Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 261 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

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NEW YORK, SATURDAY, JULY 14, 1883.

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THE WORKINGMAN'S SCHOOL.

We have frequently had occasion to refer to the growing dissatisfaction felt with our present system of school culture, and the efforts made to improve it. At the College of the City of New York, preparations have begun for the erection of a workshop, and in some of the public schools in Boston one of the school rooms has been converted into a carpenter shop where the boys spend a few hours each week in learning the use of tools.

A large and well ventilated building has recently been erected in West 54th Street, New York, for the accommodation of a "workingman's school." This name does not, as many suppose, imply that it is a trade school, nor yet a school for men, but that its benefits are intended to accrue to the children of the workingmen, who may themselves become workingmen. It is in fact a post-graduate kindergarten, taking children at that susceptible age when their faculties have been aroused in the kindergarten, and, by substituting work for play, continuing the natural method of object teaching. In the kindergarten, however, the child learns by *observation*, in the school he learns by *creation*, by the production of things. This creative method, as applied to education, is not intended, in that school at least, to make the child machine-like or subserve "the bread and butter interests" of later life, but to be applied to the training of the intellect, to the development and refinement of the taste, to the formation of character. Such are the aims and purposes of the founders of the Workingman's School. In how far they will be able to carry out in practice these high ideals, how far they can impress their thoughts upon the material at hand, and to what extent they will realize their own expectations, time alone can prove. Teachers have to be trained, methods devised, and details arranged.

The present workings of the school are such as to encourage the hope that much will be realized, and a glance at some of their methods may be of interest to our readers.

The youngest class (VIII.), as it comes from the kindergarten, which is in the same building, are taught to draw as well as to make things. The workshop and atelier are side by side. For example, the first exercise in drawing consists in placing before the class the model of a house, the end consisting of a square and triangle. A ruler and triangle are used in drawing it on drawing paper. In the workshop the pupil lays out a square of the same size on a piece of clay, and then carves it out, thus learning the use of the chisel and try-square. So the exercise of drawing rectangles, parallelograms, and triangles on paper is followed by carving them from clay. Clay has the advantage over wood that it does not require the use of very sharp tools, which could not be safely intrusted to children of six or seven years.

In the next class (VII.) the use of compasses and dividers is introduced both in drawing and carving. In class VI. drawing boards, T-squares, compasses with pencil and needle points, and scales are introduced into the drawing room. In the work room geometrical forms are cut from pasteboard. A cube, prism, pyramid, etc., are made from pasteboard after solid models. In the next class (V.) the pupil gains an idea of area and of a unit of area, while the use of a hand bracket saw is introduced. These four classes are already at work, and their productions are viewed with interest by those who visit the school.

In addition to the work above described, the pupils learn to model in clay from copies, and then make plaster casts of their own work. This affords an opportunity for awakening the slumbering art instincts, as they learn to model leaves, heads, and ornaments.

Instruction is not limited to the few subjects above mentioned, for there are many other things that go to make up a general culture. Reading and writing are taught simultaneously, as in Germany. A word is broken up into its elements and written by the children in script. Beginners in arithmetic use little numbered blocks of two sizes for tens and units. No slates are allowed, being injurious to eyesight.

In teaching geography one year is spent on the city, another on the State. It has been found that in the next year the children are able to master all of the United States, and draw the maps.

Music and calisthenics receive due attention, and are made as attractive as possible.

In 1881 and 1882, two weeks were spent in out-door life on a farm in the country, Sherman, Wayne Co., Pa., having been the spot selected. The results were most satisfactory. There in the woods, and among the hills, and along the streams, they gained not only new health and vigor, but also that more vivid realization of natural objects which contributes greatly to enhance the value of their winter study.

The pupils in this school, it must be remembered, do not represent the best possible material to work upon, being taken mostly from the tenement houses of a large city. Yet the principal, in his last annual report, says: "We have very few, perhaps 1 in 100, that deserve to be called bad; that is, persist in an evil practice in the face of gentle but continued repression of bad propensities and encouragement of good ones, which marks the ordinary discipline of the school. As a rule, the children of the workingman's school are wide-awake, but cheerful and obedient. As to the mental status of the school," he says, "a good number of the children are exceedingly intelligent, and in the 150 members of the school there is no really feeble minded child, and only a few are slow or stupid."

Whether the system of education here introduced for the first time shall prove worthy of imitation in schools for the wealthy or well-to-do or not, there can be no doubt that this school is doing a good work among the poorer classes of New York.

LOSS BY LACK OF SYSTEM.

The manufacturer can usually, by reference to his books, ascertain the cost of any article of his production, and the amount of his regular daily expenses. He can discover how much material has been lost by waste, and possibly he can make approximate allowance for loss by incompetence of his workmen. But there is one source of loss that cannot be readily estimated, and yet exists and has its effect on the results of the year's production. This is the loss from the lack of a rigid system in the using of tools and from the habitual carelessness this want of system encourages.

In every shop there must be tools that are for general use and are not individual possessions. If each successive user mislays a tool that is intended for general shop use, the aggregate of time lost in seeking for it may amount to a serious waste. Drills, taps, reamers, boring bars, arbors, milling tools, wrenches, and other implements may be intended for general use all about the shop, but when not in use they should have a home—an abiding place—so that no time would be lost in searching for them. And they should be left in proper condition for immediate use, either by the last user, or by some person whose business it is to keep them in condition. In every large shop provision should be made for this purpose, a repairer or sharpener being designated to perform this duty.

Attention to these little details is fully as important in small shops as in larger ones; for sometimes the loss of small sums occasioned by carelessness will seriously affect the balance sheet. A good practice, which is a rule in many large establishments, could be followed in smaller ones with saving results. This is to have a series of shelves or pigeon holes to contain the drills, reamers, arbors, etc., each numbered and each provided with a marked tag of sheet metal designating the tool. Every workman has a hook convenient to the pigeon holes, with a card bearing his name. When the workman takes a tool from its rack, or pigeon hole, he hangs its corresponding tag on his hook. A single glance shows where the missing tool is, and when it is returned to its place its tag is replaced over the corresponding pigeon hole. In effect, the workman charges himself with the tap, drill, or other tool when he takes it, and credits himself with it when he returns it.

The practice of this system has a good general effect on the workmen. They cannot fail to see the advantages to themselves in the saving of vexation in an aimless search for a missing tool; and the habit of care for general shop tools will extend to a similar care for their own bench and machine appliances. A saving of time could also be made in many shops by a more generous provision of general bench appliances. A single bench block for the use of a dozen vise men is not enough; it would be well if every vise had a bench block, a casting say eight or ten inches long, by four or five inches high and wide, planed on one face and side. Its cost is trifling and its uses many. It saves the hammering on the vise, and the defacing of the bench when used for straightening rods and small forgings. Encouragement to order in the care of lathe and planer tools would be given by providing for each lathe a handy tray, or sliding shelf of wood, to lie across the ways; lathe tools should never be laid on the ways of a lathe; the nicely trued surface of the Vs of a lathe cannot stand the batter of steel tools as they are usually dropped from the hand. Such a tray is useful, also, on the platen of a planer, which is too commonly used as a general receptacle for anything that should be laid on a bench.

Every shop should be provided with boxes or other conveniences for holding bolts, nuts, washers, angle irons, and blocks, for lathe and planer use, and boxes for receiving odds and ends not of present apparent value. These boxes should be distinct from the scrap heap, which ought to receive nothing of real possible shop use. They not only conduce to habits of order, but are valuable magazines to draw from in cases of emergency.

SCIENCE ON SORGHUM.

No subject connected with our agricultural resources is to us of greater national importance at the present time than that of sorghum. This to many may seem a stronger statement than truth will warrant. *Sorghum* has become to some degree a sort of by-word, for though largely cultivated in the Western and Northwestern States, and producing annually a return worth about $8,000,000, still it has confessedly failed to do what was expected of it. Somewhere about thirty years ago the Chinese variety of the plant (the varieties are numerous) was introduced into this country, and the excitement in relation to it was not small. Its sugar producing qualities were extolled above measure; our sugar trade was to be revolutionized, so to speak; every farmer was to have a little mill, and a little kettle, and he was not only to boil out his own sugar, but to supply his less fortunate neighbors.

Some way, however, things did not seem to work right. The sugar no doubt was in the sorghum cane, for when its juice was boiled down a sweet sirup was obtained, but there the demonstration stopped. The sugar was in the sirup, but it most persistently refused to come out of the sirup; it could not be induced to crystallize; and though the sirup