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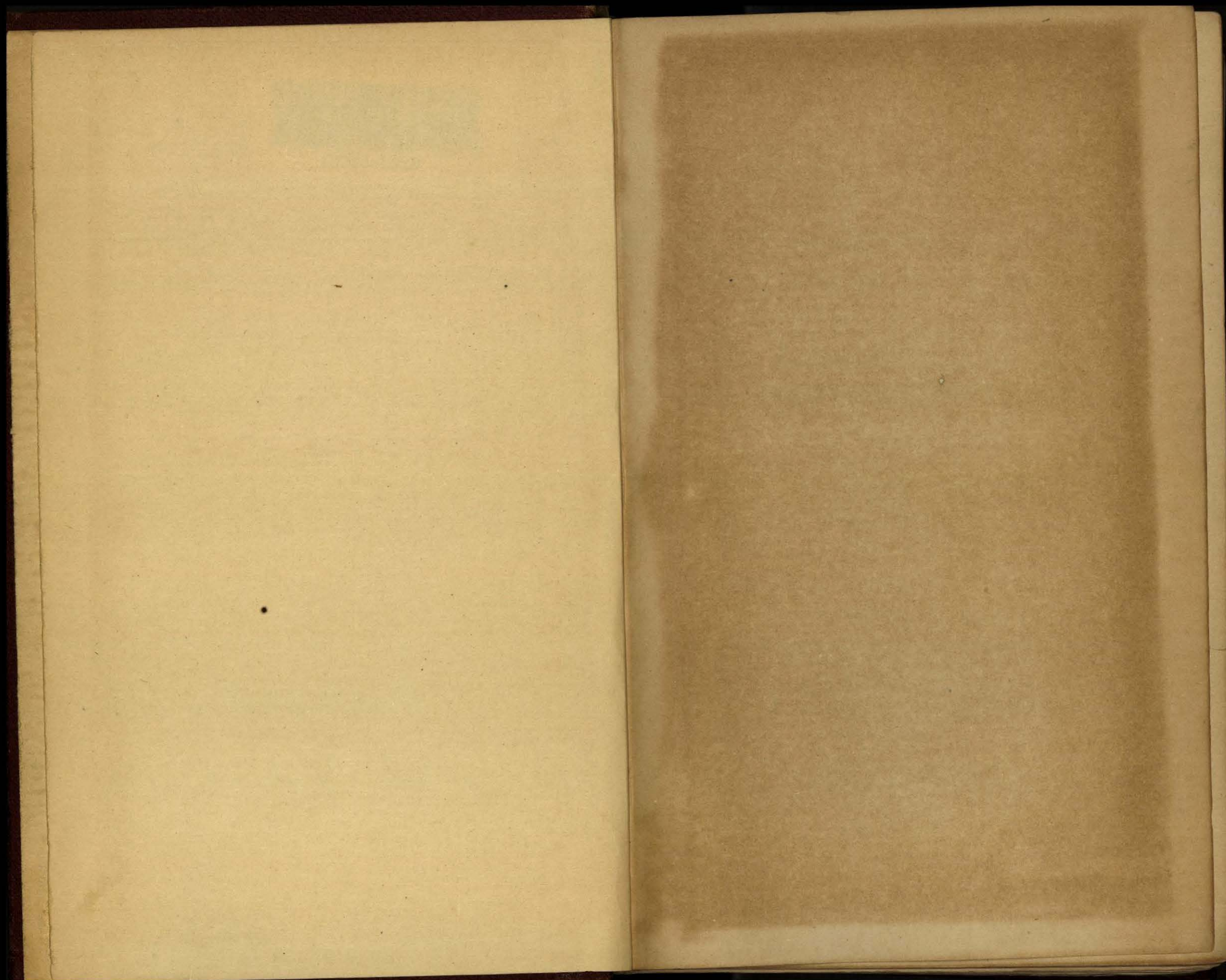
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INTRODUCTORY NOTE.

PUDDLED iron is worked up by welding together piles of small pieces, the machinery employed for the purpose to-day being essentially the same as that described by Dr. Percy in his *Metallurgy* in 1864. Steel destined for constructional purposes cannot, however, be produced by welding, and it is therefore necessary to start with masses of much greater size, and to produce it in such quantities that a modern steel works turns out ten or twenty times as much finished material per week as an iron works. The reduction in the cost of steel, which has so rapidly enabled it to displace puddled iron for most structural purposes, has been mainly effected by the perfection of the machinery used for finishing the raw material, the mechanical treatment of this metal having a commercial importance much greater than that of any other. The quality of modern constructional steel is due to the chemist, and its cheapness to the engineer.

By an exceedingly rapid process of natural development, mill and forge practice has been completely revolutionised during the past 30 years, yet, so far as the author can discover, no book has been published which explains how enormous masses of glowing steel are now handled and shaped both rapidly and cheaply. Ledebur's well-known book scarcely touches the fringe of the subject, while Howe's book on steel does not even refer to it.

Much valuable information on the subject is contained in the transactions of various technical societies, such as the Iron and Steel Institute and the Institutions of Civil and Mechanical Engineers, while excellent illustrations of portions of the plant have appeared from time to time in the technical press. In this country *The Engineer*, *Engineering*, and *The Iron and Coal Trades*

INTRODUCTORY NOTE.

Review; in America *The Iron Age*; and in Germany *Stahl und Eisen* may be specially mentioned in this connection.

These sources of information, which have been freely consulted during the preparation of the following pages, are not, however, readily intelligible to those who have had no practical experience in steel works, because they were written for the information of men engaged in the trade, who were acquainted with the technical terms commonly used in the works, and familiar with the appliances generally used at the time the articles were prepared.

The following section is an attempt to supply, as far as possible, this lack of practical experience, by giving a concise statement of elementary principles, and such a record of past and present practice, as will enable an intelligent student to understand the successive steps by which the mechanical working of steel has advanced to its present stage in a single generation. It is hoped that this record may also prove of some use to those who are actually engaged in steel-making.

Those desiring to pursue the matter further, will find at the end of each chapter a list of sources of information which may be profitably consulted. As far as practicable these have been arranged under the heads of the subjects with which they chiefly deal; but some papers, such, for instance, as those by Messrs. Lantz and Max Meier read at Dusseldorf, and published in the issue of *Stahl und Eisen* of November, 1898 (from which several illustrations in this work have been taken), deal with such a variety of subjects that it is almost impossible to classify them under any one head.

JOHN W. HALL,
Birmingham.

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