

to make their text-books interesting as well as useful. *Utile cum dulci* should be the motto of every one who has influence with children, everywhere. It would save a great deal of the labor of making crooked characters straight. Let "beauty and utility dance together" always, when they will.—*New Hampshire Journal of Education*.

#### 4. HOW TO MAKE DESKS AND SEATS.

[There are several places in this Province where school-desks and seats are made. Messrs. Jacques & Hay, of Toronto, furnish excellent hard-wood ones at \$4 50 per set of two seats and one desk.]

The problem of an easy seat and desk for a school-room is a very important one, which, like many other problems, has not yet received its only good solution. I send you the following, as the result of my own labor and study. I have tried it by years of actual use, and know the plan and proportions to be good.

Make the seat from half an inch to an inch lower than one-fourth of the person's whole height. Make the back from one to two inches higher than one-fourth of the person's height. Make the desk (level) one-sixth of the person's height above the front edge of the seat (Reasons for this may be seen by referring to the Oxford Drawing Book.) Thus, for a person about six feet high the seat should be seventeen inches, the desk twenty-nine inches from the floor, and the back nineteen inches from the seat. For one three-and-a-half feet, the heights would be ten, seventeen, and twelve inches.

In a room for pupils of all sizes the seats may vary from ten to sixteen or seventeen inches high; the desks from seventeen to twenty-eight or twenty-nine. In a primary department seats may vary from ten to thirteen inches, and desks from seventeen to twenty-one. In an intermediate department seats from twelve to fifteen inches, and desks twenty to twenty-four. In a higher department seats fourteen to seventeen inches, desks twenty-three or twenty-four to twenty-eight or twenty-nine. In all cases seats should be graded with care, and pupils seated according to their sizes—the tallest in the back of the room.

Incline the seat from the front downward one inch in one foot. Incline the back one inch in six, except the back of the seat next to the wall, which should be about twenty-five inches wide and slant one in five.

The seat for the largest size should be full twelve inches wide, and the top (or lid) of the desk eighteen or nineteen. The ends of all boards should project an inch over the standard, for firmness in nailing. Nail-heads should not be set, so as to require putty for children to pick out.

Every projecting corner of the seat, back, and desk, should be rounded to a quarter circle of a radius of three or four inches; every outer edge of the same to a semicircle. Desks for two should be from three-and-a-half feet to three feet nine inches in length for larger pupils; while three feet is long enough for a primary department. To vary the size, after making enough for one row across the room, cut off from the top and bottom of the standard each quarter of an inch; from the width of the lid and back each quarter of an inch; and from the width of the seat one-eighth of an inch. The seat should never be less than ten inches wide. These variations may be two or three times as great in a promiscuous school.

The standard may be, at each side, an inch or more narrower than the top and seat to be nailed upon it.

The shelf should be rabbeted (I think that is the term) into the standard; and the latter be nailed to the floor. Both are stronger and neater than cleats.

The whole, made of well-seasoned whitewood (which is less liable to split than pine), nicely grained and varnished, give a room a very neat appearance, are comfortable, and not so likely to be cut to pieces as those not well-finished.—*Illinois Teacher*.

#### 5. PROGRAMME FOR DRAWING.\*

[The subject of Drawing, as yet, hardly begins to receive the attention which its true importance demands. A knowledge of the principles of this art will be found exceedingly useful in all departments, and an ability to apply these principles to practical use will prove almost invaluable in some instances.]

There are several imperative reasons why drawing should be taught from the blackboard, the most important of which is, that it deprives the pupils of the means of mechanical measurement from the patterns. All instruments for the purpose of measurement must be excluded. The pupil is required to produce the same figure on a different scale and preserve the same proportions, that the eye and taste may be improved by intelligent comparison of its different parts.

For children from eight to ten years, teaching the elementary parallel straight lines, in different positions and at equal distances,

of not less than six to eight inches in length, during the same exercise, showing and explaining to the pupil what is the length of one, two, three, four, &c., inches, also of a foot and more; in this way the eye of the pupil will soon measure the size of everything he sees; this is to teach him how to see correctly, and is very practical. With the straight lines, let the pupil form the right, acute, and obtuse angles, the triangles, and last the square. The pupil has taken a vast step when he can draw a correct square by the eye. He should then be taught to draw from the cube, and also from other prismatic figures placed before them in the simplest position; the rules of the perspective to be explained; he should also draw tables, books, and any natural object composed of straight lines.

Next step advance to the curve lines, then make simple figures of the same curves; as leaves, &c., following the same particular rules as in the straight lines.

Next draw the ellipsis, and, when thoroughly mastered, draw simple figures which are composed of the ellipsis and curve lines; as vases, &c.

Next step, advance to the circle, and if mastered, draw the scroll, and when able to draw these correctly, in size not less than five to six inches diameter, you will be prepared to advance to simple symmetrical ornaments, both from plaster and from the blackboard.

Children from ten to twelve years may commence with geometrical definitions and geometrical drawings with the use of the compasses,\* constructing the angles, erecting perpendiculars, dividing, drawing the geometrical figures, triangles, quarter-angles, polygons, &c., simple practical lessons in perspective, and map drawing. Ornamental drawing should be continued, only somewhat more complicated; for the study of outlines, they should be symmetrical figures, that is, both sides should be alike, it being the most critical training for the eye, the slightest inaccuracy being at once detected; all the figures should be analyzed and resolved into their elementary lines, as a word is resolved into the letters of which it is composed; the anatomy of a drawing, thus taken to pieces and put together again, becomes so fixed in the mind of the pupil that a perfect understanding of the principles of drawing can not fail to be the result. By these means every pupil learns, while by mechanical copying the pupil without talent makes no proficiency at all. In drawing from plaster models, the same explanation is given.

After having drawn the figure, both from plaster and blackboard, understandingly, the patterns should be removed, and the pupils should be required to draw the same from memory; thus he retains the forms in his mind, he is prepared to use the different parts of the figure in other combinations, and becomes not a mere copyist, but a designer. (We can never teach designing unless the pupil has some ideas already in his mind to use in new combinations). Pupils frequently draw for years, without being able to produce a figure mentally; and this alone is what we want, independent mental operations, to enable one without patterns to make new combinations.

The drawing should first be studied and understood; next, it should be fixed upon the memory; it should be taught as a mental acquisition, not a mere outside exercise for the fingers; talent is discovered by a happy combination of the elements. Modelling of simple ornaments in clay or wax can also be commenced.

Pupils from twelve to fourteen years should be taught geometry, with reference to mensuration and surveying; also, descriptive geometry, shades and shadows, with a view to architectural and machine drawing; for these latter a few models are required. The five orders in architecture, the architectural terms, &c., also linear Perspective in simple short lectures with aid of the blackboard.

Isometrical drawing, for this is one of the most useful departments for all the mechanical trades, as the workman can take every measure from such drawings, and it is at the same time a kind of Perspective.

All the lessons which require the aid of mathematical instruments should also be taught from the blackboard; first and last it saves a text-book; the pupil should have a blank book neatly prepared in which to make his geometrical drawings, and write the explanations; all his drawings should be thus prepared for the future use of the pupil and examination by the visitor. A pupil will really learn more from the blackboard in half an hour than from the text-book in a day, thus saving much time. As the pupil acquires more power of combining and analyzing more complicated figures, shading may be taught both from plaster models and good patterns. If shading is taught too soon it is a great loss, as the time can be more profitably employed in outline drawing.

Ornamental designing should now be commenced, and the different styles of ornaments must now be explained.

If the pupil pursues other than mechanical occupations, he may now draw the human head and figure, and, when prepared, draw both from plaster; also, landscape drawing may be taught. He

\* For list of Drawing Materials in the Educational Depository, see page 178.

\* It may be well to show the pupils how to make a simple pair of compasses of wood, and so save the expense of buying the instrument.