SAND-LIME BRICK

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BY

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THESIS

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IN

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OF THE

UNIVERSITY OF ILLINOIS

1910

The present investigation was undertaken in the fall of 1907 at the suggestion of Prof. S. W. Parr and has been carried on at the Chemical Laboratory of the University of Illinois, under his direction, during the academic years, 1907-8, 1908-9, and 1909-10.

I wish to thank Prof. Parr for his kindly interest and valuable assistance during the progress of this work.

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PREFACE.

The finely divided silica occurring in numerous deposits in southern Illinois has for some time been the subject of study in the Laboratory of Applied Chemistry in the University of Illinois. Investigations upon this material were begun in the year 1905 by Mr. C. F. Hagedorn, and have been continued by Messrs. C. M. McClure, W. S. Williams,[1] and A. W. Beemer. The purpose of this work was to determine the possibility and extent of a reaction which might be brought about between the silica and lime by means of steam pressure, somewhat after the manner of the practice followed in the manufacture of sand-lime bricks. The extent of the deposits made it appear probable that this material might find an application in the manufacture of some such ceramic product as wall or floor tile, architectural decorative material, or as a filler in sand-lime bricks.

The possible use of the silica in the manufacture of sand-lime brick suggested the advisability of a study of the sand-lime brick process from both a theoretical and a practical standpoint, in order to determine the effect of substituting the silica for some of the sand commonly used in the process. It seemed desirable to investigate very closely the chemical and physical properties of compounds formed from finely divided silica and lime, inasmuch as these are evidently very closely related to the bonding material in sand-lime brick, if, indeed, they are not identical with it. It had been determined by the earlier experiments that when mixed with lime, this silica enters into a reaction which results in the production of a homogeneous compound. This new substance, it was assumed, must resemble the film of hydrated calcium silicate surrounding the sand grains in sand-lime bricks.

That good bricks can be made from sand and lime is no longer questioned. The matter of cost of their manufacture, however, should be carefully determined for any locality at which it is proposed to erect a plant, in order to avoid the mistake of building in a situation where the manufacture of the bricks is not economically practicable.

Illinois is no longer represented in the list of states producing sand-lime bricks, although there are in it, doubtless, many localities in which their manufacture would be profitable both to the producer and to the consumer. It seems fitting, therefore, that some information relative to this industry should be published by the State Geological Survey. It is the purpose of this bulletin to discuss briefly the chemistry of sand-

[1] Bull. Ill. State Geol. Survey, No. 14, 1909, p. 275.