

THE "LUNA" MOTH.

BY PROFESSOR E. C. H. DAY.

Fairies, those unseen loves of our early, happy, unreasoning childhood, disappear, as years advance, into the category of mythical impossibilities; and, in truth, even with children, they are rapidly becoming an extinct race, exterminated by the hard facts of science; but who that has known them in his fancies, does not feel a pang of regret, when he finds that they may not pass into the realms of reality? Certainly such sprites must have been a great source of contentment to those ever-childish elders of past ages, who unwaveringly believed, all their lives, in fairies and goblins; such convenient agents as they were, to whom to attribute all manner of phenomena that could not otherwise be explained! It was so easy, and, at the same time, savored so delightfully of the marvelous to be able to say "the good people have been here this night, and have brought this," or tremblingly to recognize in mischief the hand of some elfin Robin Goodfellow. It was so much easier, we repeat, than to discover by close observation, careful experiment, and strict unimaginative induction, that good things are not fairy gifts special to ourselves, and to learn, worse still, how bad things are but too frequently the certain results of our own stupidity, folly, and viciousness—the most vengeful and inexorable of goblins. And it is to this, good reader, that science brings us. Oh, that we could sometimes believe in imps and fays!

Now, we do not know whether the inhabitants of America were ever blessed with elfin agencies; Indians would hardly have appreciated beings who could

"Creep into acorn-cups, and hide them there;"

and roystering Dutchmen in their (not acorn) cups amid the lone valleys of the Catskills, would have been all too coarse associates for the monarch to whom

"The elves present, to quench his thirst,
A pure seed-pearl of infant dew,
Brought and be-sweetened in a blue
And pregnant violet."

As for genuine Yankee fairies and mermaids, never, except in Barnum's! And yet we almost wish that we could certify to the actual existence in America of a fairy queen, who, in a momentary whim, had decked the Luna moth in its beautiful garb; say, that it might attend her majesty's moonlight revels, fittingly adorned. Could we only have brought ourselves to have given to the reader as true such a pleasing myth, it would have saved us the trouble of a vast deal of, what he even now may deem useless, speculation. But first let us quote, from Harris, his admirable picture of this beautiful insect.

"Pre-eminent above all our moths in queenly beauty is the *Attacus* (now *Actias*) *Luna*, or Luna-moth, its specific name being the same as that given by the Romans to the moon, poetically styled 'fair empress of the night.' The wings of this fine insect are of a delicate light-green color, and the hinder angles of the posterior wings are prolonged, so as to form a tail to each, of an inch and a half or more in length; there is a broad purple-brown stripe along the front edge of the fore wings, extending also across the thorax, and sending backwards a little branch to an eye-like spot near the middle of the wing; these eye-spots, of which there is one on each of the wings, are transparent in the center, and are encircled by rings of white, red, yellow, and black; the hinder borders of the wings are more or less edged or scalloped with purple brown; the body is covered with a white kind of wool; the antennae are ochre-yellow; and the legs are purple-brown. The wings expand from four inches and three quarters to five inches and a half."

But to appreciate fully the beauty of the Luna, we should see the living insect, and as it flies by night; but few are fortunate enough to meet with it; and of those who do, there are many, even professing to be persons of taste, who would pass it by, as beneath their notice. Certainly, then, its beauty was not intended especially for the gratification of the eye of man. Some will say, that these colors were intended to gratify the Creator's idea of beauty; then what shall we say of all that is ugly, grotesque, and hideous in nature? And yet there must be some reason why this moth should be so beautiful; or else, we may better, after all, adopt the fairy theory, than any worse alternative. Is this endowment of such peculiar beauty of any value to the creature itself? It is not of a sexual character, for, as far as we know, the sexes are never very dissimilar.

Does its coloration, as is probably the case with some closely-allied, but differently colored, species, serve to protect it? On the contrary, the light color would probably render it more conspicuous to its enemies, so that the fairy gift would be an injury in disguise. The only escape from our difficulty appears to lie in remembering two facts, namely,

that the perfect state represents but one phase of the insects whole life history; and, secondly, that all parts of an organism are wonderfully dependent upon, or correlated with, one another. As far as Nature's use of an insect is concerned, the larval is the really important stage of its existence; the reproductive stage, though essential, being only subordinate in purpose to the earlier one. Thus, as it is the caterpillars that do Nature's work in keeping down an excess of vegetation, it is they that have to be especially protected; and as long as a sufficient number of perfect insects are preserved to maintain the necessary supply of larvae, the rest may perish. If not enough are being preserved, the perfect insects themselves will need protection; but, if too many survive, then the balance which Nature is striving to maintain, will be temporarily disturbed. What a delicate piece of machinery this vast system is!



METAMORPHOSES OF THE ATTACUS LUNA.

The peculiar tails at the hinder angles of the hind wings of the Luna moth fall into the same category as its coloration. As appendages to the insect, they have no purpose. There are butterflies, in which such tails, when the insect is at rest, represent the stem of the leaf imitated by the rest of the wings; but there are numerous species with tails, in which there is no attempt at any such imitation; and, in the case of our moth, any such imitative purpose is out of the question, because its wings do not close over the back in repose, so as to present the leaf-like form, even.

But though neither the color nor the form of the perfect insect appears in itself to have any definite purpose, yet they both must be intimately connected with the structure and conditions of life of the larva, and we may readily suppose them to be, one or both, dependent upon some very essential feature of its organization.

Perhaps—but our column is filled, and the dissatisfied reader asks, why we have wasted it upon such fruitless speculation? We have not, after all, explained why the Luna moth is so beautifully colored. We admit it; we have merely tried to indicate the direction in which such an explanation may be sought. We know that we all have a habit either of looking upon the beauties and wonders of Nature as utterly without meaning, or, at the best, of putting upon them a shallow interpretation, the first and easiest that chances to come to hand; and we have therefore thought it advisable to remind the reader again, that Nature is not an ill-arranged assortment of whims, and that it is quite time for us all to realize, that in Science at least, we must do without fairies.

Plastering.

In lathing for plasterwork, says the *Building News*, laths should break bond—an arrangement technically termed "snatching;" this gives a good hold to the joists, and makes a firm ceiling. Instead of the lathing being executed with rows of laths of equal lengths, joined by other rows of similar lengths, the bond should be broken by changing the length of the laths every five or six feet, and so causing one set to stretch across the joists to which the others have been fastened. This system takes more time than the ordinary system, and will not be adopted by men unless they are well looked after; it requires to be distinctly specified, on account of the extra labor. It is well to examine the cow hair provided for mortar before it is used; hair ought to be long and sound, but often it is brought to the building in bags, of short length and quite rotten, and no strength in it. This sort of hair

makes the plaster far worse than it would be without any; the plaster should also be examined before being put upon the ceilings, by holding a little up with the spade; the quality can be detected by the hair hanging down. The finishing coat of plaster is sometimes set with hair in it; the plasterer picks out the white hair and beats it fine, then uses it with plaster of Paris. The last coat should be composed of about one third plaster to two thirds lime putty. The blotches or streaks sometimes seen in wall plastering are generally the result of bad work, though not so in all instances; a sooty or burnt brick in a wall, will sometimes cause an unsightly patch on the plaster; marks from this cause have been known to come, not only through the plaster, but through the papering also. New ceilings ought not to be whitened; whitening eats into the new work and injures it. Lime for mortar should be burnt but little; much burning destroys its nature; the phrase "lime to be well burnt," is apt to mislead. When sluced, lime is much better than when slaked in the common way, by sluicing we mean letting it fall to pieces, instead of running it with water; it becomes much more durable for mortar, and especially for pebble-dashing in mortar. If, in mixing the lime for mortar or plaster, the least bit remains whole, though as small as a pin head, it will burst in time and throw the plaster off the wall. This explains the bursting occasionally seen on plastered walls. When the lime is run with water, this defect is not so frequent as when the lime is allowed to fall; the latter mode, however, makes a superior mortar, but the lime for this purpose is best prepared two or three months beforehand, which precaution prevents any portion of the lime remaining whole; it involves extra trouble in turning it over, which makes the mortar very expensive. I have known the following practice to be observed in making good mortar: The lime is spread on the ground and a little water thrown over it; the whole is then covered with sand and left for three or four days. The water slakes the lime into a powder; this is then mixed with the sand, and the whole passed through a sieve; it is then

ready to mix with water, to form mortar or plaster.

The best way of forming plaster cornices is to run a muffled mold, muffled with plaster of Paris, upon a ground of hair mortar, and leaving about one third of an inch to be run afterwards with plaster of Paris and lime putty; this makes a much stronger cornice than is made by the present system which is only a result of a wish to expedite the work and make it cheap at the expense of quality of workmanship. Plaster cornices often crack through there being common plaster mixed with the good; the common sets more quickly than the good, and the uneven setting produces cracks. It is a common practice to mix glue with plaster when there is doubt as to its quality; the glue causes the whole to take a longer time in setting.

MATERIAL FOR ICE HOUSES.—It is said that one of the best materials for ice houses is peat; but the genuine moss peat must be employed, and it ought to be cut in pieces fourteen inches long and five to six inches wide and thick. When it is thoroughly dried, it proves to be a poor conductor of heat; and when laid up around ice houses above the ground, is preferred by many persons to sawdust, tan bark, and the like. Peat has also been employed in Europe for building dams, and as protections to coffer dams, in laying subaqueous foundations.

REFINED OIL, for fine mechanism, can be prepared by putting zinc and lead shavings, in equal parts, into good Florence olive oil, and placing it in a cool place till the oil becomes colorless.

Improved Screw Wrench.

The object of this invention is to permit the quick adjustment of the movable jaws of screw wrenches where the relative position is changed to receive nuts of various sizes, and thus to save the time occupied in moving it the entire distance by the screw.

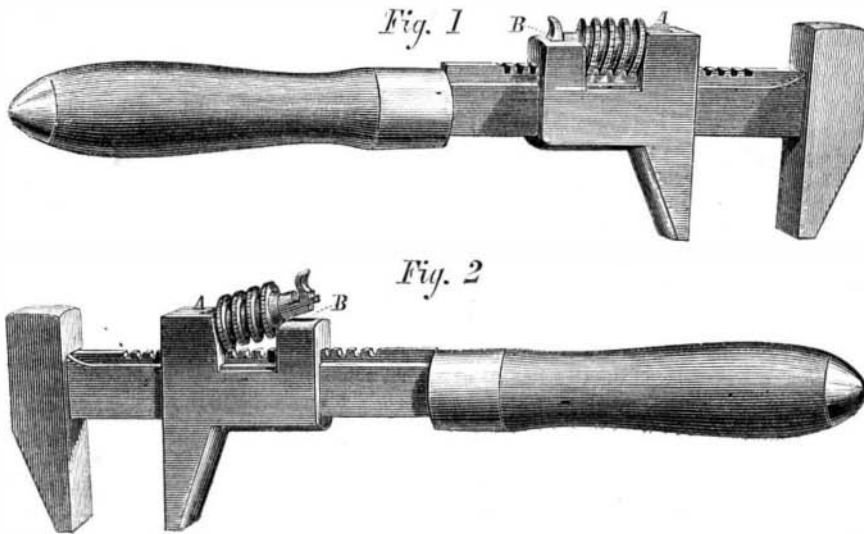
The engravings give an excellent representation of the wrench, showing the device in two positions; Fig. 1 showing the wrench adjusted for use, and Fig. 2 showing it in position to permit the rapid movement of the movable jaw to the place desired.

The shank of the wrench has a worm rack cut on the back as shown. The movable jaw has, at the back, two projections, which carry the worm and its pivot. The pivot of the worm is itself pivoted at A, and its free end shuts into a recess formed in the projection at B. When thus shut into the recess, the worm engages with the rack, and by turning it slightly the requisite nicety of adjustment is secured. The edges of the worm are milled so as to afford a good hold for the fingers. When the worm is thrown out of its engagement with the rack, the movable jaw may slide along on the shank till it nearly approaches the required position.

A spring catch in the end of the worm pivot engages with a suitable recess in the projection, B, to lock the pivot in its place, when the worm is in the position shown in Fig. 1; and a thumb piece is used to press back the catch when the worm is to be thrown out of gear, as in Fig. 2. When, however, the jaw is to be moved only a small distance, the worm is used in the usual manner.

The thread of the screw nearest the neck in Fig. 2, is beveled so as to readily enter the rack, which latter is cut in a rib extending the whole length of the back of the shank.

The wrench, in addition to the facility it affords for rapid adjustment, is strong and light, and, we should judge, durable. It was patented Nov. 22, 1870. For further information address Conrad Cline, Martinsburg, West Va., or Peter Burress, Braidwood, Ill.



BURRESS AND CLINE'S IMPROVED SCREW WRENCH.

recommended. At 530 feet the soapstone was passed, and a stratum of fine-grained sandstone entered. With it came a powerful stream of water, filling the well 300 feet. Then came more caving, and drilling had to stop at 535 feet. The casing was afterwards driven nine feet, and will be pushed down and drilling recommenced. The water has risen to within 120 feet of the surface, high above the streets of Denver, and is pure and soft. It is believed that 250 or 280 feet further will give a flowing well. The work so far has cost \$6,000, and a few citizens have borne the burden. At a meeting of the subscribers it was resolved to ask the city and county each to contribute \$2,000 to complete the work. Considering the public benefit conferred if the well be a success, as it seems likely to be, there is little doubt that the city

bolts for gates at level crossings, whereby to prevent the gates from being opened while a train is within a quarter of a mile, or any convenient distance; a safety-spring mining cage, to secure the safe lodging, or prevent the falling, of the cage, in its ascent or descent, when conveying men or goods up or down the mine shaft, should the rope or chain break, or become disarranged; a new window sash fastening and door bolt, by which to attain perfect security, from the impossibility of unfastening them from the outside. A barrister wishes to exhibit two architectural designs; a pair of spring-heeled boots, and a drawing of a man equipped with them; diagrams of Coryton's system of fairway lighting, off the coasts of Great Britain; a type-composing machine and hand-stamp; models and drawings illustrative of Coryton's atmospheric guide propeller, and Coryton's self-adjusting sails. An insurance broker has specimens of wines and other fluids, fined by a new and more effective process, and a model of the apparatus used; electric telegraph cables and conductors; model of an improved ship, and of parts thereof; specimens of improved pavement in carriage roads; specimens of improvements in iron houses, etc.; specimens of building stone, preserved by a new material; model of a machine for dressing stone; specimens of improved junctions of iron pipes, to prevent breakage; specimens of a new description of embroidery; specimens of paper hangings; specimens of an improved floor cloth. These, likewise, are all to be shown together.

[We find the above in one of our exchanges, and we can fully confirm the correctness of the theory, that inventions intended for a specific trade are most apt to originate with those who have no connection with the business—mere lookers on, who see what is needed more than they feel it.

COMBINED PRUNING HOOK AND SAW.

This combination is a useful and convenient one. The saw is used to sever such branches as are too large to be cut off by the hook, and the tool, when placed on a handle of proper length, will save a vast amount of laborious climbing, in the pruning of fruit trees. The engraving well illustrates the form and construction of the implement. It is the invention of Jeremiah Schroy, of Fortville, Ind.



Such inventions as this, which require neither large ingenuity in the devising, nor large capital in the manufacture, if they combine usefulness with cheapness, scarcely ever fail to reward their inventors. The little things that a great many want, pay better than the large ones that are only required by a few.

Malt Without Germination.

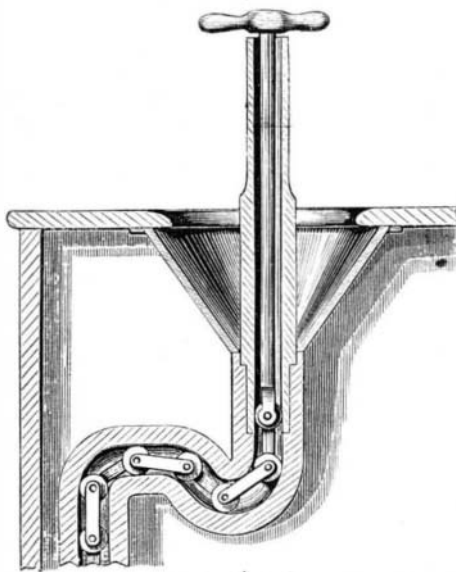
The process of malting, as is well known, consists in steeping barley in moisture till germination has commenced, and then roasting the malt to arrest the growth. When done, the product easily yields, to water, a saccharine principle, making a sirup or "wort," easily fermentable; and when fermented, giving a large proportion of alcohol. The time taken in malting, and the troublesome nature of the some what delicate process, has led many chemists to search for means of producing a wort artificially, but as yet the organic matter has defied synthetical imitation. But a new invention is announced, by which a wort can be produced from barley, without germination. The process is as follows: The barley (fifty parts by measure) is put into a vessel, and steeped in thirty parts of sulphuric acid diluted to one per cent; the vessel is then covered lightly, and placed in a water bath, kept at a steady temperature of 105° Fah. The vessel must be left in the water bath for seventy-two hours, and the contents frequently stirred to insure contact of the acid with all the barley. At the end of the process of steeping, the barley becomes soft and easily crushable, the silica in the bran being destroyed by the acid. It should be dried, and then has the appearance and smell of malt, and, we are assured, makes an excellent wort. The saving of time and trouble are altogether in favor of this process, which the inventor, Dr. Fleck, of Dresden University, has lately discovered, and on which he is now laboring with a view of rendering it easy and practicable on a large scale.

DRILL LUBRICATOR.—In drilling wrought iron, use one pound of soft soap, mixed with a gallon of boiling water. This is a cheap lubricator; it insures working with great ease, and clean cutting by the drill.

and county both will help the enterprise through. The same machinery will be available to sink many wells in different parts of the country, providing this be carried to a success.

DEVICE FOR CLEANING TRAPS IN SOIL PIPES.

Considerable trouble is often experienced in cleaning the traps of water closets, soil pipes, etc., when they have become clogged. Our engraving shows an ingenious device for this purpose, invented by James Wright, of New York city, and patented in June, 1867. It consists of a series of links, with



friction rollers at the joints, connected with a handle which works through a vertical tubular guide. This is a useful implement. Its operation is so well shown in the engraving that further description is unnecessary.

Curiosities of Genius Relating to Inventions.

It must be taken, we suppose, as a proof of the versatility of genius, that we always find that the professions and trades of these intractable inventors have not the remotest connection with their valuable mechanical, chemical, and warlike discoveries. Thus, a clergyman may send breech-loaders and tremendously destructive shells, while the nurseryman and market-gardener proffers improvements in surgical instruments, and the doctor a contrivance for forwarding the ripening of fruit on walls. One grocer demands space for the exhibition of a new axle, applicable to all carriages, a new projectile for ordnance, and a new method of propelling ships. An M. A. and F. R. G. S. has models of an invulnerable floating battery, a breech-loading gun and carriage, a means of converting guns of old pattern into breech-loaders, a refuge buoy, a beacon, a cork poncho mattress, a life, limb, and treasure preserver, an unfouling anchor, and some new screw propellers. An accountant asks space for a model of a self-acting water-closet, with water, meter, and apparatus for regulating the flow of water, all in one; the model of an improved theodolite, and an omnitonic flute, all to be shown together! A bookseller seems overflowing with invention. He has a plan of interminable suspension, applicable to bridges, aqueducts, etc., of great span or length, and by which he means to do away with the costly supports hitherto used; a target-shooting protector for the safety of those employed to note the score; a new paddle-wheel, by which to secure a greater amount of power than is attainable by any other arrangement; a self-acting railway signal, for day and night, and

EGG TONGS.

Mr. W. F. Hellen, of Washington, D. C., has patented, in this device, a very convenient and graceful implement, by which hot boiled eggs may be handled without injury to the fingers.

The accompanying engraving shows the device so clearly that no explanation is needed. Lovers of hot boiled eggs will find this article a great addition to the luxury of eating them as hot as desired, as by their use, an egg may be held without discomfort; and the end of the shell being removed, the remainder of the shell forms a cup in which the egg may be seasoned and prepared for eating. Another advantage is, that the fingers need not be soiled by the contents of the shell, when eggs are eaten, as they always ought to be, soft boiled.



American Iron Ships.

The Wilmington (Del.) *Commercial* states that on the 11th March, the ship-yards of Wilmington sent away a splendid iron sea-going steamship, of over 1,600 tons capacity. On the 18th inst., they sent away another iron steamer, intended for the Chesapeake Bay service, of about 500 tons. Three more iron vessels are now being built in the Wilmington yards, one of which will be a heavy sea-going steam propeller, of 2,000 tons or over, intended for the Boston and Baltimore trade; another is a Government steamer, built under contract with the Treasury Department; and the other a lighter, of comparatively small tonnage, intended for South America.

It says that the Wilmington yards can build the like of any ocean steamer now in use, except the *Great Eastern*, and can do the work well and promptly, and adds that they have built more iron vessels than all other yards in the United States put together, which we believe is the fact.

The Denver Artesian Well.

The *Denver News* gives an interesting account of the progress, difficulties encountered, and encouraging prospects of the artesian well, commenced last summer on one of the hills east of the city. The necessary tools, engine, and men were procured, a shaft sunk to the bed rock, and boring commenced. At 250 feet the water rose 80 feet. The strata passed through, being a soft soapstone, there was great difficulty from caving, but the bore was carried down to 430 feet, when casing became indispensable. Two hundred and sixty feet of casing were ordered and put in without trouble, but more was necessary. Two hundred feet more were ordered, but were two months in arriving. Then, after great trouble and some delay, enough casing was put in to make 396 feet, when a slide deflected the column one joint above the lower end. Then came more trouble in straightening it; then came the cold December snap, freezing up everything. Since the weather moderated, the pipe has been straightened and boring