

THE KEELY MOTOR DECEPTION.

Another chapter in the history of this time-worn, stock-jobbing deception was lately completed by a public exhibition at Sandy Hook, N. Y., on Sept. 20, of a pretended "etheric force" gun; but which in reality, to our eye, was nothing more than a clumsy air gun, from which a few bullets were discharged. Keely was present and performed as a juggler, much to the satisfaction of the assembled crowd of New York stock brokers, who seemed to relish the Keely jargon and the muddled clarity of his absurd explanations.

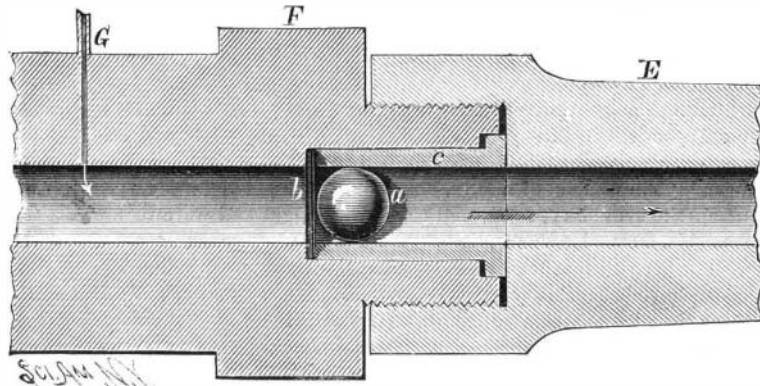
In brief, Keely and his assistants brought to the ground a small air gun, shown in our engravings, with a cylinder charged with compressed air. The cylinder was connected by a small pipe with the breech of the gun; thin disks of hard and soft rubber formed a partition between the breech air chamber and the bullet. The performance consisted first in the turning of the air faucet by Keely, then while the air was flowing through the small pipe into the air chamber, he struck on the rear part of the gun with a mallet, by which he pretended to vibrate the "etheric vapor." By the time he got through with this juggle the air pressure had accumulated behind the disks sufficiently to burst them, and then the bullet was driven out; Keely then turned off the air, and prepared another charge. By varying the thickness of the disks the velocity of the bullets could be increased or diminished as desired to suit the credulity of the audience; and by this juggle it was pretended that the pressure of the "etheric force" increased with the discharging of the gun. The day following the "exhibition" the daily papers contained laudations of Keely's "great success," the stock of the "Keely Motor Company" was thereby sent up from 9 cents on a dollar to 15 cents, and the money of the deluded purchasers was thus successfully netted.

The following is an account of the apparatus and mode of working, as described and performed on this occasion by the Keely operators. The force is derived from an etheric vapor generated by machinery specially designed for the purpose; this inter-atomic ether is composed primarily of water and air mixed in the proportion of half a wine glass of water to a bucketful of air. When this mixture is placed in the generator; which is located in the inner recesses of Mr. Keely's shop in Philadelphia, it is subjected to the influence of certain vibratory impulses which "negatize" the chemical affinity binding the elements together and a disruption ensues.

Mr. Keely has discovered that sound not only annihilates atomic force, but it also subdivides the atoms themselves; and hence, although water has yielded only pure oxygen and hydrogen when dissociated under the direction of ordinary physicists who have been unable to change the ratio existing between a volume of water and the resulting volume of gases, he has been enabled to fill large spaces with vapor under great pressure, simply because under his manipulation our atoms become his molecules. Incidentally it

may be stated that he claims to have obtained a vacuum of thirty-one pounds. The gun has a spherical knob, secured to the breech, from which projected a round bar having a diameter about equal to that at the extremity of the muzzle. The breech was 4½ inches in diameter, and

the length 3½ feet. Just forward of the trunnions, at the point F, the muzzle unscrewed; this construction was necessary to permit the placing of the gas check in position. The sectional view of the gun is not drawn to scale, and was not extended to the end of the breech, as the inventor did not wish to make public all the details; we give the drawing merely to show how the gas check was secured and its loca-



KEELY GUN.—LONGITUDINAL SECTION.

tion. A sleeve, c, having a bore equal to that of the gun fitted in an annular recess in the forward part of the breech, F. As the muzzle was screwed upon, the sleeve was forced in until it firmly held the gas check placed between the rear end of the sleeve and a shoulder formed in the breech.

The gas check consisted of three disks having a diameter of 1½ inch; the two front disks were of common hard rubber having a thickness of ⅛ of an inch; the third disk—

from the breech, G, of the gun to the magazine, A, which was made of wrought iron, and was 4½ feet long, 8½ inches outside diameter, and has a bore 5 inches in diameter; the capacity was 5 gallons. This magazine was connected by the wire, C, to a second one, B, similarly made, but only about half the size. The supply from the small to the large magazine was controlled by valves, as shown, and a valve governed the supply to the gun. These magazines had been charged with the inter-atomic ether evolved by the generator heretofore alluded to as being in Mr. Keely's shop, and although grave doubts had been expressed as to the propriety of transporting them upon the railroad—owing to the uncertainty of the effect that would be produced upon the vapor by the sonoric qualities of an express train—they arrived safely at the range. When the valve of the first magazine was opened nothing could be obtained from it (this was a preliminary part of the trial, and took place before the arrival of the guests), and it was feared that the vapor had become "negatized," but it was soon "revivified" by a few scientifically administered blows carefully distributed between the big and the little magazine.

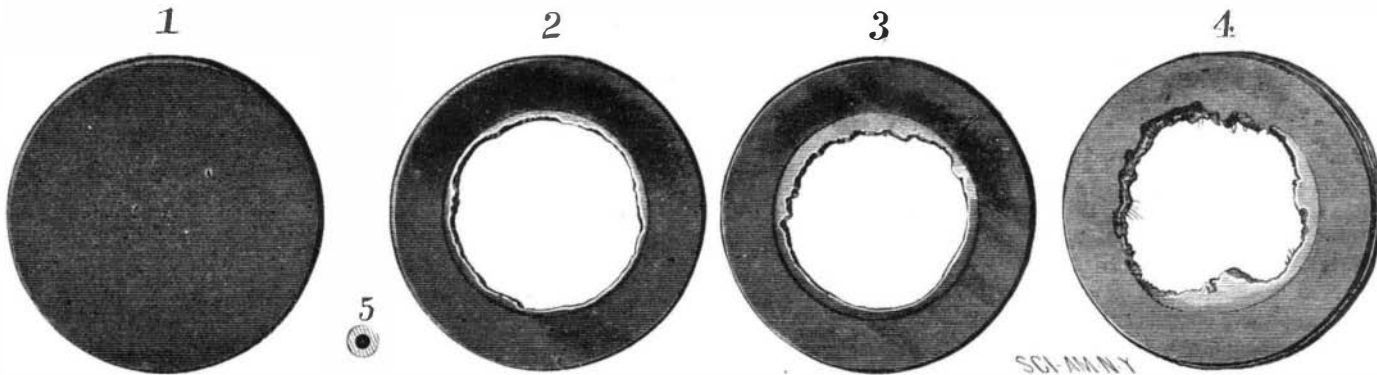
It may be here mentioned that a wooden mallet which Mr. Keely held in his hand produced effects which it is doubtful if the magician's wand could even equal. A stroke upon the little magazine "intensified" the qualities of the other in which the "vivification" was kept up by a blow now and then delivered, and a slight tap upon the end of the "resonator," H, exploded the vapor in the breech and discharged the gun. So we see that the "vitalization" of the entire plant depended very materially upon the judicious use of a mallet.

In loading the gun the gas check was first placed in position and the muzzle screwed up tight, when the ball was introduced at the muzzle and rammed home. The valve was then turned, to admit the vapor to the breech, and after waiting a few seconds the end of the "vibrator," H, was struck, when the charge exploded. The time intervening between the

turning of the valve and the discharge was, on an average, about six seconds. The first blow upon the vibrator did not often cause the explosion; it was necessary to strike it several times, but, as luck would have it, the blows always preceded the discharge. Mr. Keely did not wait a minute or two in order to convince skeptics that no explosion would take place until he struck the vibrator. There was no appliance of any kind by which the pressure in

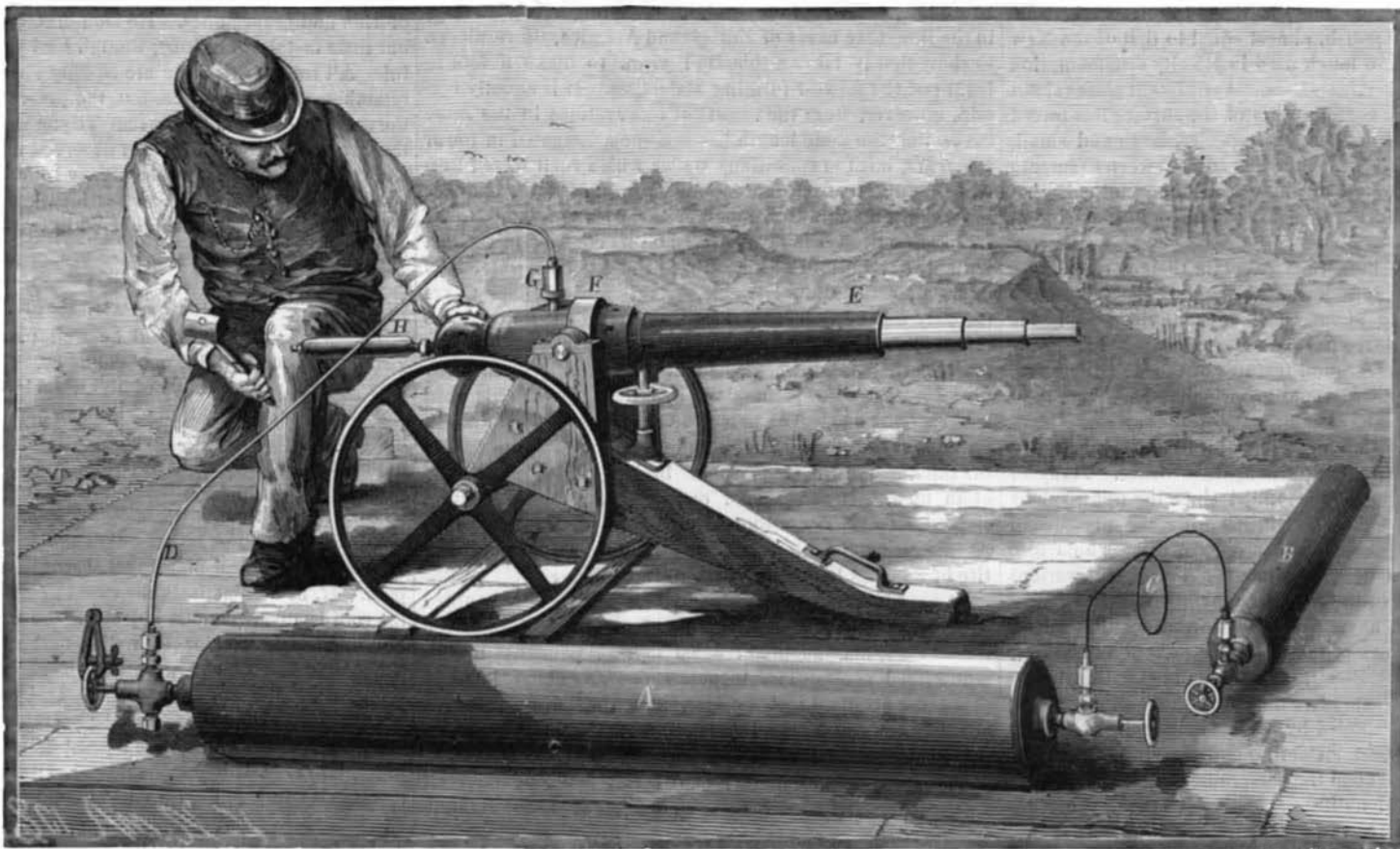
either the magazines or gun could be determined.

We believe we forgot to mention that the gun itself received considerable attention from the mallet. It had acoustic properties peculiarly its own, and blows upon its exterior set in action "vibrators" distributed through its breech. There were also vibrators forming part of the interior arrangement of each magazine. Nineteen rounds were fired at a target placed 500 yards distant. There was no difficulty in sending the bullets that far with a 5 degree elevation. A conical steel bullet pierced four inches of pine plank



KEELY GUN.—FULL SIZE VIEW OF GAS CHECK DISKS AND CONNECTING TUBE.

placed next to the pressure—was of soft rubber packing, single ply and ⅛ of an inch thick. The exact size of these disks is shown in Figs. 1, 2, 3, and 4, Fig. 1 being the disk before rupture, Figs. 2 and 3 showing the hard rubber disks after the discharge, and Fig. 4 showing the soft rubber one after the discharge. The broken disks also show the imprint made by the end of the sleeve. A spherical lead bullet having a diameter of 1½ inch was used, the bore of the gun



THE KEELY DECEPTION.—THE VAPORIC GUN.

being just sufficient to insure a snug fit. Vapor was admitted through the opening, G, to a chamber, behind the packing, having a capacity of one-half pint.

A copper tube, ⅜ of an inch external diameter and ⅛ of an inch internal (Fig. 5 being a cross section, full size) led

placed a few feet from the gun. The noise closely resembled that caused by a common shot gun when loose powder, having no ramming on top of it, is exploded. A small cloud of white vapor, which almost instantly disappeared, followed the discharge. It was impossible to

detect, with the hand, any change in the temperature of the gun.

The velocities of three consecutive shots were measured. The tenth bullet traveled at the rate of 482 feet per second, the eleventh 492 feet, and the twelfth 523 feet per second.

After the last shot had been fired the tube was disconnected from the gear, and the valve at the magazine being opened, the visitors were allowed to examine the inter-atomic ether as it issued from the pipe.

It had but a trace of odor, no taste, and had no effect upon the lungs. This ended the trial.

We saw nothing done by the Keely Vaporic Gun which cannot be duplicated by the aid of compressed air.

A gas check made of the same material Mr. Keely used and held in the same way is strong enough to withstand air at a pressure amply sufficient to drive a bullet with the velocity he obtained.

At the lowest calculation and allowing a wide margin for safety, his reservoirs would hold air at a pressure of 20,000 pounds to the square inch; this quantity would be sufficient to fire twice nineteen rounds, and since the thickness of the gas check would govern the velocity of the ball, the last shot would have a velocity equal to the first. Many more than nineteen shots could be thrown by the aid of the same apparatus he used, substituting air for inter-atomic ether.

We estimate that Keely used an air pressure of 800 to 1,000 pounds to the square inch to break his gas checks and discharge the bullets.

Although when new inventions appear it may be necessary to coin appropriate terms, we should not think it essential to resort to a heterogeneous comminglement of absurdities.

Furniture Woods.

A generation or more ago the most admired wood for furniture purposes was mahogany. Until quite recently the taste for mahogany has been held in abeyance, and black walnut has long reigned the king of the furniture woods. Before mahogany controlled the popular desire, cherry was a favorite, and our white walnut or hickory was used to a considerable extent. These old fashioned woods are coming into favor again, and very fine effects are produced by the contrasts of cherry and hickory, and by mahogany and hickory. Mahogany and cherry blend admirably as shades of color instead of contrasts. The so called "branch" mahogany, that in veneers on the fronts of bureaus and in the frames of mirrors formerly produced such impossible effects of grain, has given place to that of plain straight grain, the effect of color rather than of grain being desired.

Except yellow and black birch and the satin and birdseye maple, there are few of our native woods that show a very distinctive grain. This makes them valuable as foils to the more erratic grained woods of the tropics. One of these, the *coco bolo*, of a deep red color, with broad striated grain, works up beautifully with the cherry, making a complement of tints, or with the hickory, showing a contrast of color and of grain.

According to the statement of a prominent dealer in furniture woods, our cherry and hickory are coming rapidly into demand, and for foreign woods the mahogany and the comparatively little known *coco bolo* are much called for by makers of fine furniture, carvers, and internal finishers.

John W. Garrett.

John W. Garrett, President of the Baltimore and Ohio Railroad since 1858, died in Baltimore, Sept. 26, in the 65th year of his age. He was born in Baltimore, graduated from Lafayette College, entered his father's banking house at the age of 19, and was made president of the great railroad with which his name has since been associated at the instance of Mr. Johns Hopkins. From that time the road has regularly paid dividends, and the stock has advanced from \$57 to something over \$200 per share, largely due to his enterprising and energetic management and constant personal supervision, under which the road has been extended and branches built to make it one of the main trunk lines of the country. Mr. Garrett was also during this period the head of his banking house, was one of the trustees of the Johns Hopkins estate, and connected with many other local institutions.

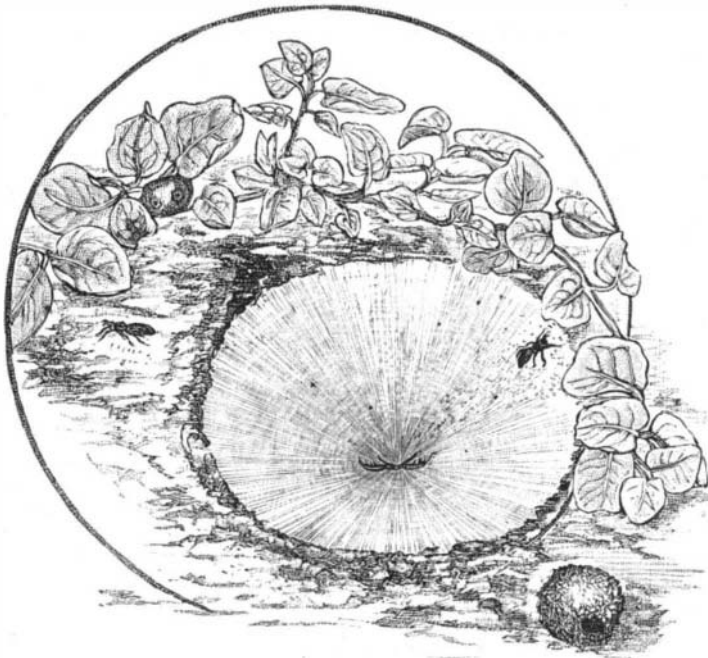
Snow Water Impurities.

Under the heading of "The Beautiful Snow," the *Microscope* points out the kind of organic impurities found in snow, which, added to what we recently quoted on the same subject, very conclusively shows the fallacy of the idea that melted snow forms a good substitute for distilled water. The impurities are as follows: Living infusoria and algae, bacilli and micrococci, mites, diatoms, and great numbers of fungi spores; also fibers of wood, mouse hairs, pieces of butterfly wings, skin of larvæ of insects, cotton fibers, pieces of grass, epidermis, pollen grains, rye and potato flour, grains of quartz, minute pieces of roofing tile, and bits of iron and coal!

THE ANT LION.

BY H. C. HOVEY.

Although the peculiar habits of the ant lion (*Myrmeleon*) have been repeatedly described by naturalists, many persons do not yet seem to be aware of his existence. Hence it may



THE PIT OF MYRMELEON, WITH A COCOON NEAR THE MARGIN.

be worth while to lay before the general reader some of the facts that have been gathered, partly by inquiry, but chiefly as the result of my own observations.

In quiet nooks, where the soil is dry and sandy, and especially in the hollows left by the roots of decayed and fallen trees, the chosen resort of busy colonies of ants, one may have noticed conical pits, from half an inch to two inches in diameter. Each of these pits is a trap, a den, inhabited by a creature as ferocious as the tiger and as subtle as the serpent. Scoop up the sand thus excavated, spread it out on a paper, and you will see a small, oval, sluggish

the only thing to be done was to abandon the pit and dig a new one in a more favorable location.

When all is made ready, the ant lion lies motionless as if dead, and will continue to do so for days and even weeks, awaiting his prey. Voracious as his habits are, he rejects whatever is dead. To one that had fasted a fortnight I offered a luscious blue-bottle fly, but in vain, because the fly was not alive. On catching another, and a large one, stripping off its wings, I let it fall directly into the expectant jaws, and it was seized instantly and dragged under the sand to satiate the hunger of the voracious foe. The fly was three times as large as the ant lion, but in an hour the carcass was tossed out of the pit, bereft of its juices; the damaged walls of the pit had been repaired, and *Myrmeleon* was ready for further supplies. Seldom does any victim escape.

A young ant lion was seen by a friend of mine to grasp the abdomen of a large fly that had invaded his den, and not being strong enough to conquer, it held on with a grasp so tenacious as to be lifted into the air and carried to a considerable distance before relaxing its hold. It is frequently the case that an ant, on finding himself slipping into the pit, will use his utmost endeavor to escape; but usually a shower of sand brings him down into the vortex. It is not true that the sand is aimed directly at the victim. It is thrown up at random, and one shower is followed by another till the desired object is accomplished. The ant lion varies his methods with different sorts of ants. When the carpenter ant, whose jaws rival those of his foe, falls into the pit, he is seized and held aloft in such a way as not to be able to fight, while the ant lion complacently sucks out his juices. Equal caution is manifested in attacking the pavement ant, which carries a sting. I have to acknowledge that I once left six ant lions of about the same age and size in a cigar box half full of sand, where each had a separate pit, and neglected to make provision for their being fed during my absence of several weeks. On my return I found but one symmetrical pit, inhabited by a sleek, fat ant lion, while around the margin lay the five dry shells of his brothers. This case of cannibalism is the only one of the sort that has fallen under my observation.

Having existed for a long time in a larval state, the *Myrmeleon* prepares for himself a spherical cocoon, in which he passes forty-two days. Toward the last of the pupa state the jaws become serviceable, as the insect uses them to gnaw his way through the walls of the cocoon, whence he escapes as an imago, leaving the jaws behind with the larval skin cast in the transformation. The imago is an elegantly shaped dragon fly, bearing as little resemblance to its primitive form as does the butterfly to the crawling caterpillar.

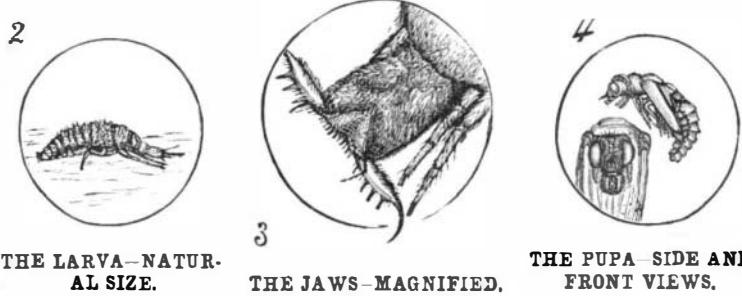
My experiments have been limited to a single species, *Myrmeleon immaculatus* (De Geer); the specimens being from Indiana and Michigan. This species, however, is widely distributed, from Massachusetts to Georgia and Minnesota. There are two or three species of pit-forming *Myrmeleons*, besides several other kinds that prowl around on the surface

for their prey. Those desirous of investigating further will find that there have been excellent descriptions published by Dr. Hagen, in the "Smithsonian Miscellaneous Collections," vol. iv., and by the same author in the *Entomologische Zeitung*, 1873. Other authorities are Brauer, Emerton, McLacblin, and McCook.

It gives me pleasure to acknowledge obligations to Mr. N. B. Pierce, of Ludington, Mich., not only for facts and references, but also for the drawings serving to illustrate this article.

Cholera and Macaroni.

If it is a fact, as alleged by Professor Koch, that cholera is the result of a microbe, what is to prevent the transmission of this dread disease to other countries from Italy, not only through the export of fabrics, etc., alone, but from olives, olive oil, pressed and preserved fruits, macaroni, and other edible commodities shipped from that beautiful and productive country, where the cholera has been raging with such dire results? Be that as it may, a correspondent of the London *Times* writes to that journal, warning people against the use of macaroni and other pastes made in Italy, and specially in the neighborhood of Naples. Supposing the theories of Professor Koch to be correct, we cannot imagine a more likely agent for receiving and transmitting microbes than macaroni, from what we have witnessed of its manufacture in the neighborhood of Naples. The factories for the manufacture of macaroni, between Naples and Pompeii, do not present, during the coolest and healthiest seasons, a pleasing or appetizing sensation to those who are fond of the paste and witness its manufacture for the first time. Macaroni in the course of its manufacture is hung to dry in the open air amid clouds of dust, flies, and stench of all kinds, the locality where it is made being in the dirtiest and poorest districts, and where it is said the cholera has been raging the severest. The *Times* correspondent cheerfully, if not playfully, closes his article by remarking: "One has only to think of this important article of food, which is so much used, being manipulated by plague stricken workmen, who no doubt sicken and die amid the macaroni which is being prepared, under such horrible conditions, to send broadcast over the world and spread the pestilence."



THE LARVA—NATURAL SIZE.

THE JAWS—MAGNIFIED.

THE PUPA—SIDE AND FRONT VIEWS.

bug, whose main anxiety is to get out of sight as quickly as possible by crawling backward into the sand. Observe him closely, and you will see that his head is furnished with a formidable pair of jaws. This ugly little fellow is the larva of *Myrmeleon*.

In my library I have placed a box of sand in which are kept a number of these ferocious pets. It is interesting to watch the process of digging the pits. The ant lion plows a circular furrow, going backward all the while, and shoveling the sand with his broad and flexible tail. It is invariably thrown outward from the center. A second and inner cir-



THE IMAGO OF MYRMELEON, JUST EMERGED FROM THE COCOON.

cle succeeds the first; and this continues until a conical pit is completed, at the bottom of which the ant lion lies, wholly concealed except as to his jaws. Occasionally a small pebble, or other obstruction, will tax the ingenuity of the insect worker. He will lift at the load with either head or tail, as is most convenient, trying to jerk it out of the pit. I have seen the effort repeated twenty times before patience met with its reward. In other instances the obstruction would exceed the ant lion's combined skill and strength, and then