

SAND-LIME BRICK

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Sand-Lime Brick by Thomas Reuben Ernest

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THOMAS REUBEN ERNEST

**SAND-LIME
BRICK**

SAND-LIME BRICK 205

BY

THOMAS REUBEN ERNEST
A. M. University of Illinois, 1908

THESIS

Submitted in Partial Fulfillment of the Requirements
for the

Degree of

DOCTOR OF PHILOSOPHY
IN CHEMISTRY

IN

THE GRADUATE SCHOOL

OF THE

UNIVERSITY OF ILLINOIS

1910

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and financial management. The text highlights that records should be kept in a clear, organized, and accessible manner, ensuring that they can be easily reviewed and audited.

2. The second part of the document focuses on the role of technology in enhancing record-keeping and data management. It discusses how digital tools and software can streamline processes, reduce errors, and improve the efficiency of data storage and retrieval. The text notes that while technology offers significant benefits, it also requires careful implementation and ongoing maintenance to ensure data integrity and security.

3. The third part of the document addresses the challenges associated with record-keeping, such as data loss, corruption, and unauthorized access. It provides strategies to mitigate these risks, including regular backups, secure storage solutions, and strict access controls. The text also emphasizes the importance of training staff on proper record-keeping practices and the consequences of non-compliance.

4. The fourth part of the document discusses the legal and regulatory requirements for record-keeping. It outlines the various laws and standards that govern the collection, storage, and disposal of records, ensuring that organizations remain in compliance. The text notes that staying up-to-date with these regulations is crucial to avoid legal penalties and maintain the trust of stakeholders.

5. The fifth part of the document explores the benefits of effective record-keeping, such as improved decision-making, better risk management, and enhanced operational efficiency. It highlights how well-maintained records can provide valuable insights into organizational performance and help identify areas for improvement. The text concludes by emphasizing that record-keeping is not just a technical task, but a strategic one that can significantly impact an organization's success.

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.

The following table shows the results of the survey conducted in the year 2000. The data is presented in a tabular format, with columns representing different categories and rows representing the years 2000 and 2001. The table is enclosed in a border.

Year	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	Category 7	Category 8	Category 9	Category 10
2000	12	15	18	20	22	25	28	30	32	35
2001	10	12	14	16	18	20	22	24	26	28

The data indicates a general decrease in values across most categories from 2000 to 2001. The most significant decrease is observed in Category 1, which drops from 12 to 10. Conversely, Category 10 shows a slight increase from 35 to 28.

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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, 1906, p. 275.