

TEACHING BY CHARTS, AND MODELS, AND MODEL- ING.*

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(With three illustrations and one plate.)

WALL CHARTS: METHODS OF MAKING THEM.

ONE selects, in the literature, the most nearly satisfactory picture. If it is simple or diagrammatic this original may be lightly ruled in one-quarter or one-half inch squares. The chart paper is ruled with squares larger than these in proportion as the chart is desired larger. Then the lines of the enlarged diagram are drawn with an airbrush and India ink, or with the slender brush made for line work, or with charcoal, and sprayed with fixative.

For most charts I find the best method to be enlargement by "solar printing" with or without a subsequent wash of transparent water color. Any maker of so-called crayon portraits will tell who makes for him those cheap enlargements which he simply fortifies with crayon touches. Other enlargements, such as those by bromide process, are expensive. This "solar printing" costs as follows:

Enlargement 24 inches square.....	\$0.75
Enlargement 36 inches square.....	2.25
Enlargement 36x48 inches.....	2.50

The paper commonly used is excellent (Steinbach paper).

All charts should be backed with gauze or linen, and this is best done by the solar printer, or backed paper can be bought. (Universal paper No. 100, 36 inches wide, is 70 cents a yard).

Washes of transparent color, thin but clear, are readily applied to differentiate still further muscle, bone and artery. Corrections

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or alterations are made with opaque color—that is, chinese white (from the jar or bottle, not from pans) is added to the colors.

Enlargement by squares or by washes of color over a solar print can be done by one who has little experience as a draughtsman, but corrections, if extensive, require skill with the brush. The pantagraph does not enlarge more than three diameters successfully.

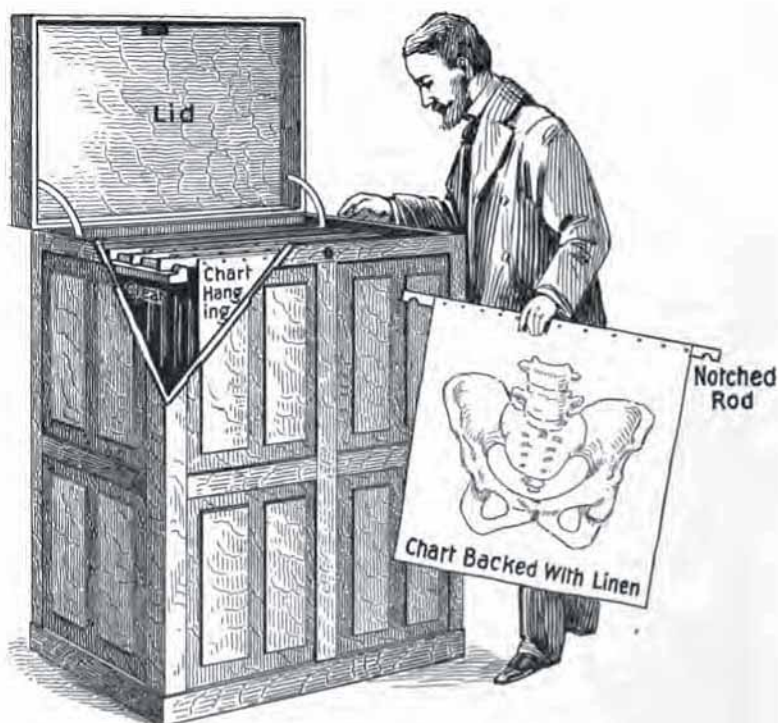


Chart box. A corner has been removed to show the charts, fastened to slats, hanging in place. The eye sees every label on the upper edges of the slats. Any one can be removed or examined without disturbing any other.

As an aid in teaching, the writer prefers the chart to the lantern slide, after experience with both. For a set lecture, where comparisons of different pictures need not be made, the lantern slide is more convenient. But where a series of changes, or the steps of an operation are to be demonstrated, or for continued exposure, as in anatomy—that is, in all cases where a reference back to pre-

vious illustrations is desired, the chart is in place. In the recitation room there can be no comparison. The demonstration-lecture, and the recitation-lecture, freely illustrated with models and charts, keeps classes alert and interested, and any method of rendering the accessories easy to handle is worthy of study.

HOW TO STORE WALL CHARTS.

Charts kept in drawers or on shelves cannot long be handled without tearing and fraying. Defacement by rubbing one over the other is inevitable. Selection is difficult. Although the best art dealers lay large etchings in inch-deep drawers, two or three in each, yet the under picture is never accessible, and the construction eats up money and wall space. Harvard uses it for anatomical charts.

Portfolios are shabby makeshifts, unsuited to large charts. The edges of the charts suffer, and where sizes vary, selection of the desired picture is not expeditious.

Mounting on wood veneer or cardboard enormously increases weight. It restricts the size of charts as well as ease of transportation. No backing has been devised that will not warp in the large sizes. I stated my difficulties at one of the largest factories of cardboards. Skilled workmen mounted some charts, and papered the back of the mounts to try to prevent twisting; and yet curling occurred, as a member of the firm had predicted. Professors A. L. Ranney and B. C. Hirst use a uniform size of mount of wood veneer, and keep the charts, standing on edge, in boxes, to be turned over like cards in a card catalogue when searching for a given picture. But they are limited to two feet by three, and this seems to be insufficient and inelastic. To carry a number of these mounted charts about the building or to some outside lecture room is to transport useless bulk and weight. Dr. Hirst slips his mounted pictures into plain wooden frames in the lecture room. The effect is very good indeed.

Wall rollers, useful for a small number of large school maps, are not suited to our purposes.

Charts Hung on Top-slats Across Cleats.—The charts may be of any dimensions within the limits chosen, but should be backed with linen or gauze. Each chart is tacked to a wooden strip along its upper edge. These strips are all of the same length, and the chart may not be wider than the maximum width selected—say three feet. The thin bar that is found in the lower edge of every

window shade makes a suitable support, is cheap, and has a flat edge for labeling. When the drawings are not in use the projecting ends of the bars rest on horizontal cleats right and left. These side supports may be brackets, projecting two feet or less from any wall, and placed four feet above the floor, or the brackets may be made fast on the rear wall of any closet; or they may be



Example of glue mold flexible as india-rubber, which demonstrates a primary perineal tear, and is sutured as the living tissues are.

cleats inside the top edge of a big box. I find three feet by four to be as large a chart as is ever needed. A box two feet from front to back works well, 2x3x4 being the inside measure. A notch in the slot at each end, with a corresponding bead on the upper edge of the cleat or bracket, prevents the slots from derailing—although this precaution is hardly necessary.

Labeling.—On the upper edge of the wooden strip the title of

the chart is printed or written, in due order : department, subdivision and subject ; thus—

OBST. ANAT. PELVIC FLOOR, SAG. SECTION.

OBST. PUERPERIUM. BREAST BANDAGE. MURPHY.

Thus it will be seen that with all the titles under one's eye, self-catalogued, and with each chart independent of any other, selection, removal, replacement or rearrangement is utterly simple.

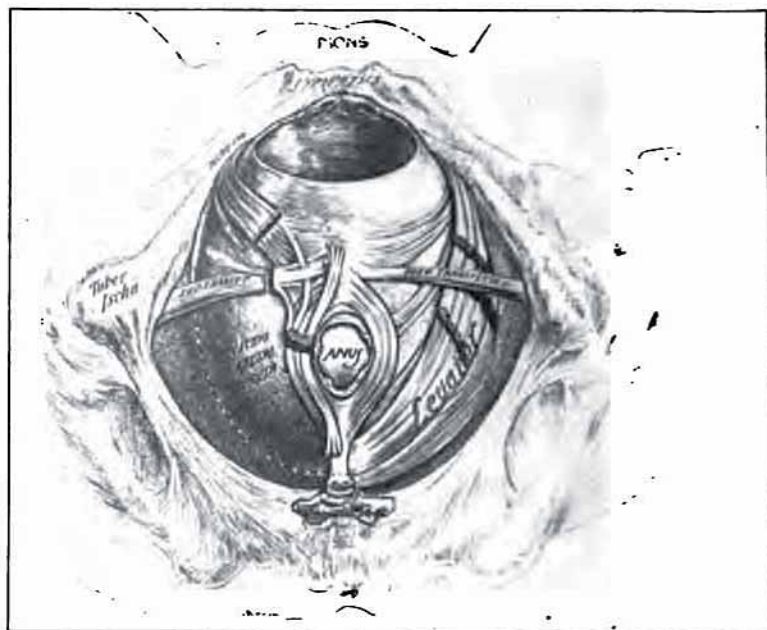
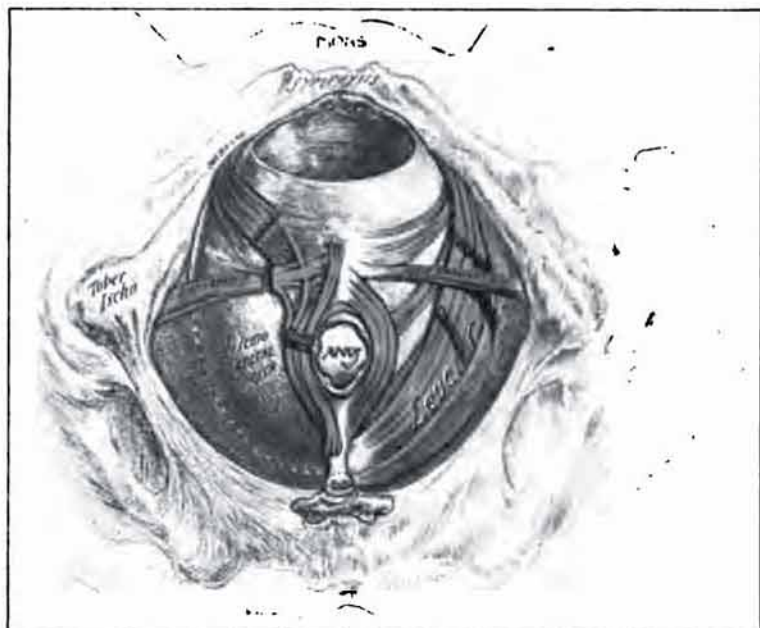
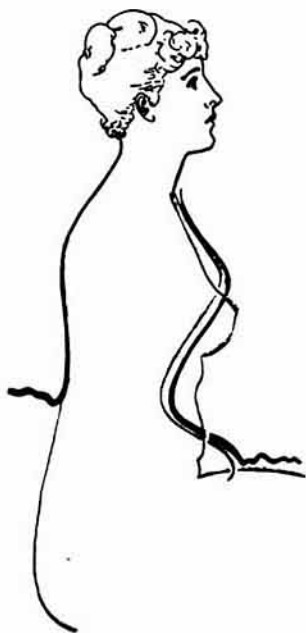


Fig 3.—Example of the value of lines or washes of color on diagram or chart. The distended muscles of the pelvic floor at the crowning of the head, and the lines of rupture which are near median. One with color, one without. Compare with plate.

TEACHING BY CASTS, MODELING CLAY AND GLUE MOLDS.

It is not too much to say that the gross anatomy of the genitals cannot be taught in two dimensions. In the dissecting room the female pelvic floor is in poor condition for study or operation. The difficulties in securing clinical opportunities in three dimensions in this country must always be great, the time limited, and the inspection cursory. But the topography of the vulva, and the



DICKINSON.—Examples of the value of lines or washes of color on diagram or chart. The upper diagram shows the lines of the corseted and uncorseted figure; the lower the distended muscles of the pelvic floor at the crowning of the head and the lines of rupture, which are never median. Compare with Fig. 3.

mass relations of the intrapelvic organs can be taught clearly and inexpensively by means of plaster casts and models, and by modeling. For instance, I find that the nurse in the first year of her training who has spent an hour in copying, in plastilina, a cast of the vulva, and has studied, in the light of this handiwork, a few other models, *knows* the relations of parts. She finds the clitoris, exposes the vestibule and searches the first fold half to three-quarters of an inch backward from the clitoris. In douching a virgin she does not poke into the fossa navicularis or, once inside the hymen, prod the anterior vaginal wall. She has learned the lines of direction, urethral, vaginal, anal, from her errors on the clay, not on the living patient. The first elastic mold which I pass around a new class, asking each to insert a two-inch pin where the catheter should enter, comes back looking like a porcupine. But after each nurse has worked on her own box of material her knowledge is at her deft fingers' ends.

Whether the medical course can equitably allot the time to the anatomist which he needs in order that the student shall model the bones is a matter in dispute, and it does not seem to the writer that the laborious modeling of the brain is essential and practical in these crowded days. But the small areas of daily clinical importance in practice, such as the nasal cavities, the pharynx, the auditory canal, and the genital canal would seem to have a just claim to the very moderate time required. To copy a model of the vulva, and of the normal and the torn cervix, to lay the plain ring or Smith pessary under a moulded uterus in the halved vagina, to go through the motions of reposition of a retroverted dummy uterus on the obstetric manikin—this is to teach gynecology by proper object lessons. The outfit is not costly. The *hard* reddish variety of plastilina should be used. It seems to be a mixture of clay and tallow and glycerine and coloring matter. It costs 35 cents a pound. One double-ended wooden modeling tool at 20 to 30 cents does well enough. The warmth of the hand softens the wax-like material so that preparation is much simpler than in the case of ordinary modeling clay, and very much more cleanly. As it does not need to be kept damp like clay, work can be dropped or picked up at any time without fear of cracking or spoiling. The finished model may be preserved by the student if he owns the stuff, or the material used over again any number of times.

MODELS.

Many museums contain wonderful reproductions in wax of various conditions bearing on the anatomy and pathology of the pelvis, as well as frozen sections, often in colored plaster. Berry Hart passes around colored gelatin reproductions of slabs of sections of the pelvis made of cathcartine. These are all of great utility. But it seems to the writer that Clarence Webster's sketchy colored plaster casts of the every-day vulva and cervix, and the common defects and injuries, and of the steps of the operations for their repair, could well be reproduced for a few cents like the medallions the Italian sells upon the streets, and that these should be sold to students, or at least lent to them, as the bone library collections are, for study in three dimensions. If I taught didactic gynecology this should be one of my first labors.

GLUE MOLDS.

Striking success in teaching suture of primary perineal injuries on casts of the pelvic floor, these being of the consistency of India rubber, demonstrate that gynecological plastic work could be thus taught efficiently. The red material has any white powder rubbed into the surface. As knife or scissors make the denudation, in the secondary operation, the red base shows up, simulating nature very fairly. The material is the same used to make the cheap little grotesque faces sold by street fakirs, which faces can be twisted into many forms. Any plaster worker can make this stuff—for the trade works constantly with the glue mold or matrix, if he is told the one secret of the process (for which I paid certain good money), and that is to add a little brown sugar to his composition. The material can be cast over again four to six times.

168 CLINTON STREET.