato grounds. The moths are very fond of honey, and will invade beehives to obtain it: yet the bees are not known to attack them, being apparently scared by the intruders, who emit plaintive squeaks when any one tries to interfere with their proceedings. Our engraving gives an accurate representation of this singular caterpillar, which has always been an interesting study to naturalists, and is evidently not unimportant to agriculturists and gardeners.

The Snapper Telegraph Sounder.

A little instrument is sold in the streets of New York city for 25 cents, for facilitating instruction and practice in telegraph manipulation. It consists of a little strip of ribbon steel mounted at one end in a soft metal block, indented in the middle by a hammer and punch, and fitted at the other end with a brass tip. By pressing down the spring a dis-

tinct snapping sound is produced, which is repeated when the spring is allowed to resume its normal position. With the aid of this instrument—which is sufficiently portable to be carried in the waistcoat pocket—conversation can be carried on between persons initiated in the use of the Morse sounder.

Tyre Rolls.

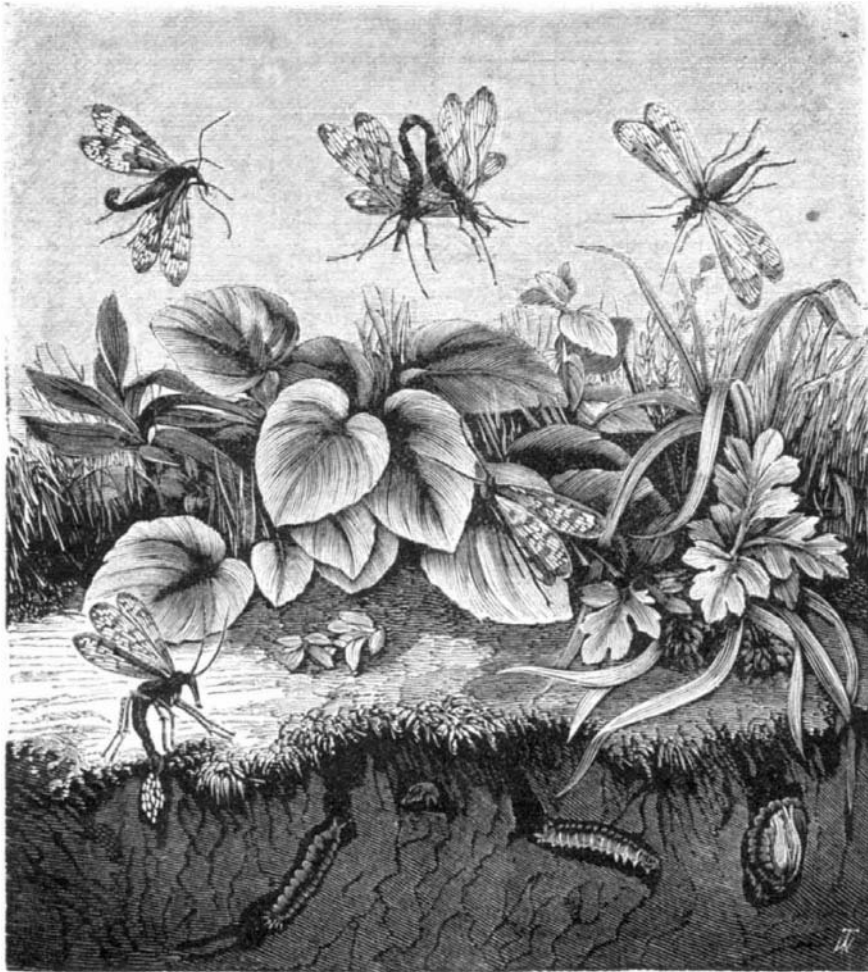
M. Dallar, an engineer of Dusseldorf, has made a new arrangement for rolling tyres. The rolls are on vertical axes. The smooth faced roll, which corresponds with the inner face of the tyre, is mounted on a vertical arbor, which receives its movement through bevel wheels from a horizontal

apparatus is completed by two pulleys turned so as to serve as guides to the tyre, and the position of which is regulated by a hand wheel and screw.

When large tyres are to be rolled, the number of these guide wheels is increased. A horizontal roll also supports the tyre. The apparatus is said to do its work perfectly.

The Royal Society Soiree.

The recent annual soiree of the President of the Royal Society was very brilliant and successful. The Royal Society's apartments consist of five noble rooms on the upper floor and two on the ground, and in each a sufficiency of novelties were displayed. In the first were some models, interest in which was at once excited by their simple labels. One of them was a model of Valour's pile driving machine, used in the construction of the old Westminster Bridge, which was built in 1739 and following years; the other was the original machine, constructed by Heathcote in 1808, which had the effect of reducing the price of bobbin net lace from five guineas a yard to five pence; *apropos* of which a quotation from Lord Bacon was given on the card: "For upon every invention of value we erect a statue to the inventor, and give him a liberal and honorable reward." In this room two of the prettiest and most instructive experiments were shown by Professor Barrett, namely, the lengthening of a bar of soft iron within a helix of wire by heat; the other the remarkable and anomalous changes which take place in the heating and cooling of iron wire. Thus, while the iron is first heating there is a sudden contraction or cooling. And so again, when the heat is cut off, the wire cools a little, and then suddenly reheats and glows, afterwards quietly passing down to a blackness. Now, the notable points of these jerks or changes are that the iron, in the first instance, loses its magnetism, and in the last jerk or oscillation regains it. In the second room some simple delicate radiometers were shown by Mr. Crookes. These consisted of a glass stem supporting a little four-bladed windmill, carrying four disks, one on each end of the four slender glass rays. These work horizontally, supported by a steel point on a small topaz, and the radiation of light from a common candle at some distance away suffices to make them rotate with great liveliness, in vacuo in a small glass globe. In the fourth room was a working model of Sir David Salomons' system of automatic railway signaling. Each engine is supposed to carry



METAMORPHOSES OF THE SCORPION FLY.

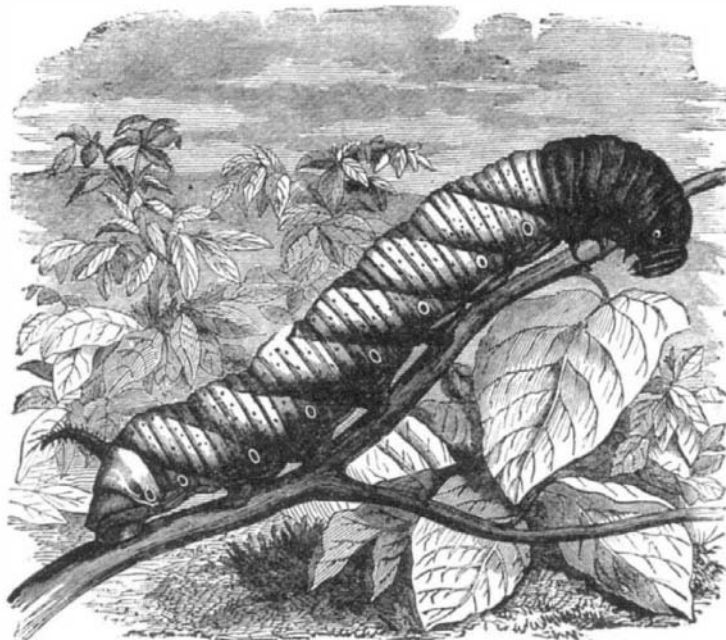
main arbor turned by a twin steam engine, of which the following are the principal dimensions, etc.: Diameter of cylinder, 10 inches; stroke, 36 inches; steam pressure, 8 lbs.; revolutions per minute, 70. The profile rolls are three in number, the first reducing the tyre after it has been forged under the steam hammer, and the two others completing the work. An arrangement like that adopted in lathes allows of giving two distinct movements to the three rolls, a longitudinal movement to bring the roll up against the tyre, and a transverse movement to bring each of the three in succession into action. The last movement is made by hand with the aid of a screw to which a wheel is attached, the transverse carriage bearing the three rolls being thus made to slide on the great carriage which has the longitudinal movement.

ry a battery and electric bell, and beneath it two metal wheels, insulated from each other, and pressing down on a signal line of small rails laid on the center of the sleepers. These central signal lines are double, and are laid in block lengths, one being a front signal line, the other a back signal line. On arriving at the termination of one block and the commencement of the next, one wheel will roll on the front signal line, while the other will roll on the back signal line, but at other places the left hand wheel will be free. Now one wire of the battery and one from the bell are taken to earth by being simply attached to the engine, the current passing through the ordinary rails of the permanent way. If, then, while a train was on one of the blocks, another train came on the same block, the bell on the engine of the

following train would ring—a sufficient warning to stop and avoid danger. In the principal library, on the table beside the model of the fine telegraph ship Faraday, Mr. Siemens exhibited some large fragments of rock which had been dredged up in 1,400 fathoms, from the ocean depths, in the laying of the United States cable. Sir William Thomson's tide-calculating machines, in the same apartment, however, bore the palm of the exhibition. By means of the first one, observation of the rise and fall of the tide is made daily from the shore, and the facts so accumulated are the constants, and form the basis for setting the second or calculating machine, in which a continuous wire passes over a series of wheels placed at various distances, the result being that of harmonic motion of different periods and epochs, by which the year's facts can be ground out by turning a hand wheel, and recorded on the paper-carrying drum.

Novel Steam Launch.

During the last few days some interesting experiments have been made with a steam launch belonging to Sir Gilbert Clayton East. The boat itself is not new, having been built some four years ago by Messrs. Forrest, of Limehouse, and then fitted with engines for driving twin screws by Messrs. John Penn & Sons, the eminent marine engineers of Greenwich. Her owner, however, finding that the two propellers were constantly becoming entangled with weeds, applied a short time ago to Messrs. Penn to supply him with a new engine to drive a single screw, as less liable to that inconvenience. In order to make more cabin accommodation Sir Gilbert East gave directions that the engines should be fitted very far back in the stern—so far back, indeed, as to render the application of an ordinary launch engine impossible—and at the suggestion of Messrs. Penn he decided to



LARVA OF THE DEATH'S HEAD MOTH.

This latter is mounted somewhat after the fashion of a slide rest on the lathe beds, and its movement is effected by hydraulic pressure brought to bear upon two pistons fixed to the carriages which enter cylinders fixed to the bed. One piston and cylinder, much larger than the other pair, serve to bring up the roll and press it against the tyre, while the smaller piston and cylinder are powerful enough to withdraw it. When the roll is not working, the carriage may be moved by means of a rack and pinion worked by hand. The