flight of rooks up into the sky can easily see how this might happen. In the cases to which I am referring, the earthworm comes out like a hunted thing. I have also noticed that many of the worms that I found dead or torpid were maimed; generally they had their tail cut off, and this when there had been no digging in my garden for a long time, and although there are few birds that would touch them. I have frequently observed that the earthworms were apparently unwilling to go to ground again, though I have tried to make them, in order to watch the rate and manner in which they bury themselves.

A few days ago, however, I saw, I believe, the explanation of most of the cases I had been observing. A large earthworm about nine inches long, bright, clean, and healthy looking, was moving somewhat irregularly on the earth of a flower bed. On stooping to examine it, I found a small yellow animal with a brown head holding on within about half an inch of the tail end of the worm. I sent it to Prof. Westwood, who writes: "Your worm eating larva is evidently one of the Carabidæ, probably *Steropus madidus*" (see *Gardeners' Chronicle*, 1854, p. 613). It was not disturbed by my taking up the worm, but went on biting its way round the worm, holding on like a bull dog, and bettering its hold every now and then. It had nearly got round the worm, leaving a lacerated ring. The wounded part seemed somewhat swollen, but on this point I am not clear, as the unequal power of extension of the wounded part may have produced the effect of swelling.

Mr. Edwin Laurence has recorded (*Nature*, vol. xxvi., p. 549) a similar circumstance observed by him in France, where, however, the larva seems to have attacked the worm differently, and with a view to killing it rather than cutting off a portion, and from his description, moreover, it would not appear to be the larva of the same species. He suggests that the numerous birds in England may have destroyed such an enemy of the earthworm. A sparrow would probably take the larva, and not touch the earthworm. One would have thought that the earthworm would have a better chance of rubbing off his deadly enemy in the earth than above ground, as a salmon is said to clean himself in a gravelly river, but we want further observations on this curious question, as well as on several others raised by the inquiry, How are worms transported to out-of-the-way places? and, How long can they live in soils of various degrees of permeability when the surface is flooded?

Consumption of Railway Ties.

There are now fully 148,000 miles of railroad *track* in the United States, and therefore about 391,000,000 ties, and the average consumption for renewals should be about 56,000,000, or the product of 560,000 acres of land, at 100 ties per acre, requiring 126,800,000 acres = 26,000 square miles, equal to less than half the area of Michigan or Wisconsin, two-thirds the area of Maine, and a little more than half the area of North Carolina, if, as reported, it takes 30 years to grow tie timber.

Mr. Hicks says that the reports to the Forestry Department show that it takes an average of 30 years to grow timber large enough for ties, and that the product is about 100 ties per acre, while the average cost of ties to the railroads is 35 cents. This is a product worth $35, as the return of an acre for 30 years. If this is all, then with money at 5 per cent, no cost of cultivation and no taxes, it will pay to grow ties on land already wooded worth $8 per acre, and on land worth $7 per acre if interest is 6 per cent.

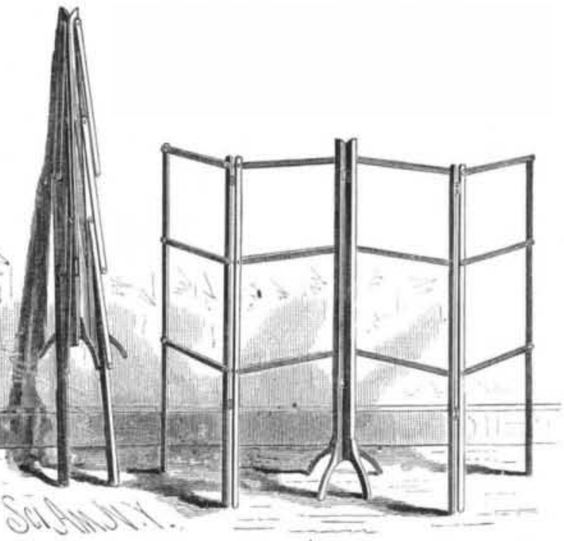
If 113·3 acres of woodland are required to maintain the ties of every mile of railroad, the question with the railroads, says the *Railroad Gazette*, is not simply whether they should produce their own ties, but also whether they may not profitably diminish their consumption. The experience of Germany indicates that an average life nearly three times as long can be had by preserving the ties with chloride of zinc, or creosoting (so called, for there is usually little or no creosote in the oil used). But even if the product of 56 acres per mile is required, it does not follow that the only escape from a famine will be the cultivation of timber. If land planted or stocked naturally with the trees which will make 100 ties in 30 years is worth $20 an acre—and in many parts of the country it is worth as much as that—at the end of the 30 years required to grow the trees it will represent, with interest at 6 per cent, $118, and with interest at 5 per cent, $88; and if then the land after the ties are cut is still worth $20 an acre, the 100 ties, before cutting, will have cost $98 in the one case and $68 in the other. But the taxes meanwhile would probably have cost $50 or $60 more, and there would be some expenditure for care. If then the land is not cheaper than $20 per acre, the railroad will probably do better to depend upon some metallic substitute than to grow tie timber, even if it gets 14 years' life out of a tie.

Better to Wear Out than Rust.

The late Prof. Samuel D. Gross at a dinner given to him in Philadelphia on April 10, 1879, said: "After fifty years of earnest work I find myself still in the harness; but although I have reached that age when most men, tired of the cares of life, seek repose in retirement and abandon themselves to the study of religion, the claims of friendship, or the contemplation of philosophy, my conviction has always been that it is far better for a man to wear out than to rust out. Brain work, study, and persistent application have been a great comfort to me, as well as a great help; they have enhanced the enjoyment of daily life, and added largely to the pleasures of the lecture room and of authorship; indeed, they will always, I am sure, if wisely regulated, be conducive both to health and longevity. A man who abandons himself to a life of inactivity, after having always been accustomed to work, is practically dead."

CLOTHES HORSE.

The engraving shows an improved clothes horse, for which latters patent have been applied for by Mr. M. F. Blake, of Martinsburg, Pa. Each frame consists of two side bars, to each of which are loosely riveted the ends of cross bars,



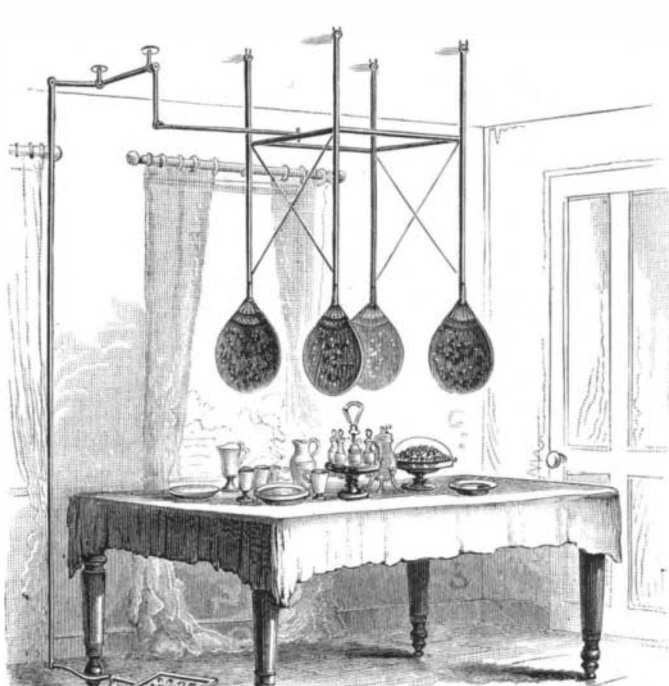
BLAKE'S CLOTHES HORSE.

this construction permitting the frame to be folded so that the side bars will rest side by side. The frames are secured to each other by hinges, and the center side bars are provided with branching legs—shown clearly in the right hand view—upon which the device will stand when so folded up that the other side bars will not extend below the center ones. The device may also be folded up as shown in the left of the engraving.

Made in this manner the clothes horse is cheap and durable, and when extended can be made to assume almost any desired position, and when folded occupies but little space. When closed, the center bars are held together by a hook and eye.

IMPROVED FAN ATTACHMENT.

The fan attachment shown in the accompanying engraving is the invention of, and is now being manufactured by, Messrs. A. O. Williams & Co., of Nos. 5 & 7 College St., Nashville, Tenn. A treadle is attached to one end of a lever, from the other end of which a rod extends upward and unites with



WILLIAMS & CO.'S IMPROVED FAN ATTACHMENT.

an arm of a bent lever fulcrumed on a hanger depending from the ceiling of the room. The lower arm of the bent lever connects with swinging rods suspended from screw eyes made fast in the ceiling. These rods are connected by horizontal bars from which the fans hang—the joints being loose so that the fans, which are rigidly secured, may move freely in a horizontal plane. By placing a foot upon the treadle, any one sitting at the table can transmit motion to the fans through their connections, so that flies will be driven away and the air agreeably moved. The device is simple, cheap, and easily set up and operated, and by its use in warm weather the pleasure and comfort of those at the table can be greatly augmented.

Glass from Bradford Rocks.

It was practically demonstrated yesterday afternoon (May 19) that the manufacture of glass from Bradford sand rock through the agency of natural gas is entirely feasible, and our initial glass industry must prove an opening wedge to kindred enterprises which must redound to its credit. A curious crowd gathered at the works yesterday and watched the blowers skillfully gather the molten bolts of glass from the pots and blow huge cylinders, which after passing through the annealing oven will as sheets be cut into window panes. Of course, on a "first performance" of this kind there are numerous little details to be arranged, and it is difficult to speak advisedly of the full measure of success achieved, but its result is regarded as highly satisfactory. In a few days everything will probably be working smoothly, and visitors will see much to interest them. Superintendent McCartney and a number of glass blowers, with several samples of the work in the shape of globes, cylinders, and canes, marched to the Riddle House and received the congratulations of the crowd. Thirty carloads of window glass have already been ordered from the Bradford glass works, and this may be considered as merely an earnest of what will be required should reasonable expectations be realized. The first product of the works will be used in the windows of the buildings. An eight-pot furnace is now in operation, and the ground is laid out for another of the same capacity. The gas fuel works splendidly, producing a most intense heat and fulfilling every requirement.—*Pittsburg Era.*

Goods Duty Free into Mexico.

Under the new reciprocity treaty between the United States and Mexico, the articles enumerated below are to be admitted free of duty into Mexico:

Accordions and harmonicas; anvils; asbestos, for roofs; agricultural knives, without their sheaths; anchors, for vessels, large or small; apparatus of all kinds for industrial, agricultural, and mining purposes, sciences and arts, and any extra separate parts and pieces pertaining thereto; bars of steel for mines, round or octagonal; barrows and hand trucks, with one or two wheels; bricks of all kinds; books, printed, unbound or bound in whole or part, with cloth or paper; beams, small, and rafters for iron roofs; barbed wire for fences, and the hooks and nails to fasten the same; coal, of all kinds; cars and carts, with springs, two wheels, four wheels, small hand; coaches and cars for railways; crucibles and melting pots of all materials and sizes; cane knives; clocks, mantel or wall, fine and ordinary; carriages and diligences of all kinds and dimensions; dynamite; fire engines; fire pumps; faucets; fuse and wicks for mines; feed, dry, and straw; fruits, fresh; firewood; guano; hoes, mattocks, and their handles; houses of wood and iron complete; harrows; henequen bags, on condition that they be used for subsequent importation with Mexican products; ice; iron and steel, made into railways; instruments, scientific; ink, printing; iron, beams; instruments of iron, brass, or wood, or composed of these materials, for artisans; lime; locomotives; lithographic stones; masts for vessels; marble, in blocks; marble, in flags for pavements, not exceeding 40 centimeters in square, polished only on one side; machines of all kinds for industrial, agricultural, and mining purposes, sciences and arts, and any separate extra parts and pieces pertaining thereto; metals, precious, in bullion or in powder; money, legal, of silver and gold of the United States; moulds and patterns of the arts; naphtha; oats, in grain or straw; oars, for small vessels; pumps, ordinary, for irrigation purposes; pickaxes; plows and plowshares; paper, tarred, for roofs; plants of any kind not growing in the country, for cultivation; pens of any metal, not silver or gold; petroleum, crude; petroleum or coal oil and its products, for illuminating purposes; powder, common, for mines; quicksilver; rakes; rags or cloth for the manufacture of paper; roof tiles of clay or other material; sickles; shovels; spades; seeds, of any kind not growing in the country, for cultivation; sulphur; stoves, of iron, for cooking and other purposes, with and without ornaments of brass; staves and headings for barrels; steam engines; soda, hydrosulphate; sewing machines; slates, for roofs and pavements; sausages, large or small; teasels of wire, mounted on bands for machinery, or vegetable teasels; types, coats of arms, spaces, rules, vignettes, and accessories for printing of all kinds; vegetables, fresh; wire, telegraph, the destination of which will be proved at the respective custom houses by the parties interested; wire of iron or steel for carding, from No. 26 upward; water pipes of all classes, materials, and dimensions, not considered as comprehended among them tubes of copper or other metal that do not come closed or soldered with seam or with riveting in all their lengths; window blinds, painted or not painted.

Fast Speed Telegraphy.

Speaking of a recent contest among Morse operators in London, the *New York Operator* says: "We are willing to admit that England can produce as fast operators as we can, but we claim that with their lumbering code of signals as against our rattling combination we can beat them, everything else being equal. We have sworn records of fast Morse sending at the rate of forty-two words a minute for sixty consecutive minutes—over 2,500 words in one hour.

Weston's Walk of Five Thousand Miles in One Hundred Days.

Since March 18, 1884, I have had the opportunity of making two careful physical examinations of Mr. Edward Payson Weston, who between the hours of nine and ten o'clock on Saturday evening, March 15, 1884, completed at the Victoria Coffee Hall, near Waterloo Railway Station, London, the very remarkable feat of walking five thousand miles in one hundred days. The walk thus accomplished was carried on partly out of doors on common roads, and partly on covered tracks; part, that is to say, up hill and down dale in all weathers belonging to the months of November, December, January, February, and of March, and part on a level plain, under shelter. The out-door walking was, of course, most exposed and most laborious, but the indoor was not without its drawbacks, the chief of which was the shortness of the laps. In one track the laps were thirty-six to the mile, and made the pedestrian so giddy at the first start that he was brought nearly to a standstill. At night, also, after a day of these short laps, he continued to suffer. He experienced a sensation as if he were turning a somersault forward, just as he was going off to sleep, a phenomenon which would recur several times before he was fairly rocked into sleep. The impression on the nervous system was much like the impression of the motion of a vessel at sea on some persons after landing from a voyage.

During the effort Mr. Weston rested regularly each Sunday and on Christmas day. He did this from a desire not to cause objection to be felt respecting his task, rather than from any necessity for the rest itself. On the contrary, he would, as a matter of exercise, have preferred to have continued at his task, and have finished eighteen days sooner. The Sunday rest affected him little on the following Monday, but on the succeeding Tuesday morning it caused each time a drowsiness which impeded him more or less through out the whole of the day, and which he attributes to the circumstance that he did not get his usual sound sleep on Sunday night. In the entire walk Mr. Weston made nearly 11,000,000 steps. He averaged three and a half miles to four miles an hour. He generally rested from two to three hours during the day, but not always. On the last day he walked from Brighton to London, fifty-three miles, without resting at all; he did not even sit down, but took food and drink as he went along. He finished each day's walk by delivering a lecture, and at the close of his feat he seemed to be as fresh and vigorous as ever.

In so far as current means of diagnosis assist us, Mr. Weston stands before us a specimen of a man of as good a standard of health as we could expect to see. I do not remember ever before to have devoted so much time to the exhaustive diagnosis of any one healthy person; but tedious as the labor has been I do not regret it, since it has given me, and I hope may give others, a few hints for a mode of arriving at a standard of vital measurements. A set of standards of such measurements being supplied, we ought, by the application of the exclusive method, to make diagnosis an art of absolute certainty in most cases of disease. In the matter of diagnosis Mr. Weston has afforded ground for useful observation. But it is to physiology that he has been most useful as a subject for experiment. In this direction he gave Dr. Flint, and Dr. Flint's learned colleagues, the opportunity of bringing out, in 1870, the best report in any language on the vexed question whether, during muscular exercise, the muscular substance itself is consumed, and whether there is indication of such consumption being indicated by the increased elimination of nitrogen by the urine; or whether, during muscular exercise, it is only the fats and non-nitrogenous foods that are consumed, and that the excess of nitrogen is due to the amount of nitrogen taken in as food, not to actual consumption of the muscular fiber itself. How far this most important question is further answered by the results of Mr. Weston's latest pedestrian feats I leave for a future study; but there is one physiological truth which I must note as I conclude, namely, that the healthy condition which he represents after one of the severest physical trials on record affords the most decisive of proofs of the success of meeting physical work on good diet —sans wine, sans beer, sans grog, sans everything of the sort.—*Asclepiad.*

Determination of Cream in Milk.

The present method is a very troublesome one, and occupies considerable time. In the last meeting of the Society for Natural Philosophy in Frankfort-on-Main, Dr. Lepsius described Foxhlet's new method, which is as follows: A potash solution is added to the milk, and the latter then shaken with ether. With fine aerometers the percentage of fat can be then easily determined in the ether. It is said that while this method permits the same accuracy as the old one, it has the great advantage of great rapidity. In the same meeting the subject of the value of skimmed milk as a nutritive substance was also debated. It was generally admitted that on account of its cheap price and percentage of albuminous material—this not being at all diminished by the removal of the cream—skimmed milk is of great value, especially for the poorer classes. At the same time it was shown that milk with the cream left in it, but diluted with water, loses in value as a nutritive substance, as the same percentage of albumen is no longer contained in the fraudulent fluid. They all agreed that substances of such common use as milk should be daily inspected by a government official, and any fraudulent admixture be made widely known.

THE STEAMER AMERICA.

A new and splendid Atlantic steamer, built of steel, named the America, arrived at this port on the 5th of June, after the very rapid passage of a little more than 6½ days from Queenstown. The ship belongs to the National Line, between New York and Liverpool. On this, her first voyage, she averaged a velocity of over 18 miles an hour for six consecutive days, and on one of the days made 477 miles, being 20 miles an hour for the day, less 3 miles. The probability is she will improve on this speed; a very little improvement will place her at the head of the class of fastest steamers.

The America is 450 feet long, 51¼ feet beam, 36 feet depth. Engines three cylinder compound, one 63 inches, and two of 91 inches; stroke 66 inches. Piston valves on all the cylinders. Seven boilers and 39 furnaces. Working steam pressure, 95 pounds; 9,000 developed horse power. This ship is built specially for speed and passenger service. Her accommodations are superb.

The only steamer that has exceeded the speed of the America is the Cunarder Oregon, which made the passage in 6 days 10 hours and 10 minutes. The general public looks chiefly to the speed attained, but shipowners will be interested to know that although the Oregon arrived in five hours and a half less time, her consumption of coal was 337 tons each day, while the America burned only 190, a difference of 147 tons a day. The Oregon carried 120 engineers, firemen, and coal heavers, while the America required but 92. The difference of expense in the engine room alone is not far from $450 a day while under steam, $3,150 for each passage, and $75,600 for a year. The Oregon developed about 16,000 horse power, while the America developed less than 9,000. These figures show conclusively that the speed of the America is due entirely to her model. She is the first ship that has been built on a model looking to the passenger traffic almost exclusively for profit.

She has twelve bulkheads so arranged that she could float even if two compartments were filled by a collision. Her chief engineer is of the opinion that she would still float after her engine room has been filled by a collision. She carries 10 large life boats. The America is commanded by Capt. R. W. Grace. Mr. William Dover is chief engineer. The America carries 32 seamen in her forecastle, 92 men all told in her engine room, and 82 cooks and stewards.

The National Line has carried about 1,000,000 passengers across the Atlantic since it was organized, and has never lost a life.

Action of Light on Colors Employed for Dyeing.*

Matters relating to the phenomena which can be classed under the above heading have for a long time engaged the attention of practical men, artists, and a few scientists, and various methods of trial have been proposed for the classification, as to stability, of the colors employed in dyeing. Former State regulations, forbidding under more or less severe penalties the employment of certain of these coloring matters, have to some extent split up the substances in question into two great classes, namely, the fast and the loose, or the stable and the unstable respectively, from whichever point of view we may regard the matter. It was especially forbidden to dyers to use indiscriminately coloring matters of these two classes in the carrying out of work entrusted to them.

The investigations of Dufay and Hellot on the resistance of dyed goods to washing, etc., were certainly of great service in aiding the establishment of a proper adjustment of the two classes of dyewares, but soon the State regulations were no longer enforced, and with them vanished the check to careless work, which, although a rather awkward restriction to the dyeing trade, still did good in keeping down the production of worthless goods. The action of daylight on dyed goods was the first thing to be ascertained when experimenting on stability and resistance to altering agents in general. As is well known, the desideratum is the maximum amount of resistance to atmospheric influences, to day or sun light, to air, water, and finally soaping in many cases. Besides this, the goods require, in order to satisfy just demands made as to their power of serving, to be dyed in colors varying in intensity, brightness, and solidity, according to the different uses to which they are to be put.

Thus tissues intended for preparing artificial flowers, also those for ladies' ball and evening costumes, do not require to be exposed to much else than artificial light, and hence can be dyed with fugitive colors and in light shades. On the other hand, summer goods in the same lines ought not to be got up with any but colors stable with respect to sunlight. These may be of shades light enough to be but little altered by slight changes, but the time during which they are to be used and the price of the cloth on which they are dyed must fix the stability the colors are required to possess. The same may be said of the dyes employed for men's clothing, only, as a rule, intensity of color is not essential nor demanded, except for military purposes and for furniture goods. Furniture goods, such as cretonnes, etc., require to be dyed in colors possessing intensity and fullness of shade, together with the maximum amount of resistance to the influence of light, especially as a considerable quantity of the above mentioned goods is of a very high price, and hence requires to serve for a long time.

To-day the classification of colors in an accurate and practically available manner, with reference to resisting power, etc., is all the more essential to the dyeing trade, as it is now fast becoming the practice to employ the so-called aniline colors, not only for artificial flowers and goods of a similar class, but also for dress goods for both men and women, and for furniture. Reference may here be made to the fact that the splendid bouquet of roses got up with anilines, and exhibited at the International Exhibition in 1878, in a few weeks was modified to a livid shade by the diffused daylight. It was evidently very necessary to devise a quick and ready method of experiment, and, above all, one giving constant results. We arranged series of woolen samples dyed in different colors of the same intensity, and considered stable together, and parallel with series of similar samples and color, but of unstable character. An opaque screen was cut off one-half of each sample, and these series were exposed to the action of daylight and sunlight, under the protection of a thin glass, during one summer month. As the result of this exposure, we observed an enormous difference in the resisting power of different colors, and this difference was rendered the more striking by comparing the unaltered portion, which had been covered by the opaque screen, with the exposed and altered portion.

All, indeed, were modified to a certain extent—small, indeed, in some cases—but it was obvious that the majority of the colors obtained by the old systems, such as vat blues, Prussian or royal blues, cochineal, madder, wood colors, etc., were much more stable than Nicholson blue, fuchsine, picric acid yellow, etc. However, there is one exceedingly remarkable thing to be noticed in comparing the results obtained on one series of twenty-four samples, and that is that four of the artificial organic coloring matters stand by themselves in forming a distinct and separate class remarkable for the resisting power of its members. The four colors in question are the following: (1) The Ponceau, called "Carmin de Naphthol, coming in Class II. Red. (2) An Orange, marked II., coming in Class IV. Orange Red. (3) Chrysoine, placed under Class II. Orange. (4) Artificial Alizarine, which has, in the present state of the dyeing trade, almost driven out madder, and is much more stable than the so famous ancient article. The class numbers attached refer to the chromatic scale of colors devised by the eminent scientist Chevreul.

A copy of this scale is to be found in every Continental dye and print works, and renders service in combining and matching tints which it is not easy to overestimate. By their beauty, and their fastness and stability on wool, these four colors encourage us in the hope that chemistry will continue to render eminent services to the dyeing trade, and may finally succeed in producing whole series of colors, fast and stable, as well as beautiful and brilliant. As the power of resisting modifying agents possessed by coloring matters depends to a large extent on the methods employed in their manufacture, we may state that the colors used were presented by Messrs. Poirrier and Company, of St. Denis (Paris), in whose works they were all prepared, under the skillful superintendence of Monsieur Rosenstiehl.

* By Mons. Decaux, manager of the Gobelins, Paris.

The Laboratory that Jack Built.

This is the laboratory that Jack built.

This is the window in the laboratory that Jack built.

This is the glass that lighted the window in the laboratory that Jack built.

This is the sand used in making the glass that lighted the window in the laboratory that Jack built.

This is the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.

This is the salt, a molecule new, that furnished the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.

This is the chlorine, of yellowish hue, contained in the salt, a molecule new, that furnished the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.

This is the sodium, light and free, that united with chlorine, of yellowish hue, to form common salt, a molecule new, that furnished the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.

This is the atom that weighs twenty-three, consisting of sodium so light and free, that united with chlorine, of yellowish hue, to form common salt, a molecule new, that furnished the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.

This is the science of chemistry that teaches of atoms weighing twenty and three, and of sodium metal so light and free, that united with chlorine, of yellowish hue, to form common salt, a molecule new, that furnished the soda that, melted with sand, compounded the glass that lighted the window in the laboratory that Jack built.—*Chem. News.*

The Aeronautical Legacy.

A statement has been recently made in the papers that Charles F. Ritchel, of Bridgeport, Conn., had been made the legatee of a wealthy brewer, lately deceased, to enable him to extend his experiments in air navigation. So far as the legacy was made, the report was correct; but it is in such terms that it is doubtful that it can be legalized. Mr. Ritchel has not, as yet, received any portion of it, and he is not sanguine of obtaining a dollar from this source. The gentleman who thus showed, in his will, his interest in the experiments of Mr. Ritchel had, during his life, voluntarily aided him with funds to a small amount, but at present Mr. Ritchel's costs are borne by himself.