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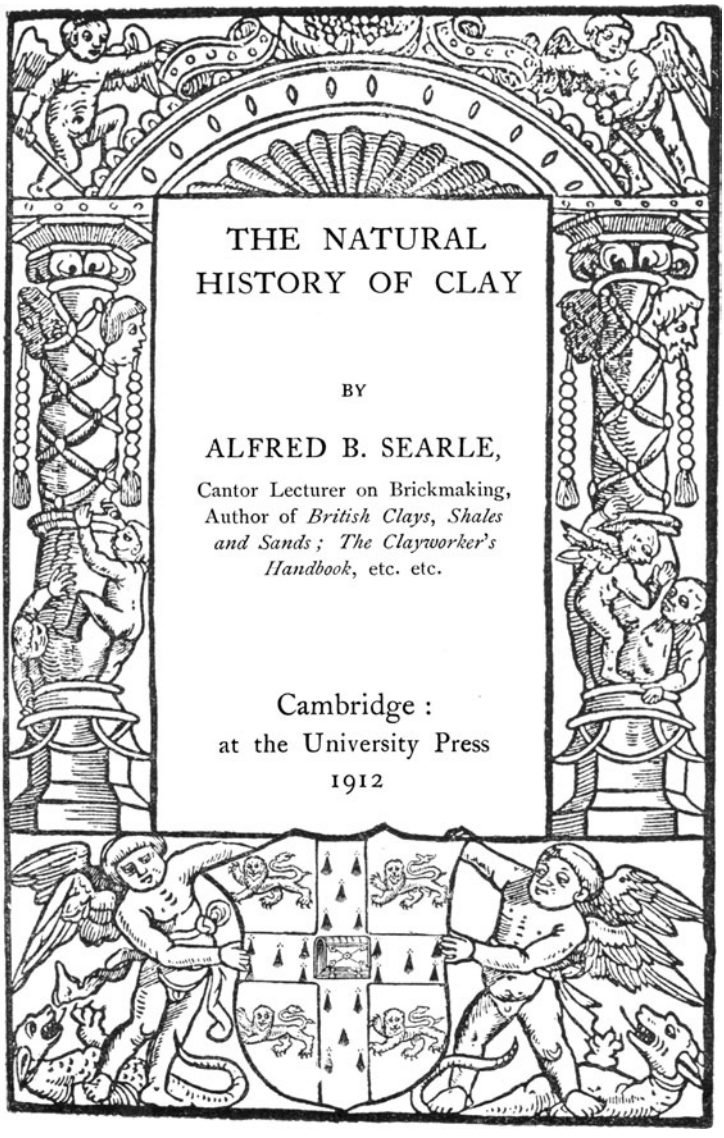
THE NATURAL HISTORY OF CLAY



THE NATURAL HISTORY OF CLAY

BY

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PREFACE

BOTH as raw materials and in the form of pottery, bricks, tiles, terra-cotta and many other articles of use and ornament, clays are amongst the most important rock products. Yet the origin of the substances we know as 'clay,' the processes occurring in its formation and the causes of some of the most important of its characteristics are of such a nature that it is remarkable that its use should have become so extended in the arts and sciences, while we know so little of its properties when in a pure state.

In the following pages an attempt has been made to state in a simple form an outline of our present knowledge of the subject and to indicate the problems which still lie before us.

The experimental solution of these problems is rendered peculiarly difficult by the inertness of the materials at ordinary temperatures and the ease with which the clay molecule appears to break down into its constituent oxides at temperatures approaching red heat or as soon as it begins to react with alkaline or basic materials.

Another serious difficulty is the highly complex nature of that property known as 'plasticity' to which many clays owe their chief value. For many years this has been regarded as an elementary property such

as hardness, cohesion or colour, but it is now known to be of so elusive a nature as almost to defy measurement with any degree of accuracy.

The thoroughness with which the methods of physical chemistry have been applied to geological and mineralogical problems during recent years has been of very great assistance to the student of clay problems, as will be seen on studying some of the works mentioned in the short bibliography at the end of the present volume. When the principles of hydrolysis, ionization, mass reaction and reactional velocity have been applied in still further detail to the study of clays, our knowledge of their natural history will increase even more rapidly than it has done during the past few years.

No industry exercises so great a fascination over those engaged in it as do the various branches of clay-working; no other substance offers so many problems of such absorbing interest to the artist, the craftsman, the geologist, the chemist and the general student of nature, whilst the differences in legal opinion as to the nature of clay could themselves occupy a volume far larger than the present one.

A. B. S.

The White Building,
Sheffield.
November 1911.

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THE CHIEF CLAY ROCKS (arranged geologically)

Tertiary	Recent (*alluvial clay, silt, brick earths, boulder clay*)	
	Pliocene, Miocene, Oligocene, Eocene	(*brick earths, ball clays, coarse pottery clays*)
Secondary	Cretaceous (*cement clays, brick clays*)	
	Oolitic (*brick and tile clays*)	
	Triassic (*brick, tile and terra-cotta clays*)	
Primary	Permian (*brick, tile and flower-pot clays*)	
	Carboniferous (*brick clays, fire-clays, ganister*)	
	Devonian, Silurian, Ordovician, Cambrian, Pre-Cambrian	(*clay schists, slates and clay shales*)
	Igneous Rocks occur on several horizons (*china clays and kaolins*)	

(In the above Table only the clay-bearing strata are mentioned. The formations named consist chiefly of other rocks in which the clays form strata of variable thickness.)