the calcined clay, which has lost its plasticity, can be added to the raw clay in quantities as large as desired to secure the best working quality; that drying at a moderately fast rate can be accomplished with safety, and the properties of the burned clay body are not affected.

The calcined clay, then, acts as sand during the early stages of manufacture, but when burned it proceeds towards vitrification with the raw clay, and does not remain inert at ordinary burning temperatures as sand will.

Further experiments on preheating clays shows that if the ground clay be heated from 300° to 500° C. that they lose a great deal of their plasticity, and the quality of the clay is changed from a tough, sticky mass when melted to a granular and easily worked body which can be moulded by the stiff-mud process, and will stand fast or moderately fast drying.

How extremely finely divided some of these clays are in the raw state and the change in texture they undergo in preheating is shown in the following mechanical analysis, made by the centrifugal method:—

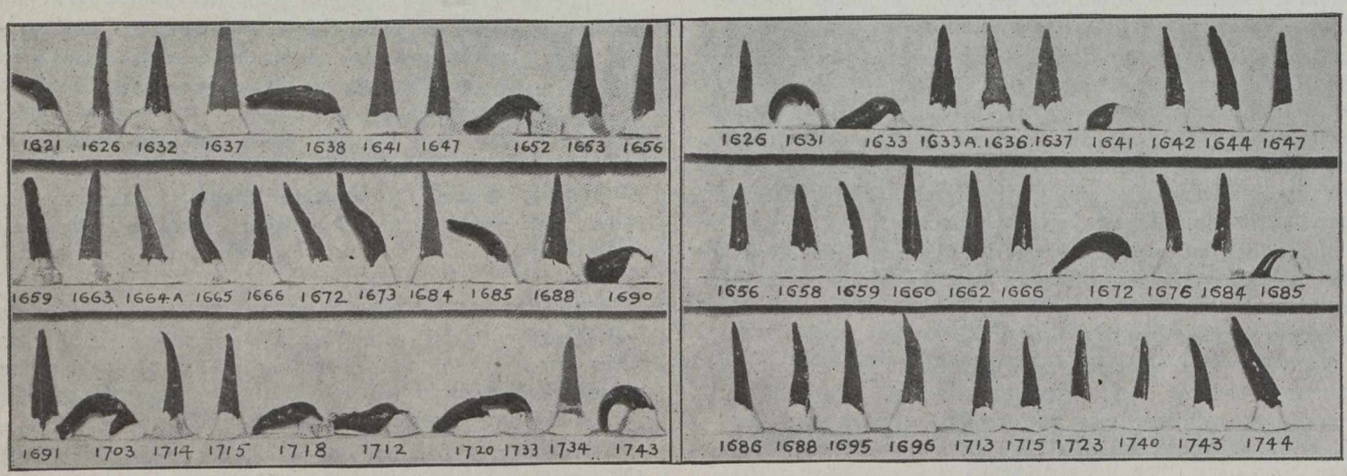
be cured by the addition of 1 to 2 per cent. of hydrochloric acid to the mixing water, or 1 to 2 per cent. by weight of common salt added to the dry clay. The salt seemed to be the most practical, and was used in the greater number of tests.

The amount of water required for tempering the clay was reduced by about 10 per cent. by the addition of salt. The water appeared to convey the salt from the body and deposit it at the surface in a slight scum, but this generally disappeared in burning.

The bricks so treated dried perfectly in about four days at a temperature of 70° to 80° F., but would not stand fast drying.

The object of preheating any clay is to overcome drying difficulties, and the temperature required to accomplish this object varies with different kinds of clay. The amount of heat necessary for some clays would destroy the plasticity of another clay and render it useless for moulding.

In some cases while drying can be carried on safely after preheating, the burned wares may show a tendency



Pyramids of Clay after Heating to Cone 1. **Pyramids of Clay after Heating to Cone 3.**

(The figures under each refer to the laboratory numbers.)

Material.	Percentage retained on 200-mesh sieve.	Percentage of silt.	Percentage of clay.
1. Normal clay	Trace	57.40	38.40
Preheated to 500° C...	36.20	46.20	15.00
2. Normal clay	6.4	45.6	46.0
Preheated to 450° C...	14.6	62.0	14.4
3. Normal clay	1.5	49.6	46.8
Preheated to 500° C...	22.1	52.0	24.5

1. Brown clay shale—Dirt hills, Alta. Lab. No. 1646.

2. Yellowish clay shale—Redcliff, Alta. Lab. No. 1686.

3. Dark grey underclay—Entwhistle, Alta. Lab. No. 1661.

The gains included under the heading of silt have a diameter from 1-200 to 1-5000 of an inch, and those under clay from 1-5000 to 1-25,000 of an inch.

Inasmuch as calcining and preheating clays involves the expense of extra machinery, fuel, and labor, it follows that only clays used for the higher grade products can be treated economically by this method.

Further experiments were undertaken with certain substances which when added to the clay would reduce the amount of water used in mixing, and also assist in conveying the moisture from the body of the clay to the surface during drying.

Of the various materials tried for this purpose during the experiments, those that gave the best results were hydrochloric acid and salt. Most cases of cracking could to crack, but such clays generally work perfectly when dry pressed.

The temperature used in calcining clay must be sufficiently high to deprive the clay of all plasticity and reduce it to a condition resembling sand. Although this operation requires a higher temperature than preheating with the object of destroying only a portion of the plasticity, the operation is a simpler one because critical temperatures are not observed.

Clays to which salt is added frequently show a slight glaze when burned to cone 1, but the quality of the body does not seem to be affected, especially if the clay is somewhat refractory. The use of salt appears to be detrimental to some of the more easily fusible clays.

No difference was detected in the burned wares made from clay treated with hydrochloric acid.

It is hoped that a more complete investigation will follow the preliminary work already done, but the manufacturer having drying trouble with his clay will probably overcome it by adopting after trial the method which is best suited to his particular case.

The Canadian Fairbanks-Morse Company have increased their capital by the issue of $1,000,000 of preferred stock. The company will increase its Toronto plant by the erection of a new factory, and make other extensions.