

States during recent years, that story awaits another narrator; but, if only a desire, on the part of Americans to learn more concerning the place which American chemists occupy in the world's history of chemistry, is awakened, this compilation of facts will not only have been a pleasure but it will have served a worthy purpose."

The book is to be regarded as a "compilation" and not as a history. All American chemists should be thankful to the author for the pains he has taken to collect this material and for placing it before us. It furnishes the basis for the history of chemistry in America which remains to be written.

It is interesting to note the fact that so many of those who are necessarily mentioned in the book were connected with the University of Pennsylvania. It is, therefore, most appropriate that this work of compilation and comment should have been done by the one who at present holds the two important positions in that university of provost and professor of chemistry.

IRA REMSEN

*Das Relativitätsprinzip.* By LORENTZ, EINSTEIN and MINKOWSKI. Leipzig: B. G. Teubner. 1913. Pp. 89.

Under the general title *Fortschritte der mathematischen Wissenschaften in Monographien*, Otto Blumenthal is issuing a series of which number 2 is a collection of six papers by eminent advancers of mathematical physics dealing with relativity.

The first paper is a short note by Lorentz of date 1895 in which the hypothesis of shortening in the direction of motion is discussed, practically for the first time, though both he and FitzGerald had for some time been familiar with it. The second is a translation of Lorentz's very famous Electromagnetic phenomena in a system moving with any velocity smaller than that of light, dated 1904. Here not only the hypothesis of shortening, but the Lorentz group, fundamental in relativity theory, is found.

The third article is Einstein's epochal formulation (1905) of the principle of relativity

as a fundamental physical principle independent of any hypothesis of shortening. He goes right at the heart of the matter in that direct way which has been so characteristic of his theories. The next is a short note, not two and one half pages, in which Einstein points out that a consequence of the foregoing work is the proportionality of mass and energy.

Minkowski's *Raum und Zeit* (1908) is the fifth article. Here the simple four-dimensional formulation of mechanics and of the inverse square law of attraction is first clearly exhibited—yet not so clearly that Sommerfeld's explanatory notes are unwelcome. This address of Minkowski's had been reprinted separately, and to the exhaustion of the edition is perhaps due the publication of the present collection.

The final article is from Lorentz's *Alte und Neue Frage der Physik* (1910) and forms an appropriate close to a series which presents concisely and at first hand the steps in the development from the Michelson experiment to the full fledged theory of relativity.

E. B. WILSON

*Controlled Natural Selection and Value Marking.* By J. C. NOTTRAM. New York, Longmans, Green and Co. 1914. Octavo. Pp. 130.

The author of this book advances a new theory to account for the origin of sexual dimorphism and of polymorphism within animal species. He starts with the assumption that the competition in the struggle for existence is frequently between groups rather than between individuals. Thus, family may compete with family, or pair with pair, rather than individual with individual. Conspicuousness on the part of one member of the family (its least necessary member) it is supposed, may insure persistence of the family by drawing the attacks of enemies to the one and thus diverting them from the more valuable members of the family. Thus male conspicuousness, in sexually dimorphic species, is supposed to be advantageous to the female and young. "Controlled natural selection ac-

counts for both the origin and purpose of secondary sexual characters in the following way. Males are more conspicuous in nature than females: males are less valuable than females. Males and females are associated together during life, and especially during the breeding season when the difference in color is greatest, and when their difference in value is highest; therefore according to the theory, the conspicuous color of the male serves to control natural selection in such a way that the less valuable male will be killed in preference to the more valuable female."

It is assumed that if the male is taken, the female and young will *not* be taken. But the reader might reasonably inquire how the family would be benefited by the loss of its strongest member, and how the survivors would be protected after his demise. Is it to be supposed that the appetites of all enemies will be permanently appeased by a single meal, and that the father having been taken the family will not be further molested?

Not only conspicuousness due to color but also such as may arise from movement, sound or scent is interpreted in this same way. This puts a new meaning on courtship and other means of display and on song, which are all supposed to be protective to the family in which they occur by causing the destruction of those individuals which thus advertise themselves, which result is then supposed to give the others a better chance to survive.

For illustrations in support of his theory the author relies chiefly upon British birds, though reference is frequently made also to insects.

W. E. CASTLE

*PUBLICATION OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR 1916*

THE *American Ephemeris and Nautical Almanac* for the year 1916, recently issued by the U. S. Naval Observatory, differs materially in construction and arrangement from previous numbers of this publication.

The preparation of this volume marks the inauguration of the scheme of cooperation

adopted by the congress of representatives of the various national Ephemerides held at Paris in 1911. In accordance with this agreement a portion of the material contained in the volume for 1916, including the greater part of the Greenwich Ephemerides of the moon and planets and the apparent places of the stars, has been supplied by the foreign almanac offices, while the office of the American Ephemeris has in turn furnished to all foreign offices the data regarding eclipses, occultations, physical ephemerides of the sun, moon and planets, etc. This system of exchange reduces considerably the amount of duplication of work by different computers, and will, it is believed, prove mutually beneficial to the offices concerned.

Congress has, however, in the law authorizing this exchange, provided that any such arrangement shall be terminable on one year's notice and that the work of the Nautical Almanac Office during the continuance of any such arrangement shall be conducted so that in case of emergency the entire portion of the work intended for the use of navigators may be computed by the force employed by that office, and without any foreign cooperation whatsoever; and that employees whose services in part can be spared on this account may be employed in improving the tables of the planets, moon and stars, to be used in preparing for publication the annual volumes.

A rearrangement of the material contained in the first part of the Ephemeris has been made, with the view of giving it in better and more convenient form for the astronomer. Instead of giving portions of the ephemerides of the sun and moon alternately, month by month, there is now given for the entire year first the ephemeris of the sun complete, then the ephemeris of the moon complete, then the ephemeris of each of the seven major planets.

Other changes worthy of note are the following: Daily ephemerides are given for 35 circumpolar stars instead of 25, and they have been arranged in more convenient form. The apparent right ascensions of stars whose declination is less than 60° are given to 0.001, and the apparent declinations of all stars are