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Clay Models for the School Museum

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Objects of biological origin may be copied in clay. The Egyptian beetle supplied the idea for the scarab, of which millions have been made. Studies may be made of normal size, or reduced or enlarged. Besides furnishing museum specimens, these contribute to the student's growth. How often do we hear "I simply cannot draw!" Pottery can be the unconscious route to drawing as well as leading to sculpture and chemistry.

TECHNIQUE¹

Clays are different in color and properties. Usually those in the commercial market have been subjected to chemical analysis, so that firing time and temperature are known. Small quantities of the prepared clay will keep moist and ready for use in a covered crock or glass container. It is shipped in 100-lb. covered wooden buckets, or less amounts, and kept moist with a damp cloth after being exposed to air.

¹ The writer will gladly answer questions concerning this and other points.

A lump of clay is "wedged" by kneading and throwing on a hard surface to exclude all air; this leaves the clay solid but pliable. A piece of wire (preferably copper) is fastened to a wall or back of work table so the wire is held taut and obliquely. After the clay is kneaded, it is cut in half by pressing the clay on the wire; each half is then thrown on the table, one on top of the other. It is kneaded again, cut and thrown again and again until the cut surface is smooth and pasty, indicating the absence of air (which would cause the clay to burst when fired).²

When the clay is in suitable condition form a short cylinder by rolling between the palms of the hands. Then on a flat, smooth surface, press and roll gently, until the cylinder is lengthened to a "rope" or "coil." Practice makes the coil even and of a thickness adapted to the size of the object desired. Prac-

² Pueblo Pottery Making, No. 6. Denver Art Museum, Denver, Colorado, August 1936, 10¢ per copy. Gives excellent illustrations of manipulation and technique.

tice by making a hollow cylinder (vase), starting the base from the center, like a watch-spring. The first upward coil is added to the base even with the outer edge, worked into the base with thumb inside and forefinger outside, and pressed into shape outside, so as to start the walls of the vase in the desired form. Continue the coils up to the desired height, keeping the outer surface as smooth as possible. A straight-edge, or piece of cardboard, held against the sides of the vase, can be used as a "templet" (template) to keep a symmetrical form. A cardboard circle of the same size as the base which will indicate the same periphery is laid on top of each new coil as it is added. The last coil is smoothed into the desired form, and the vase is ready for drying.

There is a time in the drying that is called "leather dry," when the surface is in best condition for smoothing and cutting. Water and a small sponge should be at hand, to counteract dryness during the course of working. The unfinished object is kept in a closed receptacle or in a damp cloth; when the work is completed, it is allowed to dry thoroughly before being fired.

Tools can be as simple as a boy fisherman's pin-hook, a manicure stick or a sewing needle. Various tools can be obtained from firms that supply clays, glazes, etc. Fingers have always been the best tools because they convey sensations of tactile values.

Having learned to control the medium, one may attempt museum specimens. A beetle, wing, or leaf may be an interesting beginning subject. Children's toy shops sometimes have small inexpensive kilns for firing small objects. Colored with glaze applied delicately, using a fine brush, and fired, these objects may be actual jewels.

Whether complicated museum specimens are wanted, or simpler ones for a

classroom exercise, the question of finish will arise. In the classroom, clay models can be made quickly and dried but not fired. These will teach details, and the models can be crushed and the clay used again after wetting and kneading. Models may be painted when thoroughly dry, but the best ones for permanent use are glazed and fired.

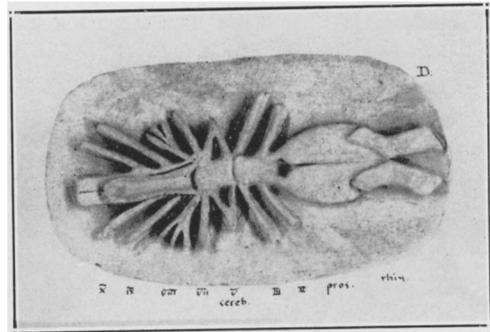


FIG. 1. Model of the dorsal side of the brain of the lung-fish *Ceratodus*, in relief on clay tile. Design adapted from Parker and Haswell.

SUBJECTS

For such objects as heads of birds, showing beak adaptations (duck, chicken, pigeon, and the like) use actual bird heads if available; good pictures in textbooks or manuals may of course be used. Solid models may be made, or, using a flat clay tile, the design may be incised, giving a diagrammatic or schematic effect. This is useful for such as ecological maps. Or elevated (bas-relief) on the tile, flowers and insects may be tried. To save time, the clay coils or tiles may be ready for distribution at the beginning of the period. The effect of a fossil imprint may be shown by pressing the paw of a kitten or other such object into the clay. Insects may be imbedded in the soft surface, leaving their impressions. Tiles showing phylogeny may be valuable, and a series of them is both educational and ornamental. Clay utility jars with covers, clay spoons for chemicals and plates

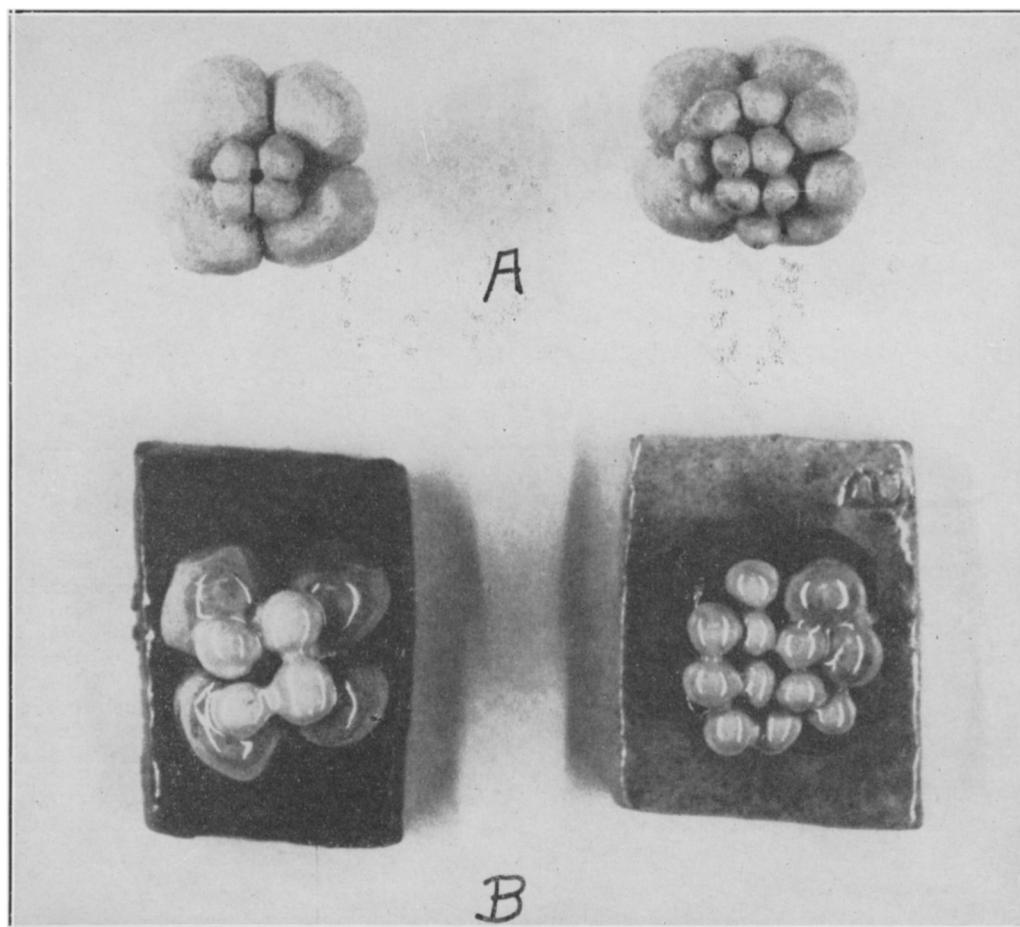


FIG. 2. Vertical views of 8-cell and 16-cell stages of embryo of the sandworm *Nereis*; A—unglazed clay, B—glazed and fired. The glazed models are in two colors, which add much to the appearance of the model.

for specimens—making these at home will teach manipulation and save school time, also economize metal war materials. Tiles of kneaded clay, patted to oblong shape, are useful. For a tile box, fasten two strips of wood, one-half inch thick, about three inches apart, to a flat surface. Close the ends with short pieces of the same thickness, thus making a box of the desired size and one-half inch deep. Sprinkle the interior with clay dust or flint. Fill and press the kneaded clay into this box even with the top. When the clay is dry, remove one of the sides or ends of the box and release the tile, using the blade of a knife if neces-

sary. Shrinkage usually releases the tile from the side strips.

For impressions or incisions, use a small piece of clay to test best condition, allowing at least ten minutes for settling. Insects should be imbedded as soon as the clay has settled. Good and important impressions can be used as moulds after firing. A tracing of a design may be used on leather-dry clay; with experience a design may be incised in dry clay, with the "incisor" kept wet to prevent uneven edges.

For bas-relief (raised designs) apply design by tracing or drawing. Keep the clay moist and remove the background

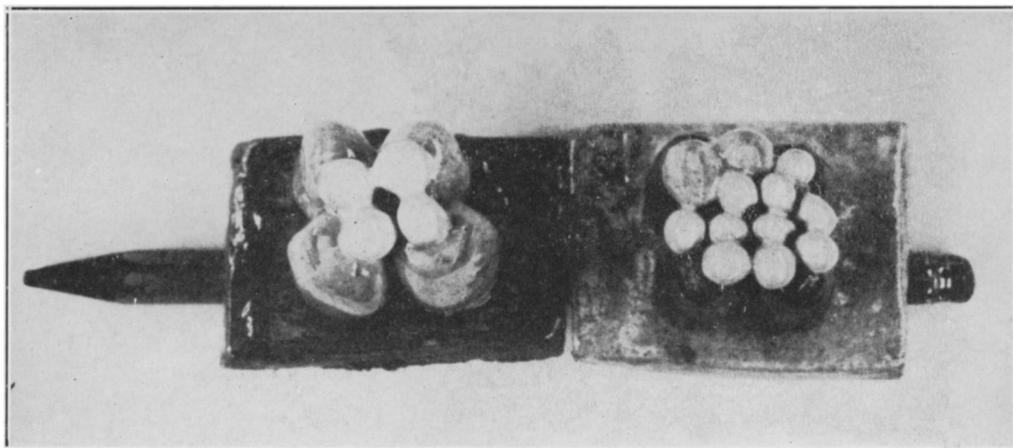


FIG. 3. "Three-quarters" view of 2-A; the pencil gives a measure of the size of these particular models.

material with a modelling tool. Build up the design by adding clay; before adding new clay, make scratches on the surface to be covered and wet slightly, so the new clay will adhere.

For "modelling in the round" take a lump of kneaded clay and shape with the fingers, adding or removing as necessary; for additions use "slip," which is thinned-out clay and water. Plaster-of-Paris bases, or "bats," convenient to model on, can be made in a small pie-plate. These absorb excess moisture, and do not adhere to the clay.

For color, use paint or glaze. Oil paints, with a little turpentine, may be applied to the dried or fired clay. Water colors will do for temporary work. Apply underglaze and overglaze colors to fired objects. These do not show the color until firing, so that small test pieces are processed and then the model treated similarly. Manufacturers have color charts; 25 test packages, enough for a year's work, can be bought at a small cost (\$1.00 to \$1.50). Some knowledge of chemistry is helpful in using independent glazes and in experimentation. In using lead or tin glazes, protect the skin and do not inhale the dust.

SILVER BURDETT COMPANY announces the appointment on November 1, 1944, of Mr. G. Dan Robison, Jr., as Eastern Sales Manager with headquarters in the New York Office. Mr. Robison has been sales representative in Tennessee for the past nine years, with sales responsibilities also in several neighboring states. Formerly he was a teacher in the Paris, Tennessee High School. He received his undergraduate training at Cumberland and his graduate work was done at George Peabody.

THE SCIENCE TALENT SEARCH, sponsored by *Westinghouse*, is again under way. The \$11,000 in scholarships, which are awarded each year to the finalists, can be applied to any accredited college or university in the United States which is approved by a scholarship committee named by Science Clubs of America. Scholarships awarded to finalists who enter military service will be held in trust until they return to civilian life.

HOMER M. HIGHTOWER, 34 Ruth Street, Hammond, Indiana, has prepared an outline chart of the plant and animal kingdoms, which comes folded and punched to fit into a laboratory notebook. For information, write him at the above address.

ALFRED M. ELLIOTT, State Teachers College, Bemidji, Minnesota, has prepared sets of zoology and botany plates, charts in miniature, punched for a standard notebook. For information, write him at the above address.

SUGGESTIONS FOR A SPECIAL ISSUE on *Laboratory Aids and Substitutes* are in order and welcome.