

**ILLINOIS STATE
GEOLOGICAL SURVEY.
BULLETIN NO. 18, A STUDY
OF SAND-LIME BRICK**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649418725

Illinois State Geological Survey. Bulletin No. 18, A Study of Sand-Lime Brick by S. W. Parr & T. R. Ernest

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

S. W. PARR & T. R. ERNEST

**ILLINOIS STATE
GEOLOGICAL SURVEY.
BULLETIN NO. 18, A STUDY
OF SAND-LIME BRICK**

ILLINOIS
STATE GEOLOGICAL SURVEY

F. W. DEWOLF, Director

BULLETIN No. 18

A Study of Sand-Lime Brick

BY

S. W. PARR

AND

T. R. ERNEST



Urbana
University of Illinois
1912
LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS



ILLINOIS STATE JOURNAL CO., STATE PRINTERS
SPRINGFIELD, ILL.
1912

557.73

1.2

STATE GEOLOGICAL COMMISSION.

GOVERNOR C. S. DENEEN, *Chairman.*

PROFESSOR T. C. CHAMBERLIN, *Vice-Chairman.*

PRESIDENT EDMUND J. JAMES, *Secretary.*

FRANK W. DEWOLF, *Director.*

15559



TABLE OF CONTENTS.

	PAGE.
Preface	9
Historical introduction	11
General consideration of the sand-lime brick industry	14
Meaning of the term sand-lime brick	14
The constituents of sand-lime bricks	15
The element silicon	15
Silica	15
Silicic acids and the silicates	17
Lime and other calcium compounds	19
The raw materials of the sand-lime brick industry	24
Sand	24
Occurrences and origin	24
Impurities	25
Lime	26
Impurities	26
Burning	27
Cost of burning	27
Market grades	28
Methods of testing	29
Technique of the manufacture of sand-lime bricks	31
Processes for preparing mixtures	31
The hydrated lime methods	32
The caustic lime method	33
Preparation of the sand	34
Conclusions	42
The effect of impurities in sand	42
Pressure in molding	44
Hardening	45
The chemistry of sand-lime bricks	47
Review of previous work	47
Chemical investigation	49
Theoretical	49
Preparation of material for analysis	51
Methods of analysis	53
Results of chemical analyses	54
Discussion of analyses	59
General conclusions as to the constitution of sand-lime bricks	62
The physical texture of sand-lime bricks	63
Tests of sand-lime bricks	65
Strength tests	66
Effects of freezing	67
Fire resisting qualities of sand-lime bricks	69
Description of methods of testing	70
Materials used in tests	70
Apparatus used in tests	71
Burning	71
Testing	71
Method of averaging results	72
Discussion of results	72
Conclusion	74
Summary	75
Bibliography	77

LIST OF ILLUSTRATIONS.

PLATES.		PAGE.
I.	House built of mortar bricks in 1872.....	10
II.	Cross-section of semi-gas fired kiln.....	28
III.	Photographs of samples of bricks.....	42
IV.	Apparatus used for hardening mixtures of lime and silica by steam.....	44
V.	Microphotographs of sections of sand-lime bricks.....	64
VI.	Microphotographs of sections of steamed lime-silica mixtures.....	66

FIGURES.		
1.	Le Chatelier's curves of expansion of different forms of silica.....	17
2.	Curves showing rise of temperature during hydration of lime.....	30
3.	Curves recording variations in modulus of rupture for bricks heated to different temperatures.....	72
4.	Curves recording variations in crushing strength of bricks heated to different temperatures.....	73

LETTER OF TRANSMITTAL.

STATE GEOLOGICAL SURVEY,
UNIVERSITY OF ILLINOIS, Feb. 7, 1912.

Governor C. S. Deneen, Chairman, and Members of the Geological Commission:

GENTLEMEN—I submit herewith manuscript for a report entitled, A study of sand-lime brick, and recommend that it be published as Bulletin No. 18. The report was prepared by Prof. S. W. Parr, consulting chemist of the Survey, in collaboration with Dr. T. R. Ernest.

No sand-lime bricks are now produced in Illinois, though the industry has a footing in neighboring states, and, if we may judge from foreign experience, will become prominent here in the future.

Very respectfully,

FRANK W. DEWOLF,
Director.