



LXV. Notices respecting new books

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in cases where experiment indicates that true saturation is not obtained. For in order to settle the value of q and θ we require to know the form of the curve for a considerable range of voltages, and this is particularly difficult in cases of intense ionization. In other words, the failure to obtain saturation may be due to a small value of θ , in which case we are beyond the true saturation current, or it may be that θ is negligible and that the voltage is insufficient for saturation.

No doubt actual experiments will be complicated by inequality of the velocities of the positive and negative ions and of the rate of supply of these at positive and negative plates. This, however, only increases the difficulty I have mentioned.

A comparison of the curves I have drawn with actual experiments where saturation is not obtained, shows clearly the uncertainty thus introduced in estimating for instance q . The point seems to me one which merits considerable attention.

There are some other cases in which the equations can be integrated: for instance, when the ions are supplied entirely by the plates, and the positive and negative ions move with unequal velocities. I hope to consider some of these cases soon.

Physical Laboratory,
The University, Glasgow,
22nd Aug. 1904.

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Radioactivity. By FREDK. SODDY, M.A. (The Electrician Printing and Publishing Co. Ltd.)

THE account which Professor Soddy gives in this book of the development of the science of Radioactivity up to the commencement of the present year is clear in style and full in treatment. Details of experimental work are given in many places; a feature which will be appreciated by the many who, fascinated by the interest of the subject, are endeavouring to pursue investigations for themselves. We feel indeed that we would have been thankful to Professor Soddy had he given yet more practical details. All workers in this field should for instance be repeatedly warned against the risk of error arising from the subtle dispersal of emanation, or the obstinately persistent radioactivity of vessels or instruments once brought into contact with radium salts.

Nothing can more strikingly mark the rapid progress of this branch of Science than to note how much has been done since the appearance of so recent a work. Thus Paschen's investigations into the nature of the γ rays seem to suggest that in these rays we are dealing with something quite different from the X rays and,

relatively to the other rays from radium, of much more importance than was held hitherto to be the case. Again, we find throughout Professor Soddy's book the α particle spoken of as having the dimensions of the material atom, with nothing to suggest the quite different view put forward by Mr. Harold Wilson during the present year.

This, in common with other works dealing with the rapidly advancing science of Radioactivity, will require frequent re-editing. A solid and valuable body of experimental work, with which new views must ultimately be brought into harmony, is, however, carefully and ably described in this volume. J. J.

Astronomical and Historical Chronology in the battle of the Centuries. By WILLIAM LEIGHTON JORDAN, F.R.G.S., F.S.S., &c. (Longmans, Green & Co.)

Few questions seem so simple and yet really are so complicated as questions of chronology. And here we are not alluding to the many different eras which have been used in different parts of the world and in different periods of the world's history, from which to express the date of any event we desire to chronicle or discuss. In all Christian countries for many centuries past (not, be it remembered, during the four or five immediately following that event) the birth of Christ, or the date at which it was supposed to have taken place, was the initial point from which all other events were dated, either before or after it, necessitating the use of the symbols B.C. for before, and A.D. for after the Nativity. It is now generally recognized that when this era was first introduced a mistake was made with regard to the year in which it took place, and that our Lord was really born probably in B.C. 5. That, however, is not the point which is especially discussed in the volume before us.

The assumed date of Christ's birth is generally supposed to have been about the end of the year which we now reckon as B.C. 1 (the interval between the recognized Christmas Day and the end of the year as settled by the Julian Calendar is too short to be worth taking into account), so that A.D. 1 was then commenced and completed on December 31 of that year. According to this one century was completed on Dec. 31, A.D. 100, and nineteen centuries on Dec. 31, A.D. 1900. The writer of this notice well remembers a letter being written from some unknown correspondent to the late Sir George Airy, then Astronomer-Royal, asking him to resolve a dispute when the twentieth century would commence, and the answer was that "a very little thought" would show that it would commence on Jan. 1, 1901. The book now before us takes a different view, and the Author does not forget to remind us that the German Emperor some time ago put forth a dictum that the twentieth century began on Jan. 1, 1900.

Mr. Jordan, recalling the fact that those medieval writers who first used Christian chronology reckoned not from the Birth,

but from the Incarnation, of Christ (*i. e.* the Annunciation, commonly called Lady Day preceding the Nativity), contends that the years should be taken as ordinal, not cardinal, and that the year usually called B.C. 1, should be considered to be the *first* year from the initial point of reckoning, so that on its completion one year had elapsed. Scientific or astronomical chronologists, when making calculations, are compelled to do this virtually by calling the year 0 which is ordinarily denominated B.C. 1, and when they have finished their calculations, restore the B.C. dates to those in the usual system, by which the year preceding A.D. 1 is B.C. 1, without an intermediate year 0, as numerical succession requires. This is why Mr. Jordan adopts for his title 'Astronomical and Historical Chronology,' which he thinks should be the same, and he dedicates his book to the librarians of Florence and Pisa, in the hope that they may find in medieval Italian literature further evidence of the correctness of his view with regard to the early usage of Christian chronology in this way. Although Dionysius Exiguus is said to have been a native of Scythia, and was probably Greek by nationality, he did his work at Rome (where he died about the middle of the sixth century), and his system of chronology was first used in Italy.

As might be expected, in the course of his elaborate discussion of the question (taken up, we may mention, at the commencement, according to his view, of the present century) the Author furnishes us with much subsidiary information with regard to the application of the Metonic Cycle and other chronological data. W. T. L.

Die Telegraphie Ohne Draht. Von AUGUSTO RIGHI und BERNHARD DESSAU. Mit 258 eingedruckten Abbildungen. Braunschweig: F. Vieweg und Sohn. 1903. Pp. xi + 481.

WE had occasion recently to review this work in its Italian edition, and as the German issue of it is an exact replica of the Italian work, there is little need to do more than merely draw the attention of our readers to the existence of the German version. Like all Messrs. Vieweg's publications, it is printed and illustrated in the best style. Many of our readers unacquainted with Italian will, no doubt, be glad to know that a German version is available.

Jelineks Psychrometer-Tafeln. Erweitert und vermehrt von J. HANN. Neu herausgegeben und mit Hygrometer-Tafeln versehen von J. M. PERNTNER. Fünfte erweiterte Auflage. Leipzig: W. Engelmann. 1903. Pp. xiii + 108.

THIS enlarged set of hygrometric tables should prove very useful to meteorologists. The general principles of the wet and dry bulb hygrometer, and of de Saussure's hair hygrometer, are dealt with in the introduction, in which the method of using the various tables is also clearly explained, and illustrated by several examples worked out in detail. Numerous references are given to the literature of the subject.

A Text-Book of Organic Chemistry. By WILLIAM A. NOYES, Professor of Chemistry in the Rose Polytechnic Institute. Henry Holt & Company, New York. 1903. Pp. xvii + 534.

THE task of writing a satisfactory elementary text-book of organic chemistry is, in view of the extraordinary rapid accumulation of new facts in that domain of science, an extremely difficult one, and we must confess that in our opinion the author has succeeded in accomplishing it admirably. The introductory two chapters, on physical measurements, are particularly good. In the general arrangement of the subject-matter, the book differs from others of a similar kind in the rejection of the old division into "fatty" and "aromatic" compounds. A very useful feature is the list of laboratory exercises given at the end of each chapter.

La Moderna Teoria dei Fenomeni Fisici (Radioattività, Ioni, Elettroni). Di AUGUSTO RIGHI. Bologna: Nicola Zanichelli. 1904. (Attualità Scientifiche—No. 3.) Pp. viii + 135.

PROFESSOR RIGHI is to be congratulated on having produced so fascinating an account of the new phase in physical science brought about by the introduction of the electronic theory. Not only the serious scientific worker, but the general reader will find this little volume delightful reading. In non-technical yet strictly scientific language, the author traces the gradual growth of the electronic idea, and describes the remarkable series of experimental researches which have gradually led to the general adoption of the electronic theory. Electrolytic ions and electrons; electrons and luminous phenomena; nature of cathode rays; ions in gases and solids; radioactivity; mass, velocity, and charge of ions and electrons; electrons and the constitution of matter—such is the list of subjects dealt with by Prof. Righi in his interesting little book, the value of which to the serious student will be enhanced by the complete bibliography given at the end of the book.

Essais Industriels des Machines Electriques et des Groupes Electrogènes. Par F. LOPPÉ. Paris: Gauthier-Villars. 1904. Pp. 283.

THIS work is a fine specimen of that lucidity and elegance of style for which the best writers of French text-books are noted. The testing of electrical machinery and of "generating sets" has become so important a matter for the modern engineer that a book specially devoted to this subject is sure to appeal to a very wide circle of readers; and in the work under review its distinguished author has succeeded in giving an interesting and useful summary of the large amount of experimental work carried out within recent years in connexion with the testing of electrical machinery.

It is now well known that many of the earlier methods of dynamo and motor testing, and of separating the various losses, were based on assumptions which subsequent researches have shown to be untenable. A clear idea of the nature of the assumptions underlying any particular test is of extreme importance to the engineer, and in M. Loppé's book he will find a systematic and critical account of all the best-known methods relating to the testing of

continuous-current machines, alternators, and direct-coupled generating sets, and a useful chapter on the methods approved by the American Institute of Electrical Engineers, the Verband Deutscher Elektrotechniker, and l'Association Française des Propriétaires d'Appareils à Vapeur. The Appendix contains various specimen test-sheets and tables.

In some respects the book is not quite up-to-date, and the sentence at the foot of p. 44 regarding the calorimetric method of determining efficiencies, regarding which the author says that "en pratique cette méthode est inapplicable," is a strange commentary on Mr. Threlfall's recent paper on "The Testing of Electric Generators by Air Calorimetry," read before the Institution of Electrical Engineers. The names of English engineers are frequently misspelt; thus, we read of "M. Swenburn," "Sylvanus Thomson," &c. These, however, are only minor blemishes in a really useful book.

Traité d'Analyse des Substances Minérales. Par ADOLPHE CARNOT, Membre de l'Institut. Tome Second: Métalloïdes. Paris: Ch. Dunod. 1904. Pp. 822.

THIS is the second volume of a comprehensive treatise on the analysis of mineral substances, and deals with metalloids; this term has, however, to be given a somewhat elastic interpretation, the author including within the present volume titanium, tungsten, molybdenum, vanadium, &c. The method of treatment, which is uniform throughout, consists in giving the occurrence in nature and properties of the element under consideration, and of its more important compounds; then follows a detailed and careful study of the most useful and reliable methods for detecting and quantitatively estimating the element, and for separating it from elements previously considered.

A very important and highly commendable feature of the book is the amount of attention given to matters of technical importance to engineers, agriculturists, and others engaged in various branches of industry in which some knowledge of chemistry and chemical analysis is essential. As an example of the thoroughness which the author brings to bear on his task, we may mention that in the section devoted to carbon the various methods of determining the calorific values of solid, liquid, and gaseous fuels are fully considered, and an illustrated description is given of Mahler's calorimetric bomb. Similar thoroughness characterizes the other sections of the book, and renders it an important work of reference not only for the professional chemist, but for many others who, in the course of their professional work, have occasion to seek more detailed information on various subjects which may more properly be said to belong to the province of the technological chemist.

In addition to its thoroughness, the book possesses all those admirable qualities for which French writers of high-class text-books have long been renowned, and which should secure for it a welcome place in every chemical library.