

since it deals exclusively with that debated point, the action of two elements of current on one another.

So long as Maxwell's theories of the mutual induction of closed circuits are taken as the starting-point, a certain indeterminateness must inevitably arise in the endeavour to isolate the effects of separate portions of the circuits. It is with the various rival hypotheses required to complete the solution of the problem that the present investigation deals. In the first section we have an account of Ampère's hypothesis and the laws of force resulting from it. The next section deals with the most general law of force, based on the law of the inverse square; this is followed by a section devoted to Maxwell's investigations, and finally Dr. Kerntler propounds a new law of force which, he claims, is free from the objections raised by him against Ampère's, Neumann's, Weber's, and other formulæ. This law is merely obtained by assigning certain values to the arbitrary constants which occur in the expressions for the force-components, and which satisfy the relations found by Stefan. The subsequent applications of the proposed law to finite portions of conductors form an interesting collection of problems.

An important feature is that the author divides the various hypothetical laws into two categories—those which are applicable to determine the action between closed circuits only, and those which give correct results when used to find the action of a closed circuit on an element of current.

In former times, when the doctrine of action at a distance held the field, such an investigation as the present would, doubtless, have attracted many supporters, between whom and the advocates of Ampère's and other laws a spirited controversy might have arisen. At present we have become so accustomed to regarding the seat of electro-magnetic action as residing in the dielectric, that it is difficult to regard any investigation of direction action and reaction between two elements of current as being of more than purely academical interest. Still, the fact that many of our text-books base their introductory treatment, both of electrostatics and of magnetism, on the theory of action at a distance renders it desirable that interest should be resuscitated in these attempted solutions of the corresponding problem for electric currents; and for this, if for no other reason, the present endeavour to establish a new formula cannot fail to be worthy of the attention of physicists. G. H. B.

*Catalogue of Tertiary Mollusca.* Part i. The Australasian Tertiary Mollusca. By George F. Harris. Pp. xxvi + 407. Eight plates. (London: Printed by order of the Trustees of the British Museum, 1897.)

*Catalogue of the Fossil Cephalopoda.* Part iii. The Bacritidae and part of the sub-order Ammonoidea. By Dr. Arthur H. Foord and George Charles Crick. Pp. xxxiii + 303. Illustrated. (London: Printed by order of the Trustees of the British Museum, 1897.)

THE present work by Mr. Harris commences a new catalogue. This first part is devoted to descriptions and figures of the shells of Australasia (exclusive of Cephalopoda), and will be followed, in due course, by other geographical series in the collection. The larger part of the Mollusca and Bryozoa, and the whole of the Brachiopoda, Annelida, Arthropoda, Echinoderma, and Cœlentera, still remain to be recorded, as well as the greater portion of the fossil plants. When complete the catalogue will include at least thirty volumes, and will then contain no more than a brief account of these extensive collections in the Natural History branch of the British Museum.

The classes of Australasian Tertiary Mollusca described by Mr. Harris in the volume under consideration include the Gasteropoda, the Scaphopoda, and the Lamelli-branchiata, and the author rightly points out that their study cannot fail to shed much light on certain questions

relating to phylogeny, and to assist the zoologist in tracing the origin of many of the principal groups of these divisions of the Mollusca.

The eight plates, drawn by Miss G. M. Woodward, which accompany the text, are of the usual high order of excellence one associates with the publications of the Trustees of the British Museum.

The volume dealing with the Cephalopoda is mainly the work of Mr. Crick, though Dr. Foord, notwithstanding his removal to Dublin, has rendered all the assistance possible, in order to carry the work through the press. As Dr. Woodward points out in his preface, this addition to the catalogue will prove of extreme importance to all those who desire to study the phylogeny of this group, for we are here presented with conclusive evidence that the Goniatites almost imperceptibly pass into the Ammonites. The figures, of which there are one hundred and forty-five, prepared, with few exceptions, by Miss Woodward, assist very much in making the text clear.

*The Story of the Mine, as illustrated by the Great Comstock Lode of Nevada.* By Charles Howard Shinn. Pp. x + 272. (London: Gay and Bird, 1897.)

WE learn from the editor's preface that this volume is one of a series intended to explain how the Western States of America were explored, how cities sprang up in desert wastes or among mountains difficult of access, and how gradually these States have become the home of a thriving population. The part played by the miner in the wonderfully rapid development of the Great West is dealt with by Mr. Shinn in a masterly manner.

Taking the Comstock Lode as a typical example, he draws a vivid picture of the early prospecting and subsequent working. The pathetic story of the first discoverers, the brothers Grosh, who both perished before they could reap the fruits of their skill and energy, is probably unknown to most English readers; soon they were followed by hardy but ignorant prospectors, who began by working the gold which they chanced to find in the earth thrown up by a gopher, and threw away as valueless the very rich silver ore which accompanied it. An assay of the "blue stuff," carried by a farmer to a distant town, revealed the true wealth of the marvellous vein; but difficulties of all kinds beset the miner in his endeavours to work it. How they were overcome by pluck, perseverance and science, is told in Mr. Shinn's pages; these should be read by every student of mining, for he may glean from them much valuable information, which is usually placed before him in a less tempting fashion in his dry technical manuals. Numerous illustrations add value to the text. The view of the Belcher Mine shows very clearly how the huge underground excavations are supported by "square sets," and might well be copied as a diagram for teaching purposes. The picture of hydraulic mining is excellent, and decidedly better than some similar illustrations which appear in text-books on mining. It is a pity there is no index.

C. L. N. F.

*First Stage Sound, Light and Heat.* By John Don, M.A., B.Sc. Pp. 307. (London: W. B. Clive, University Correspondence College Press.)

THE syllabus of the Science and Art Department's elementary examination in Sound, Light, and Heat, is the framework upon which this book has been constructed. The facts and phenomena belonging to the branches of physical science named in the title of the book are clearly described, and with due attention to experiment. Teachers of Departmental classes will be attracted to the book by its conciseness, by the summary at the end of each chapter, and by the large number of exercises and problems to be found in its pages.