A CHANCE FOR INVENTORS—A GREATER THAN WHITNEY WANTED.

Messrs. Editors:—Through the medium of your truly valuable sheet, I wish to call the attention of the inventive genius of some of your friends to an invention (yet to be made) that, if successful, will be to the inventor an everlasting fortune and an eternal income: I refer to the cotton gin. The plan now adopted for separating the seed of the cotton from the lint (and which has been in use from the first raising of cotton in the country to the present time) is, as you are well aware, the saw gin, and it does saw the cotton in every sense of the word. It cuts the staple, knocks it, tears it, and, in fact, in a great measure destroys it; and an improved cotton gin that would do away with these objections would enhance the value of cotton one-fourth at least. Here is a pretty margin, and some one must embrace it. Let the prime, main object of the inventor be to preserve the staple of the cotton entire. The staple of the cotton is what sells it; cotton may be unexceptionable in color, free of dust, leaves and all kinds of trash, and yet, with the staple destroyed, in a measure, by the process of ginning, the price obtained will be merely nominal.

I have made these suggestions with the hope that some scientific genius will give the subject a thorough investigation, and as I before remarked, whoever invents a cotton gin that will accomplish the ends required will be remunerated to an extent unheard of in the line of patents. I shall be happy to give information to any one as to any question that may arise concerning cotton in any or all its stages, or relating to the process now in use for ginning. There has been as little improvement made in cotton gins as ships' anchors. Who will reap the harvest?

A. J. H.

Camden, Arkansas, March 14, 1860.

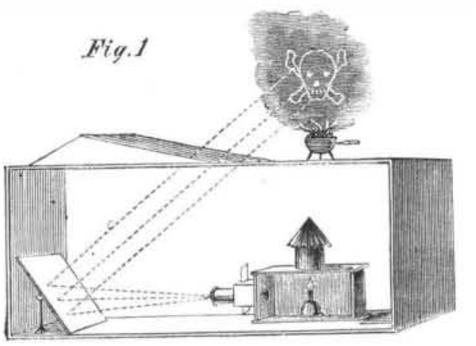
[This has been a favorite field for inventors, and it is very remarkable that a merely mechanical obstacle to the accomplishment of so very great a desideratum should have so completely baffled the inventive genius of the country. In the winter of 1792, as Mrs. Greene, widow of the famous revolutionary general, was one day entertaining at Mulberry Grove (her place near Savannah) some gentlemen of the neighborhood, the conversation turned on the subject of the cultivation of cotton, which had been recently introduced to a small extent in the country. As it required the labor of an entire day to separate the seed from a single pound, it was manifest that unless some mode could be devised for doing the work more rapidly, the production of the article could never be carried to any great extent, and a strong desire was expressed by the company that some machine could be invented for ginning the short staple or green seed cotton. Mrs. Greene told the gentlemen that they had better apply to her young friend, Mr. Whitney; she presumed he could do it, for he could do almost anything. Mr. Whitney was at this time studying law, having recently graduated at Yale College; and he was spending a short time with Mrs. Greene at her hospitable invitation, having made her acquaintance on their voyage from the North. On learning what was wanted he addressed himself to the task; and not being able to procure cotton with the seed in it in the neighborhood, he visited Savannah for that purpose, and after a search through the warehouses of the city, he succeeded in finding a small quantity. Taking it home he soon devised that famous machine which has wrought such changes in the condition of this country and of the world. Whitney's machine cleaned 300 lbs. in a day, and did it better than one pound could be done by hand in the same time. In the saw gin the cotton is seized by rows of teeth formed of strong wires projecting from a roller, or by teeth like those of a saw made upon circular plates of iron. These pass between grate-bars set so closely together that the seed cannot pass through, but the cotton is drawn in and swept off by a cylindrical brush. Notwithstanding the immense improvement which was embraced in this machine over the old process of cleaning by hand, we are informed (by the above correspondent) that it is still very imperfect, and that it destroys the enormous amount of one-fourth of the value of the whole cotton crop. Here is a field for inventors! A chance to save $40,000,000 per year! The practical mode for our correspondent to forward his object is to distribute samples of cotton in the seed to inventors, and it will be very wonderful indeed if they are not able to surmount a merely mechanical obstacle to the accomplishment of so great an object.

CURIOUS OPTICAL PHENOMENA.

Messrs. Editors:—Of all our senses, the *sight* is certainly subject to the greatest illusion. We every day discover new phenomena, and doubtless many more are reserved for posterity. It frequently happens, moreover, that a discovery which at first seemed of little consequence has led to matters of the highest importance. The accompanying diagrams are demonstrations of two experiments, an account of which I have been induced to send you by recently seeing in the Scientific American (page 142) an answer to a correspondent, stating "No mirror can throw an image into the atmosphere." I did not doubt your statement, but I thought that my experiments seemed to contradict it. If I am wrong, please place me in the right.

Experiment I.—Take a wooden box (Fig. 1), and place within it a magic lantern. At the end towards

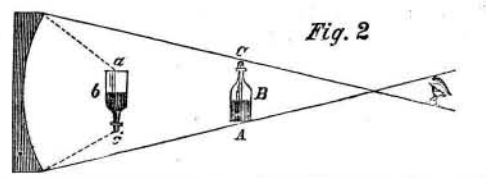
Fig. 1



which the lantern points, place a mirror at any suitable angle with the end, say 45°. Cut an aperture in the top, and near it place a chafing dish, in which burn some charcoal or more suitable substance that will create a dense smoke; for example, some incense. Procure a glass slide, on which a phantom or more pleasing figure is painted; and after lighting the fire in the chafing dish, throw the incense upon it, and insert the picture in the lantern, and a magnified view of the phantom or other picture will be obtained in the cloud of smoke!

Experiment II.—Take a glass bottle, A (Fig. 2), and fill it half full with clear water, leaving the upper part

Fig. 2

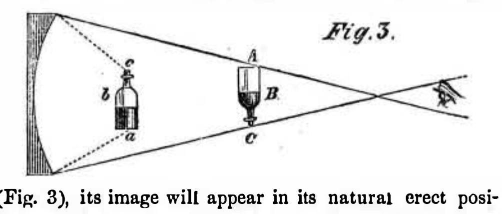


empty, and cork it in the common manner. Place this bottle opposite a concave mirror, and beyond its focus, that it may appear reversed and before the mirror. Place yourself still farther distant than the bottle, and it will appear to you in the situation, *a b c*.

Now it is remarkable, in this apparent bottle, that the water which, according to all the laws of catoptrics and all the experiments made on other objects, should appear at *a b*, appears on the contrary at *b c*, and consequently the part *a b* appears to be empty!

If the bottle be inverted and placed before the mirror

Fig. 3.



(Fig. 3), its image will appear in its natural erect position; and the water, which is in reality at B C, will appear to be at *a b*.

If, while the bottle is inverted, it be uncorked, and the water permitted to run gently out, it will appear that while the part B C is emptying, that of *a b*, in the image, is filling; and (what is likewise very remarkable) as soon as the bottle is empty, the illusion ceases, the image also appearing entirely empty. Likewise, if the bottle be quite full, there is no illusion.

If, while the bottle is inverted and partly empty, some drops of water fall from the bottom, A, towards B C, it seems in the image as if there were formed at the bottom of the part *a b*, bubbles of air that arise from *a* to *b*, which is the part that seems full of water. All these phenomena constantly appear. The remarkable circumstances in this experiment are, first, not only to see an object where it is not, but also where the image is not; secondly, that of two objects which are really in the same place, as the surface of the bottle and the water it contains, the one is seen at one place and the other at another; and we see the bottle in the place of its image, and the water where neither it nor its image is.

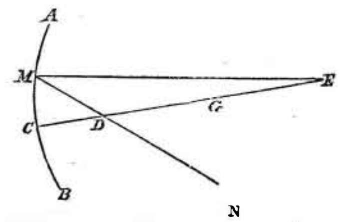
It has been conjectured, with some appearance of reason, that the above-described illusion arises partly from our eyes not being accustomed to see water suspended in a bottle with the neck downward, and partly from the resemblance there is between the color of the air and that of water, which induces us to imagine that we see them where they usually are; and this is rendered more probable by putting any colored liquid into the bottle, for that will appear in its proper place.

E. S. B.

Commack, L. I., March 21, 1860.

REMARKS.

Our correspondent has not correctly quoted the answer to which he refers. It is as follows: "No mirror can *form* an image in the atmosphere." We considered that it was a correct answer to the question asked, and do so still. We understood it to mean the forming of an image in the atmosphere, similar to the one in Fig. 1 (which can be found in several published works), in which the image is shown by the reflection of the solid particles arising from the dense gas, which is quite a different condition. There is a looseness of expression in many works of science regarding the action of mirrors, such as "the image is behind the mirror," for "the image *appears* to be behind the mirror;" and "the image is formed in the atmosphere," instead of "*appears* to be in the atmosphere." The accompanying diagram explains the action of concave mirrors.



A B represents a mirror forming part of a sphere, whose center is at G; and C G is the radius. Let us suppose an object, E, to be very distant from the mirror; its image will appear before the mirror at D, the middle point of the radius, C G; for a ray of light, E M, from the object, E, falling on the surface at the point, M, will be reflected thence in such a manner as to pass through the point, D; and when the eye is placed at N, it will see the object apparently at D. This image will be to the object in the ratio of C D to C E, and (as a consequence) much smaller. By bringing the object from E nearer to the mirror, the image will retire; and when it is brought to the center, G, the image appears to be situated there; but you must look towards the mirror to see it—not from A or B to the atmosphere at G. If the object is now brought forward to D, the image will retire infinitely beyond E; but if the object be placed between C and D, the image will appear to fall *behind* the mirror, and will be greater than the object. A concave mirror either enlarges or contracts the size of the objects, according to the distance they are situated from it. If we look into a concave mirror at a point between C and D, the face will appear frightfully large; this is owing to the nature of reflection—the angle of incidence, E M A, being always equal to the angle of reflection, C M N. The image, A B C (in Figs. 2 and 3) is placed beyond the center.

There are many curious phenomena connected with optics; but everything relating to the reflection of rays by mirrors is reduced to two things—the one is the *place* of the image which the reflected rays represent, and the other is the *relation* of the image to the object; in other words, *where* the image is, and *how* it is. When we look into a plane mirror, we see our own image behind the glass; that is, if we are situated two, three or more feet from the mirror, our image appears to be at the same distance behind it, and it is customary thus to speak of it; but, in reality, there is only a shadow behind the opaque mirror. It would, therefore, be more correct to say "the image *appears* to be behind the mirror," and "the image *appears to be in the atmosphere before the mirror*," as in the case of concaves; and so on. A convex mirror represents objects in miniature; a concave mirror magnifies objects placed near to it, but when they are situated at a considerable distance, they appear inverted and much smaller.

The following is an interesting extract on this subject from Sir J. Emerson Tennent's recent work on Ceylon:—"A curious phenomenon, to which the name of 'Anthelia' has been given (and which may probably have suggested to the early painters the idea of the 'glory' surrounding the heads of beatified saints) is to be seen in singular beauty at early morning in Ceylon. When the light is intense, and the shadows proportionally dark—when the sun is near the horizon, and the shadow of a person walking is thrown on the dewy grass—each particle furnishes a double reflection from its concave and convex surfaces; and, to the spectator, his own figure (but more particularly the head) appears surrounded by a 'halo' as vivid as if radiated from diamonds. The Buddhists may have taken, from this beautiful object, their idea of the *agni* (an emblem of the sun) with which the head of Buddha is surmounted. But, unable to express a halo in sculpture, they concentrated it into a flame."

A NEW AREOMETER FOR DETERMINING THE REAL DENSITY OF LIQUIDS.

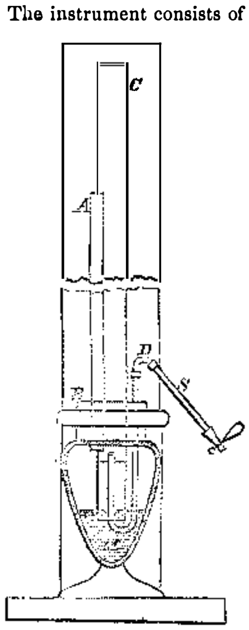
If two liquids of different density are in equilibrium in communicating vessels, the heights of the two columns are inversely as the densities. This rule is well known all over the world, and in order to find the specific gravity of a certain liquid, or its density, as compared with that of distilled water, it is only necessary to measure the height of a column of said liquid sustained by a given column of distilled water, and to calculate the relative proportion of the two.

In the first place, however, to measure the columns with the desired correctness requires certain precautions, and to charge a U-shaped tube with different liquids and discharge it again is coupled with such difficulties that the principles mentioned above, notwithstanding their simplicity, has never been turned to any account in practice.

The floating areometers which are in common use are subjected to the serious inconvenience of being very deficient in exactness, and it really is very rare that two instruments of this class correspond exactly with each other, neither do they give the real density nor the volume per pound.

The novel areometer of Mr. Jeannel is based on the equilibrium of two columns of liquid in a U-shaped tube, and notwithstanding this instrument is more difficult to handle than the floating areometers, it is preferable on account of its greater exactness, as it indicates the real density of the liquid, and it allows, at the same time, of making corrections necessary on account of the changing temperature. With alcoholic liquids only it becomes necessary to use tables for correction.

The instrument consists of the tubes A B and C D,



which communicate by an intermediate column of mercury contained in the V-shaped vessel, M. The small tube, A B, of a diameter of about $\frac{1}{4}$ of an inch and about 22 inches long, connects with the vessel, M, being in reality a prolongation of the same, and both the upper part of the vessel and the small tube are filled with distilled water to a hight of 20 inches, which is marked 1000 on the scale. The other tube, C D, of a diameter of about $\frac{5}{8}$ of an inch and a length of about 25 inches, contains also a column of distilled water of the hight of 20 inches. This tube extends down into the mercury contained in the lower part of the vessel, M.

A siphon, S, serves to empty the tube, C D, and if this tube is emptied and filled with a liquid of greater density, it takes a column of less hight to cause the column of water in the tube, A B, to rise to a hight of 20 inches, and, on the other hand, if liquid of less density is filled into the tube, C D, a higher column is required to raise the distilled water in the tube, A B, to a hight of 20 inches. The hights of the two columns are inversely as the densities.

By proper scales on both tubes the density as well as the volume per pound of different liquids can be determined.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, the 15th inst., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair; John Johnson, secretary *pro tem.*

MISCELLANEOUS BUSINESS.

Heating by Steam.—Lewis M. Hills, of New Haven, read a paper presenting the usual arguments for warming buildings by steam. The paper was briefly remarked upon by the president and Messrs. Godwin, Garvey and Fisher. Mr. Fisher believed the largest building, or even a whole block, might be warmed by a single boiler; whereas, a single hot-air furnace would be altogether impracticable for such duty.

Leather from Whale Skin.—Mr. Howe read a paper prepared by D. H. Tetu, of Kamarousha, Canada, on the white whale of the St. Lawrence. The Canadians call the fish a porpoise, but works on natural history describe it as a whale; it is found for a distance of 200 miles between St. Roch (60 miles above Quebec) and Father Point; also found abundantly in rivers emptying into Hudson's Bay. Since the discovery of Canada, this fish has been an article of commerce; but the oil was not very good, and little use was found for the skin; lately, however, Mr. Tetu has succeeded in purifying the oil and tanning the skin. The oil is equal to the best sperm, and the leather has excellent qualities. The average price of the animal 10 years ago was $40, now it is $150; average weight, 2,500 lbs, and the largest, 5,000 lbs.—worth $200; average length 22 feet, and 15 feet in circumference. The ear is so small that only well-skilled naturalists can find it, yet the sense of hearing is more acute than in any other whale. Mr. Tetu catches the white whale in nets, near the river Saguenay.

In addition to the above, which is a condensation of the more important statements of the paper, Mr. Tetu, in answer to questions from various members, said that all kinds of leather are made from the skins; but it does not make good sole leather, for the reason that it is too pliable; ordinary tanning process employed, except that the limeing is omitted, and the tanning requires more time on account of the closeness of the fiber of the skin. The skin has hair (Dr. Stevens—All mammals have hair); the leather lasts five times longer than any other leather, yet costs the same; the skin of one whale is equal to the skins of 12 to 25 calves; the leather is chiefly used by the British army. Mr. Tetu may be seen at No. 77 Franklin-street, this city.

Specimens of leather were exhibited and passed among the members, and elicited general approval—especially for strength and pliability. The president and a reporter were unable, by pulling against each other, to break a strip a little larger than a shoe string.

Fry's Revolving Window Sash.—Mr. Garbanati exhibited a model of a window sash invented by Thomas P. Fry, of Brooklyn. The object of the invention is especially to encourage and facilitate the cleaning of the outside of the window. The sash is pivoted to guides which travel up and down in corresponding grooves of the casing. The window is thus easily turned, and the outside brought in, without detaching from the casing. The sash, also, when turned so as to be horizontal, allows as free ventilation as when the window is entirely removed.

The time allotted to miscellaneous business having expired, the president called up the regular subject—"Adulterated Food."

DISCUSSION.

Mr. Treadwell presented for chemical examination a sample of sugar which he had used in his family, but which he believed was not genuine; it contained matter which he thought was not so soluble as sugar.

Dr. Reuben—A gentleman in New Hampshire complained that he had found sand in maple sugar; but it was shown that the sand was a constituent of the sap, and that it was formed and precipitated in the same way as cream-of-tartar is found in wine.

A lively debate here ensued between Drs. Gould, Reuben and Mr. Latson, on the question whether salt should enter into the food of man; but nothing important was brought out, and as the subject was foreign to the purpose of the meeting, we make no report of it.

Professor Hendricks—Some of the gentlemen who have spoken here give their experience as dyspeptics, and advise us to adopt what they found which suited their cases. But dyspeptics' rules are not what healthy men should follow. It is safer to do precisely what dyspeptics forbid. (The professor made a stirring speech, and sat down amid applause and laughter.)

Mr. Seely presented four samples of carbonate of soda procured from respectable grocers, and sold under the name of saleratus or super-carbonate of soda. The powders were dissolved in separate vessels of water, and a solution of bi-chloride of mercury was added to each. The clear solutions immediately changed to a dark, dirty red, and a bulky precipitate soon settled. These tests showed that the super-carbonate of soda commonly sold is little better than common washing soda effloresced or dried. Had the articles been genuine, the precipitate made by the bi-chloride of mercury would have been white.

A gentleman (whose name our reporter did not learn) said:—I was once engaged in manufacturing saleratus, and sent to a baker a lot of genuine super-carbonate of soda. But the baker found that it made his bread yellow, and returned it to us. We then mixed it with 25 per cent of salt, and the baker found it of the best quality.

Mr. Seely—But the baker's bread might not have been any better. Almost any mineral matter makes pure bread whiter; alum was once commonly added to bread to whiten it. In Belgium it is said that sulphate of copper has been used; 1 part in 70,000 of flour answering the purpose. Liebig recommends lime, for the reason that lime is an essential element of the body.

The President—Pure wheat will not make white bread. Whiteness is not a desirable quality of bread; it is generally an evidence of fraud or ignorance.

Mr. Fisher—I found the bread in Florence yellowish, but excellent; better than I have found elsewhere. I do not know how bread is made here, but it is all bad.

Mr. Garbanati commended the French bread, which, he said, may be procured at various places in New York and Brooklyn.

Mr. Latson—The superiority of French bread is due rather to skillful manipulation than to any difference in ingredients used. A French baker will use precisely the same materials as other bakers, and yet invariably make a better bread. His skill consists chiefly in determining the point when the raised loaf should be put in the oven; he does not allow the fermentation to go as far as to make the bread sour or to give it a disagreeable flavor. He never works over his dough after it is once raised, as is evident from the fact that large cavities are always found in his bread.

Dr. Reuben—No substance whatever which is not an element of the body should be taken into the system. The effect of foreign matter constantly taken in is cumulative; and if it does not appear in a day, it surely will during the lifetime. It is only after a considerable time that painters feel the effects of lead.

Dr. Stevens—An impression has gone from this club that cattle are very much damaged by the transport from distant places; this I consider an error. Cattle are brought even from Texas, but they start in the Spring and do not reach here till Fall. On all railroads which carry cattle, there are stations at intervals of 200 or 250 miles where the cattle are taken out and receive every needful attention. If any of them are disabled by disease or accident, they are generally left behind and sold in the neighborhood. (The doctor here named the various railroads which transport cattle towards New York, with all resting stations.) It is my belief that in New York we have the best beef in the world; that no finer cattle can be found in any other market.

Mr. J. Lamb presented samples of pure ground spices prepared in Brooklyn. He said that the manufacturer had come from Europe, where he was engaged in the manufacture of certain kinds of sauce. When he attempted to make his sauce here, he found that he was producing a very different article. The black pepper he bought was largely adulterated with rottenstone and pummice stone. He was obliged, in order to carry on