

THE PRINCIPLES OF RADIOGRAPHY

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The Principles of Radiography by J. A. Crowther

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J. A. CROWTHER

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OF RADIOGRAPHY**

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RADIOGRAPHY

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WITH 55 ILLUSTRATIONS

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PREFACE

IN this little volume I have tried to give an intelligible, though non-mathematical, account of the physical principles involved in the production of a radiogram, and in the construction and use of the apparatus employed for the purpose. The book contains little or nothing that an experienced X-ray worker will not have had to discover for himself during the course of his work. The discovery of physical principles with the aid of an elaborate X-ray installation is, however, apt to be an expensive as well as a tedious process, and the ordinary text-books of Physics are not primarily concerned with the needs of radiographers. It seemed, therefore, that practitioners and others who might be commencing this fascinating branch of work with no greater knowledge of physics than some hazy recollections of a first M.B. examination, might welcome a brief explanation of the principles of the subject on the physical side. With the medical side of the subject it is not within my province to deal.

The subject-matter of this volume formed part of a series of lectures given in connection with the recently established Diploma in Medical Radiology and Electrology, at Cambridge. The interest shown by the members of the class in the physical principles of the subject, and the difficulty experienced in finding any book which met our immediate requirements, encourages me to hope that these pages may prove of use to a wider circle.

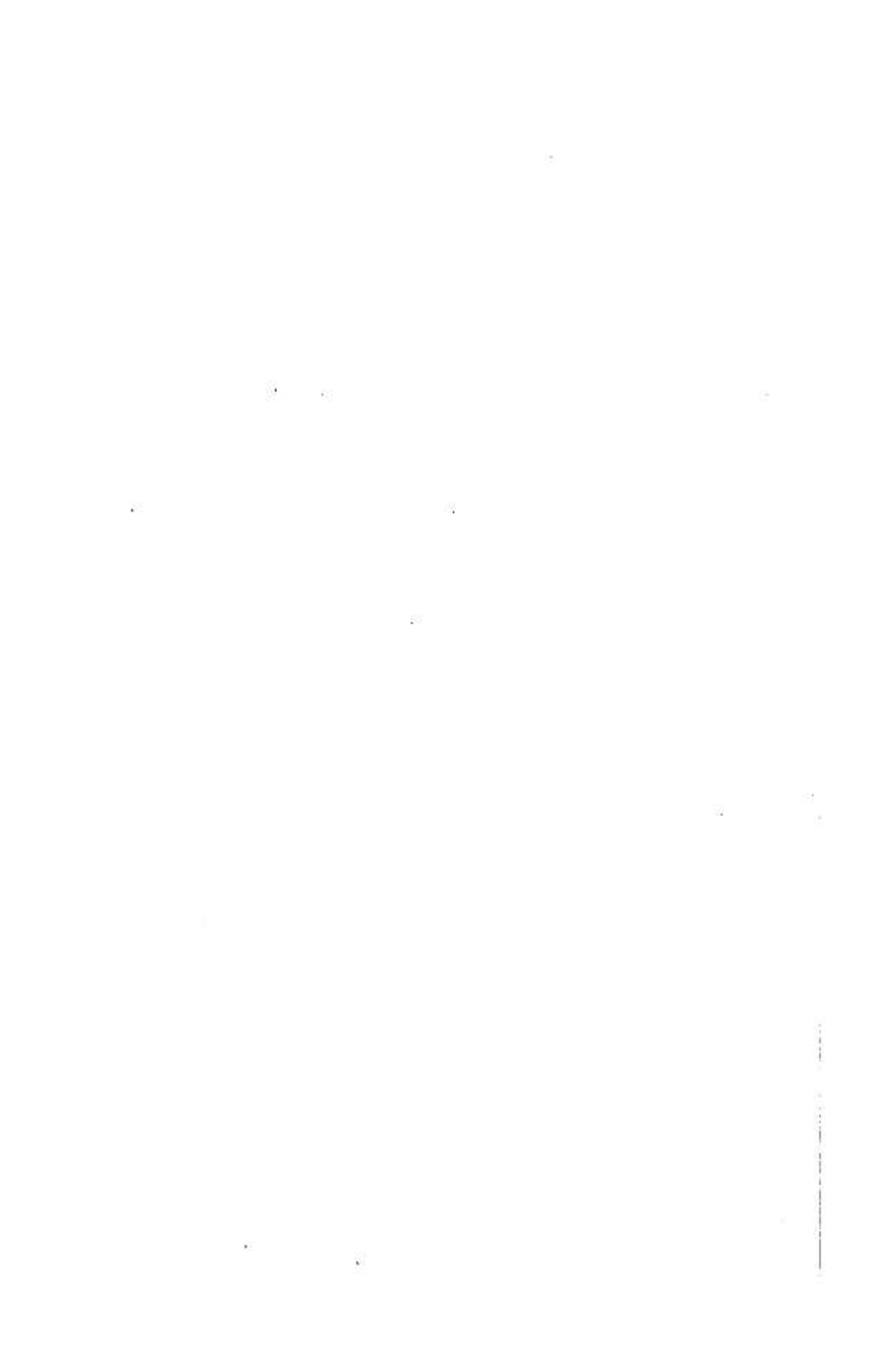
I wish to express my thanks to Dr. Shillington Scales for the use of the radiogram from which Fig. 47 has been reproduced ; also to Messrs. Cuthbert Andrews for the illustrations of the X-ray tubes ; to Messrs. F. R. Butt & Co. for the illustrations of their couch and viewing box ; and to Messrs. Baird and Tatlock and the Cambridge and Paul Scientific Instrument Co. for the blocks of Figs. 3 and 11 respectively.

J. A. C.

CAMBRIDGE

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THE PRINCIPLES OF RADIOGRAPHY

CHAPTER I

ELECTRICAL PHENOMENA

1. INTRODUCTION.—The discovery of X-rays by Röntgen in 1894 may be considered as one of the more recent advances of electrical science. Practically a century of painstaking and brilliant research, both practical and theoretical, into the properties of electricity had preceded it, and rendered it possible. Some acquaintance with electrical science is, therefore, almost indispensable for the proper understanding of the principles of radiology. It is true that so much thought and invention has now been applied to the construction of X-ray apparatus that almost any person of intelligence can work at any rate one of the smaller installations with reasonable success by merely following the instructions of the manufacturer. But it is equally true that scientific apparatus only yields its best results in the hands of one who understands the principles on which it acts. It is necessary, therefore, to preface our discussion of the production and properties of X-rays with a recapitulation of some of the more important facts of electricity.

2. ELECTRICAL ATTRACTIONS.—If a stick of ebonite or sealing wax is rubbed with flannel it is found to attract light objects such as feathers, scraps of paper, or pith balls. A glass rod rubbed with silk produces similar effects. These attractions are called electrical attractions, and the rods are said to be electrified by friction, or to have acquired a charge of electricity. The name "electricity" was given to the phenomenon by