meteorology of the northern hemisphere is independent of that of the southern? To settle that primary question we want a synchronous chart for the globe. As long as we are unable to watch the changes in the globe we are to a certain extent groping in the dark. A great part of the world is already mapped every day, and the time has now arrived when it is worth while to consider what contributions we can make towards identifying the distribution of pressure over the globe. We may idealize a little by disregarding the local peculiarities without sacrificing the general application. I have put in the exhibition a series of maps showing what approximation can be made to an isochronous chart of the globe without special effort. We are gradually extending the possibility of acquiring a knowledge of the facts in that as in other directions. With a little enterprise a serviceable map could be compiled; and when that has been reached, and when we have added to that what the clouds can tell us, and when the work of the aeronautical committee has so far progressed that we can connect the motion of the upper atmosphere with the conditions at the surface, when we know the real kinematics of the vertical and horizontal motion of the various parts of a traveling storm, we shall, if the universities will help us, be able to give some rational explanation of these periodic relations which our solar physics friends are identifying for us, and to classify our phenomena in a way that the inheritors of Kepler's achievements associated with us in this section may be not unwilling to recognize as scientific.

W. N. SHAW.

SCIENTIFIC BOOKS.

Introduction to the Rarer Elements. By PHILIP E. BROWNING, Ph.D., Assistant Professor of Chemistry, Yale University. New York, John Wiley & Sons. Pp. viii + 157.

"This small volume, prepared from material used by the author in a short lecture course given at Yale University, is intended to serve as a convenient hand-book in the introductory study of the rarer elements; that is, of those elements which are not always taken up in a general course in chemistry. No attempt has been made to treat any part of the subject exhaustively, but enough references have been given to furnish a point of departure for the student who wishes to investigate for himself. Experimental work has been included except in the case of those elements which are unavailable, either because of their scarcity or because of the difficulty of isolating them."

The above excerpt is taken from the preface of this excellent work. The unusual interest in the so-called rare earths in very recent years has been marked. Doubtless many instructors have wished for a guide to be placed in the hands of students. To be sure, those who have been engaged with investigations along these lines have had at hand Truchot's 'Les Terres Rares,' Herzfeld and Korn's 'Chemie der seltenen Erden' (upon which this book is in a measure founded), as well as such specialized brochures as Koppel's 'Die Chemie des Thoriums,' Giesel's 'Ueber radioaktive Substanzen' and Karl Hofmann's 'Die Radioaktiven Stoffe nach dem gegenwärtigen Stande der Wissenschaftlichen Erkenntnis.' Crookes' 'Select Methods' is classic, but not up to date. Recently the first book on the 'rare earths' published in America came from the pen of Dr. Ohley, but we are not reviewing that work. One almost wonders why such a book as the one under discussion has not been offered before. It comes at a ripe period and well qualified it is to meet a want.

The book is exactly what it pretends to be. The different elements are not taken up in the order of the periodic classification, but each one is treated in a systematic manner; a short history of the discovery, occurrence (with names of the minerals and their accepted formulas, with the average percentage of the particular earth indicated), its extraction, preparation, properties, followed by a

list of the typical compounds known, their characteristics, estimation, separation and finally valuable experimental work for laboratory practise. Numerous references to original papers are given.

To round the work off, consideration is given to platinum and gold, which are without doubt rare metals in some laboratories. Some five pages are allotted to the newly discovered gases in the atmosphere, wherein the fact, not generally known, that Cavendish in 1785 found argon, is alluded to. The last few pages are given to an enumeration of some of the unconfirmed discoveries of new elements within recent times, in fact since 1896. Radium and polonium are disposed of in one paragraph.

There is an index and no advertisements are in the back, for which thanks are due the publishers, who made the book of good appearance.

While in such an abbreviated work the author was confined to well-defined and verified observations, perhaps it might have added value to mention incidentally those uses to which some of the rarer substances are put.

The reviewer is doubtless not familiar with the classification of the author, who places thorium and zirconium in the aluminium group. By analogy according to the oxides, hydroxides and salts, these elements would come in the silicon-titanium group. In the preparation of lanthanum, didymium, etc., no mention is made of the recent elegant electrical methods of Muthmann. In the list of minerals bearing thorium, auerlite is not mentioned. The book does not pretend to contain it all, however.

Every one does not specialize in rare earth chemistry, but the reviewer can not well understand how a teacher of inorganic chemistry can be without some work on the subject. These substances constitute as integral a part of that subdivision of science as any of the other elements.

From the numerous requests for assistance and advice as to literature on the subject, made the reviewer from technical laboratories, it may be well to say that many would do well to have a copy of this book close by. The book is to be commended as fulfilling in a most satisfactory manner what it pretends.

Chas. Baskerville.

Lehrbuch der kosmischen Physik. II., Physik der Atmosphäre. Von Dr. Svante August Arrhenius. Leipzig, S. Hirzel. 1903. 8vo. Pp. viii + 553; 138 figs. and charts.

The author of the 'Lehrbuch der kosmischen Physik,' Dr. Svante August Arrhenius, who is professor of physics at the high school in Stockholm, is already known to meteorologists, chiefly through his researches on the effect of the earth's atmosphere upon solar radiation, and on the relation of the moon's declination to atmospheric electricity and magnetism. The 'Lehrbuch' embraces over 1,000 pages all told, of which between 500 and 600 deal with the physics of the atmosphere. With this second portion of the book this review is alone concerned.

Any one who reads these chapters on the atmosphere with the idea that he will find in them a general account of meteorological phenomena such as is to be had in most of the text-books on meteorology will be disappointed. The author makes no attempt to discuss his subject from such a point of view. He expressly states in his preface that he has tried to avoid matters which are purely astronomical, geological or meteorological, and that he has, so far as possible, discussed only such problems as have close relations with physics and chemistry. We have, therefore, in this 'Lehrbuch' no text-book or reference book on general meteorology, but a discussion of the more directly physical relations of the subject. From this standpoint Dr. Arrhenius has given us an excellent piece of work. It is a compact summary of the most important recent investigations of the physics of the atmosphere, and as such it will prove useful to working meteorologists and physicists. The text, however, contains many mathematical formulæ and numerical data and, therefore, makes decidedly 'heavy' reading. The consideration of the measurement of solar radiation is particularly extended. The chapter on