positive has hardened, this card may be stripped off and a fresh card glued in the inset thus provided. This protects the edges, yet is flush with the sides of the model.

To prevent sticking of the final positive to the plaster negative, the negative surface is coated with 'label lacquer,' a solution of celluloid in acetone. If this is done no grease need be used, and the resulting positive surface is nearly perfect, requiring a minimum of scraping.

The plaster should be mixed all at once in a large container, to a rather fluid consistency so that it may be poured in one operation and smoothed off on the surface. Annoying airholes result from casting with stiff plaster.

The model is finished by shellacking and enameling, after which the binary diagrams on the sides, and the contours on the top, are inked in.

For drawing the contours the writer used the device shown in Fig. 2. Its support is a horizontal triangle on three legs. On this rests a movable unit consisting of three rods radiating from a vertical sleeve. A rod, to which a drafting pen is fastened, fits in this sleeve. The pen used is hinged and may be adjusted to work on a surface of any degree of inclination. The pen is held at the proper height by means of a set screw in the sleeve; the movable unit may then be guided so that the pen will draw the desired contour.

Protection for the inked lines and labels is given by a final coat of varnish; the variety known as "White Damar" varnish appears to be the most satisfactory for perfect transparency. Figure 2 shows a completed model of the system albite-anorthite-diopside.

AURICHALCITE IN MISSOURI

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The occurrence of aurichalcite, $2(Zn,Cu)CO_3 \cdot 3(Zn,Cu)(OH)_2$, in Missouri is unreported hitherto, so far as the writer knows, and a note concerning a recent find may be in order for the record. One of the writer's students, Mr. Carl E. Paden, collected specimens in November, 1939, from the Shinn mine in Stark City, Newton County, Missouri, (near the Joplin area), which contain aurichalcite and associated sphalerite, hemimorphite, covellite, malachite, and dolomite. The ore minerals cover and cement a chert and dolomitic limestone breccia which is also cemented by secondary crystalline dolomite showing the curved crystals and pink color typical of that mineral from the Joplin region.

The sphalerite is resinous and dark brown, and highly shattered in most parts. After fracturing, solutions permeated the formation and replaced the sphalerite with covellite in thin layers. The covellite is very dark to black, iridescent in places, and sometimes powdery. Since oxidation is also shown on the specimens the possibility of the black powder being tenorite must not be overlooked. Tests made on the finest scrapings gave positive sulphur reactions, indicating a sulphide, but it is still possible that a little unreplaced sphalerite contributed the sulphur. However, the iridescent appearance and the fact that similar material from the same region was determined as covellite by Siebenthal[1] (1916) support the belief that all of this black material is covellite.

Oxidation, carbonation, and hydration followed the sulphide deposition. The limestone fragments show solution, iron compounds have been oxidized to brown staining limonite, and some clay is present. Sphalerite is covered along open cracks with thin hemimorphite which may also be present cementing the fragments.

The aurichalcite, an oxidation product of the copper and zinc minerals, occurs in fine, pale greenish-blue blades which radiate in bunches up to 3 or 4 millimeters in diameter. Aurichalcite has formed on top of the hemimorphite, or is mixed with the hemimorphite, where it serves as a cement, but most commonly it has replaced dolomite. The aurichalcite is not abundant as far as quantity goes, but is well developed in the small specimens at hand. Malachite is present at times as small hemispheres of radiating crystals on the hemimorphite.

Apparently after brecciation of the cherty limestone the dolomite and sphalerite were deposited between the rock fragments and replacement of sphalerite by covellite followed. Oxidation later developed hemimorphite, malachite, and aurichalcite which overlies the hemimorphite and replaces dolomite.

[1] Siebenthal, C. E., Origin of the zinc and lead deposits of the Joplin region: *U. S. Geol. Survey, Bull.* **606,** 258 (1916).

Important studies of the alkali xanthates, foremost reagents in the flotation process for metal ores, are being conducted at the Massachusetts Institute of Technology under the newly created Dow Fellowship.

The project is being started by Kenneth C. Vincent, first holder of the fellowship, and will be continued by him for a year under the direction of Professor Antoine M. Gaudin, known internationally for his outstanding work in ore dressing and recently appointed Richards Professor of Mineral Dressing at the Massachusetts Institute of Technology. A grant from the Dow Chemical Company makes the research possible.

Vincent is a graduate in chemical engineering of the University of Utah, and also holds a degree of master of science in mineral dressing from the Montana School of Mines. At the time of his appointment to the fellowship, he was research engineer for the American Smelting Company in Utah.