



One more illustration on the subject of gravity, and we leave that branch of physics for the present, not that there is any lack of illustration, but because there are so many other subjects which we have to place before our juvenile readers.



The above little figure may be made to balance itself amusingly. Get a piece of wood about two inches long; cut one end of it into the form of a man's head and shoulders, and let the other end taper off to a fine point. Next, furnish the little gentleman with a pair of wafters, shaped like oars, instead of arms; but they must be more than double the length of his body; stick them in his shoulders, and he is complete. When you place him on the tip of your finger, if you have taken care to make the point exactly in the center, he will stand upright, as seen in the engraving. By blowing on the wafters he may be made to turn round very quickly. It is explained by the reasons that were given in our last number.

This little machine consists of three vanes, the form of each being the segment of a circle, the obliquity of whose surface increases as it recedes from the center of motion. The flyers are attached to a spindle, which fits loosely in the stand, and around it is wound a string, like that around a humming-top. If this string be suddenly pulled, a powerful rotary motion will be given to the vanes or flyers,



and from being set at an angle they will cut the air obliquely, consequently a reaction takes place; and if the weight of the flyers and spindle be less (as it should be) than the force of the reaction, it ascends, whirling its way upwards, like a bird, into the sky. If it be made to spin in a room, it rises to the ceiling, and spins around on the ceiling for some time. It is a highly amusing and instructive toy, as it is on the same principle that birds fly; or perhaps its action is more like that of the screw propeller in the water, and it might justly be called an aerial propeller. If we are ever able to travel in the air by means of balloons, it will be by the aid of some such contrivance as this, although we think that that day is very far distant.

To Show the Pressure of the Atmosphere.

Invert a tall glass or jar in a dish of water, and place a lighted taper under it; as the taper consumes the air in the jar, its pressure becomes less on the water immediately under the jar; while the pressure of the atmosphere

on the water *without* the circle of the jar remaining the same, part of the water in the dish will be forced up into the jar, to supply the place of the air which the taper has consumed. Nothing but the pressure of the atmosphere could thus cause part of the water to rise within the jar above its own level.

Tinning Cast Iron.

Vessels for cooking and other purposes, commonly called "tin-ware," are in general use, because they are so cheap, clean and strong. The material of which they are composed is sheet iron coated with tin. The latter metal adheres so tenaciously to cleaned wrought iron that it is almost impossible to separate the two metals; hence the iron, otherwise so liable to corrode, is almost perfectly prevented from rusting. Sheet tin can now be spun in the lathe into cheap vessels of various forms; still there is a variety of forms of cheap articles which can only be made of cast iron, and they would come into more extended use, were some method discovered for tinning them, it being a curious fact that while tin will adhere tenaciously to wrought iron, it has no affinity at all for cast iron. Various efforts have been made to tin cast iron, but they have generally been unsuccessful. It is true that the interior of hollow cast iron ware is generally tinned, but this coating is not very durable.

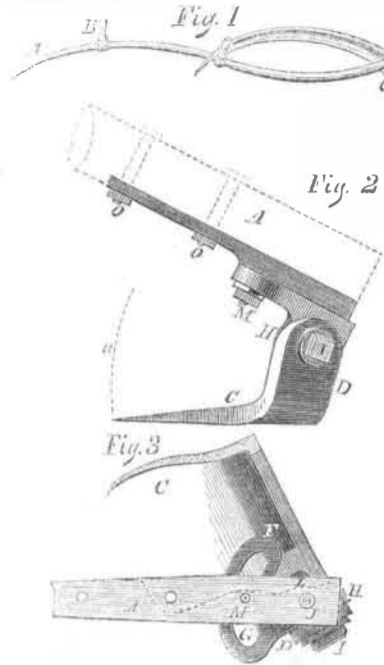
Quite recently, however, it is stated in some of our foreign cotemporaries, that M. Weinberger, of Paris, has succeeded in tinning cast iron, and rendering the tin coating as durable as on common tin-ware. For this purpose he subjects the cast iron vessels to a decarbonizing process, in the same manner that malleable iron is treated, by enclosing them in cases filled up with some decarbonizing agent, such as the red oxyd of iron, and then submitting them to a red heat for several days. Such vessels, after being decarbonized, are scoured clean with acid, sand and warm water, to remove all the oxyd, then they are submerged in molten tin in a vessel, having its surface covered with tallow, in exactly the same manner that sheet iron is tinned. This is a valuable and simple process for treating cast iron to be tinned, and may be carried on very extensively in our country, as the most suitable iron for the purpose is that made from charcoal, of which we have an abundance.

New Folding Scythe.

This scythe is constructed with several very valuable improvements. In the first place, the blade may be set at any required angle with the ground; secondly, the position of the blade with respect to the handle or snath may be altered and fixed in any position desired; and thirdly, the blade will fold and lie in a line with or be protected by the handle, for portability.

Fig. 1 of the annexed engravings represents the scythe complete and folded. A is the snath; B B are the handles mounted thereon; C is the blade, which has a portion of the heel, D, turned up at or about right angles to the blade; in the end of the turned-up portion, D, an eye is formed. The several parts are better seen in Figs. 2 and 3, which are different and detached views of the jointed parts. Fig. 3 is a plan of a portion of a scythe blade with the parts for fixing it to the snath attached thereto; Fig. 2 is a view of the same looking towards the heel of the scythe from behind. In this view the snath is represented by dotted lines, A. F is a quadrant-shaped piece of metal, which has a similarly shaped slot, G, formed in it. H is a portion of the quadrant piece; it is formed on and projects downwards from the quadrant, at right angles, or nearly so. In the projection, H, a hole is formed and tapped; a screw, I, is passed through the hole or eye in the heel part, D, of the scythe blade, and then screwed into the tapped hole in the projection, H, thus firmly securing these parts together. J is a pin or pivot formed on the quadrant piece, F. This pivot projects upwards and is inserted in a hole or eye in the plate, L. Through the

slot, G, a screw, M, is passed, and is then screwed into a tapped hole formed in the plate, L. The plate, L, is placed in a recess formed in the butt of the snath, and is firmly and permanently secured thereto by bolts, screws and nuts, O O, which bolts are passed through holes in the plate, L, and through corresponding holes in the snath, A.



To set the blade, C, in a proper position relative to the snath, A, and to the surface of the ground, the screws, I, and M, are unscrewed, the blade is then at liberty to be moved into the position required, when the screws, I and M, are tightened, and thus the snath and blade are secured as they have been set. Either the screws, I or M, may be made use of separately to set the blade, the screw, I, being made use of when a vertical movement is required, and the screw, M, for a horizontal, as represented by the dotted line, Q, in Fig. 3. When the scythe is not required for use, both the screws, I, and M, are unscrewed until the blade, C, is capable of receiving a vertical movement on the screw, I, and likewise the blade, C, and quadrant, F, a horizontal movement on the pivot, J. The blade, C, is then made to approach the snath, A; the screw, M, thus traverses in the slot, G, until the blade and snath assume the position shown in Fig. 1, when it is more easily and safely carried from one place to another, and also more readily stowed away.

We transcribe the above from the London *Mechanics' Magazine*.

Sugar-making.

Some recent improvements in the process of making and purifying sugars consist in applying to the juice a saturated mixture of alum and lime, in the proportion of two pounds of the mixture to a hundred gallons of the juice. These being intimately mixed, the acid is to be neutralized by the application of milk of lime, in the proportion of three pounds to a hundred gallons. If there be an excess of acid, it will be discovered by the application of the test paper usually employed by chemists to detect acids, and more milk of lime must be added; and if there be an excess of alkali, it may be discovered by the application of the test paper used for detecting alkalies, and more juice must be added. When the mixture ceases to affect either the test for acid or alkali, the impurities will be precipitated, and may thus be separated; and the juice thus purified is to be subjected to the usual mode of clarification and concentration. Pure raw sugar is now obtained direct from the sugar cane, without having undergone any subsequent process of decolorization or refining, prepared by effecting the last stages of the concentration of the cane juice in a vacuum, at a temperature insufficient to produce any chemical changes in its constituent parts. By this improved and scientific process of manufacture, no molasses or uncrystallizable sugar is formed, and there is, hence, an increase of 25 per cent. in the quantity of sugar obtained.

Literary Notices.

THE KNICKERBOCKER MAGAZINE for January, 1858. John A. Gray, New York.—This, the oldest of American monthlies, in commencing its fifty-first volume, starts well. "The Life of a Midshipman" is still continued, and seems to increase in interest as it progresses. A good sketch, entitled "John Bradshaw's Adventures in Smithburgh," enlivens its pages, while the "Editor's Table" is covered with all the riches of literary lore for the past month; and right pleasantly does the editor carry the reader through these realms of printed thought, giving information, cautions and advice by the way, which, if regularly perused with that attention they deserve, will not be altogether powerless in forming the future literary mind of our country. The criticisms are just, and a just criticism is worth a volume of praises to a young or even old author.

THE ECLECTIC MAGAZINE.—W. H. Bidwell, Editor and Proprietor, New York.—We have received the January number of this excellent periodical. It contains a portrait of Mrs. Barrett Browning, the poetess, and a picture representing Sir Walter Scott and his literary friends at Abootsford. The articles are well chosen, as fair representatives of the kind of selections that will be made throughout the year. It is one of the best magazines published in our country, and we wish it for the New Year all that success it so well deserves.

BLACKWOOD'S EDINBURGH MAGAZINE.—Leonard Scott & Co., New York. This number contains an excellent article entitled "Phrenology in France," in which it adduces many instances of remarkable exceptions to the laws of this system, and asks the phrenologists not to explain, but to refute them. There is also an article on the "Religions of India," and many others equally interesting.

AMERICAN FARMERS' MAGAZINE.—J. A. Nash, Editor and Proprietor, No. 7 Beekman street, New York. This highly interesting and valuable periodical has entered upon its eleventh volume, and contains much matter that will interest the farmer, mechanic, and all who have the beauties of nature around them, and wish to know how to improve natural advantages by cultivation.

CHARLESTON MEDICAL JOURNAL AND REVIEW.—J. D. Burns, M. D., Editor and Publisher. This bi-monthly periodical, so often favorably noticed in our columns, has changed its editor, and seems from the January number to be as full of valuable information in the medical science as ever, if not more so.

THE NORTH CAROLINA JOURNAL OF EDUCATION.—No. 1 of Vol. 1 is received. It contains an excellent article entitled "The Bible as a School Book," in which the writer urges weighty reasons in its favor. We hope never to see the Word of God banished from its proper place as the first of all books as an educator of youth. It is a priceless gift to man.

THE YOUNG MEN'S MAGAZINE for January, published at 348 Broadway, New York, by R. C. McCormick, is an excellent number for the young men of our country, and deserves to be widely circulated and carefully read.



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