

Making Satisfactory Glass from American Clays

By S. R. Winters

A SERIES of investigations, embracing a three-year period, as conducted by the Clay Products Section of the National Bureau of Standards, has established the merits of domestic clays for the manufacture of glass. Hitherto America has relied upon Grossalmerode, Germany, as an exclusive source for glass refractories, little knowing that portions of Tennessee, Kentucky, Arkansas, Ohio, and Illinois, are veritable mines of clay products.

Plasticity, bending power, and strength are the desired properties figuring in the selection of clays for the glass industry. The fire shrinkage of the American bond clays as contrasted with the imported product is a disparagement in favor of the latter. The extreme furnace shrinkage, however, according to Government scientists, can be overcome by the incorporation of a sprinkling of siliceous clay or sand, by increasing the content of grog or by sizing, and by the use of higher pot-arch furnaces. Siliceous clays, perhaps the most feasible remedy, are plentiful in New Jersey, and sandwiched among the fire-clay deposits of Missouri, Kentucky, Tennessee, Ohio, and Pennsylvania.

That the porosity of the pot body be as low as possible when the glass charge is introduced, is a prerequisite in glass making. Seemingly, this is contradictory to the requirement that the fire shrinkage be low; whereupon, the Bureau of Standards suggests a compromise by using with the siliceous clay a material burning dense at the furnace temperature. German clay has a porosity of 16.9 per cent at 1,290 degrees Centigrade whereas a Missouri product shows only 8.96 per cent. A happy medium is possible. The Arkansas clay, having a porosity of 25.6 per cent at the above-mentioned temperature, requires a larger volume of dense-burning clay to attain the prescribed degree of compactness. Extreme caution in drying glass pots and tank blocks is essential; otherwise, irregularities will be evident when the pot has been placed in the melting furnace.

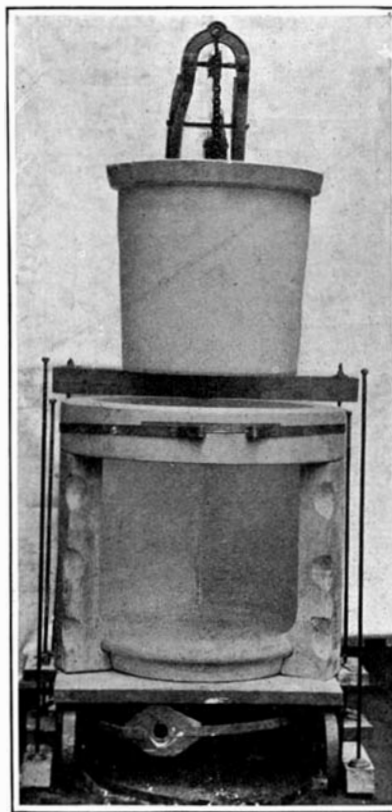
American clays resist the corrosion of glass more satisfactorily than the imported product. By way of disparagement, while the German clay is resistant to corrosion sufficiently to meet the requirements for

glasses of the soda-lime type, it does not compare favorably in contact with flint glass. The rigidity of siliceous clay at furnace temperatures—its capacity for resisting pressure without deformation—is another feather in its cap. On the other hand, it has a tendency of being fragile when being manipulated in the furnace; a weakness which expresses itself by an inclination to spall under sudden temperature changes.

Looking to the development of American bond clays, a ceramic chemist of the Bureau of Standards recommends the abandonment of the pot-arch construction in vogue and substituting therefor either the down-draft or the up-draft firing common to clay industries. Preferably, the firing should be done from two sides, over bag walls, copying the arrangement of the rectangular down-draft kiln employed in brick burning. A perforated kiln bottom permits the guidance of heat and flames at will, a condition insuring the burning of the bottom of the pots which are placed on blocks. Either the down-draft or up-draft firing, provided ample space is available, renders it feasible to preheat the pots to a higher temperature; possibly, 1,200 to 1,300 degrees Centigrade. Thereby, a maximum degree of fire shrinkage will be accomplished here instead of deferring the process until the material reaches the melting furnace. Such an attainment is desirable.



Block of glass made from American clays, being freed from its coat of slag



Special type of mold for the casting of glass pots

A Radio Link in Our Telephone System

By Frank B. Howe

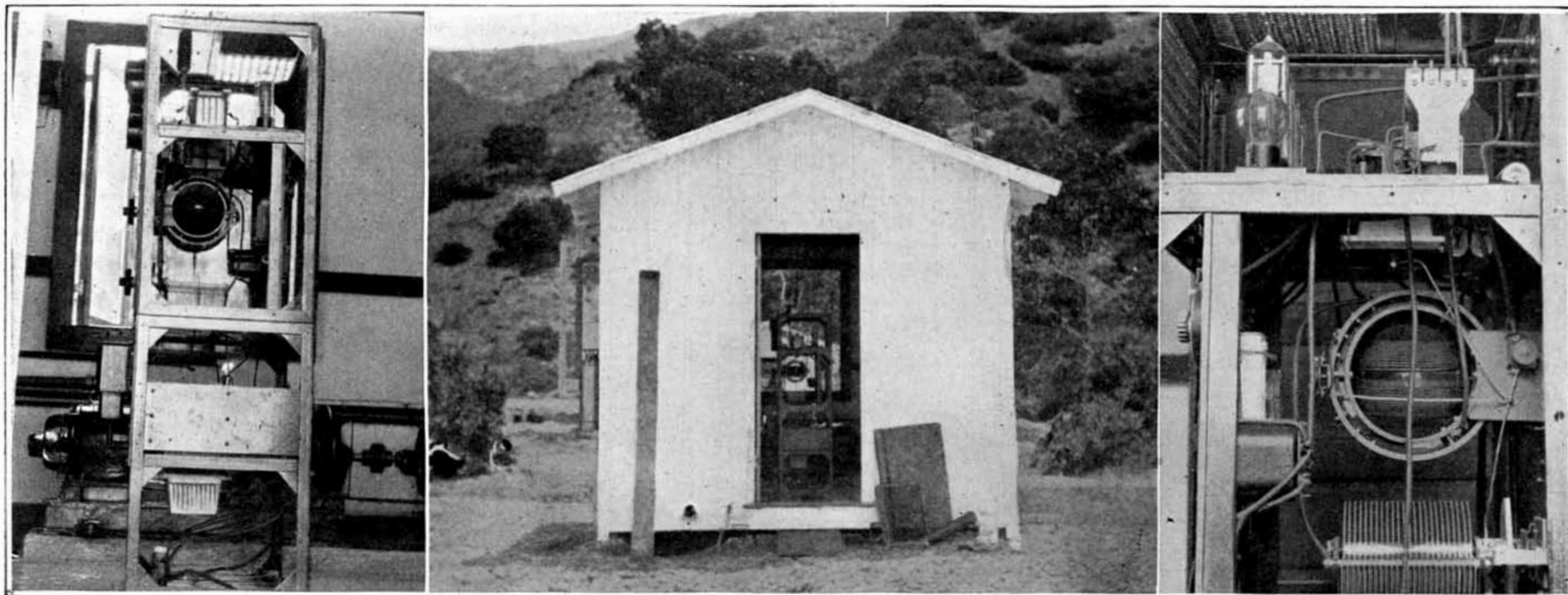
COMPLETING the latest link in the chain of devices for commercial communication, the first radio telephone to be opened to the public has been established between Catalina Island, California, and the mainland by the Pacific Telephone and Telegraph Company. The system not only establishes telephonic communication between the island and mainland but it can be plugged into the regular telephone service and connected to any subscriber's phone without additions or changes in the regular house instrument. In fact, since the establishment of the service, a heavy concessionaire on the island, William Wrigley, Jr., has been holding daily conversations from his residence in Chicago with his managers on Catalina Island.

The mechanism of the commercial radio telephone is anything but bulky. Walking around the island from the little town of Avalon, one comes eventually

into a little cove, free from everything in the way of civilization that would tend to interrupt the waves of the wireless. There are two little white houses, about ten feet square, and two high aeriels. That is all. In one of the little sheds is the mechanism for sending messages, or transmitter. In the other is the receiving instrument, which looks much like an ordinary telephone exchange desk. A generator for charging the storage batteries used in the system, completes the list of instruments.

The land end of the system is located at Long Beach, a small city on the southern California coast. Here the connections are made with the regular service, over wires. The charge for a wireless message is no greater than for an ordinary long-distance call—40 cents for three minutes. The distance from Catalina to the mainland is 26 miles.

That the system is successful, there is not the slightest doubt. One can hear as clearly as over the common type of phone and calls are made with equal promptness. One man constitutes the entire working force of the island station. When the writer called the one-man force was out swimming—calls were being made every few minutes, but the mechanism was taking complete care of them all by itself, and there was nothing for the crew to do.



Left: General view of the radio telephone transmitter, showing its simplicity. Center: Small building containing the transmitter for sending out the radio telephone waves to the mainland. Right: Close-up view of some of the transmitter apparatus. Note the oscillation and modulation vacuum tubes in upper left-hand corner, the variometer tuner in the center, and the variable plate condenser below. All the components of the transmitter, excepting such accessories as the motor-generator set, are mounted in the angle-iron frame

Radio telephone station on Catalina Island, which maintains communication with the California mainland and thence through the usual telephone system