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CHARLES BABBAGE

The mathematical work of Charles Babbage

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PREFACE

This book is a critique of the mathematical work of Charles Babbage. In it I have attempted to demonstrate a continuous development from his early work in notational reform with the Analytical Society to his ideas and construction of the difference and analytical engines. I have discussed his achievements within the context of the mathematical climate in which he lived, and the range of fundamental thinking and inventiveness he applied to non-mathematical concepts. He had ideas well ahead of his time that were misunderstood and neglected by his contemporaries, but which place him as a significant figure in the development of modern mathematics.

One continuous thread in Babbage's personal development was the importance he attached to notation, and in advancing from his powerful advocacy of the differential notation for the calculus to the need for a mechanical notation to describe the working parts of his engines, he laid down rules and even experimented with mathematical symbolism which to him provided the unity between the concepts of generality and simplicity. It has been necessary, in order to avoid excessive problems in printing, not to reproduce all of these notational devices precisely; in particular, standard subscripts and superscripts have been used in some places instead of Babbage's vertical notation.

One typical example from chapter 5, is that the original S_n^p is printed as S_n^p , but this clearly makes no difference to the content.

Finally I would like to thank those who have helped in this work. Dr A. V. Armitage, Dr H. B. Calvert, Dr D. T. Whiteside and Mrs E. Butler made many valuable suggestions, and Mrs W. Whitaker typed accurately through the somewhat intricate nota-

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