these systems—in two hours! And this at the beginning of the course! This same course also provides laboratory work on Apus and Hydrophilus in addition to that on two other Arthropods, but can not get time for any work on the fish or the Echinodermata or the Coelenterata. We can crowd ourselves enough to pass the Tunicata, but we can hardly comprehend how a man capable of beginning so promising a work as the 'Lehrbuch der Zoologie' can so lightly pass over these magnificent groups.

As to the figures we are bound to say that in point of distinctness most of them are inferior to those of well known standard works. The shading is often poorly done, though they are all neat and clean. Originality, however, is hardly enough to justify a new figure, particularly if it is to appear in a text-book for some good. Unless a figure is a decided improvement in some respect or other we prefer to have it remain the exclusive property of the author and his students. Some of the figures are of necessity so much like well known old ones that they have nothing to specially recommend them.

It is undoubtedly a mistake to introduce into an elementary course individual views of matters in dispute. The authors have not sinned grossly in this respect; still the 'Cladus' and 'Anhang' ideas might have been kept out without impairing the value of the book. We even get the accounts of Apus and Hydrophilus as Anhänge.

The hope of the authors that their 'Büchlein' will prove useful to others may be realized to some extent in Germany; but for the English teacher and student, excepting the descriptions and illustrations of animals not taken up so fully in other books, there is nothing in it to recommend it above any of the good books now available.　　　　　HENRY F. NACHTRIEB.

SCIENTIFIC JOURNALS.

THE PHYSICAL REVIEW, JULY–AUGUST.

On the Measurement of the Expansion of Metals by the Interferential Method: By E. W. MORLEY and WM. A. ROGERS. The first part of this article by Prof. Morley is devoted to a description of the method used, which consists essentially in measuring the change in length, during the heating or cooling of a test bar, by observing the displacement of interference bands. These bands result from the interference of beams of monochrómatic light reflected from mirrors which are placed at the ends of the test bar and a constant temperature bar respectively. A later article will contain the results of an actual trial of the method. As in all cases where interference phenomena are used, the method demands great care in all details and is capable of extreme accuracy. Prof. Morley discusses the sources of error and the means of avoiding them at some length and in a very practical manner. A difficulty which one would not be apt to think of arose when the sodium flame was used as a source of light; for the number of bands to be counted was so great (five or six thousand) that the slight difference in wave-length between the two sodium lines caused a great decrease in the visibility of the bands in certain regions. Thus when about 3,400 bands had been counted, the fringes were so obscure that the next hundred could hardly be observed at all.

The Viscosity of Polarized Dielectrics: By A. W. DUFF. Professor Duff finds that the viscosity of certain non-conducting liquids, such as glycerine and castor oil, is increased when the liquid is subjected to considerable electrostatic stress. The increase observed was small, being expressed in fractions of one per cent., but the fact of its existence seems to be definitely proved. The change was measured by observing the rate of descent of small spheres which were allowed to fall through the liquid between two oppositely charged plates. If, as seems probable, Prof. Duff's results are confirmed, we have here a new class of electrical phenomena, doubtless intimately connected with the electrostatic Kerr effect.

Note on the Theorem of Clausius: By EDGAR BUCKINGHAM. Prof. Buckingham's object is to give a demonstration of what we usually refer to as the 'Second Law of Thermodynamics,' for cases not considered in Clausius' original proof and usually treated very briefly by his followers. The cases considered are (1) systems whose state is defined by only one coordinate besides the

temperature, but where the work done is not necessarily confined to overcoming pressure. The coordinate used to define the state may be of the most general type ; *e. g.*, quantity of electricity, as used by Helmholtz. (2) Systems whose state is defined by more than two coordinates. An example of such a case would be an electrolytic cell in which the effect of pressure is not negligible. Professor Buckingham's article gives an interesting discussion of the graphical, as well as the analytical, treatment of such cases. The article is one which will do good, for the subject is one which must be presented in many different forms, as well as with great clearness, if our text-books are to be freed from the hazy and unsound treatments of Thermodynamics with which they now abound.

The Refractive Index and Reflecting Power of Water and Alcohol for Electric Waves : By A. D. COLE. In preliminary work the index of refraction for waves 260 cm. long was found to be 8.95 for water and 5.24 for alcohol. These results are in fair agreement with values obtained by other observers, as well as with the values computed according to Maxwell's theory from the dielectric constants. Using much shorter waves (5 cm.) Prof. Cole then again determined the indices, the object being to find at what wave-length dispersion begins. The absorption of both liquids was so great that a prism method could not be used, even with the delicate means at hand for detecting and measuring the waves. The method finally adopted depended upon the measurement of the *reflecting power* of the two liquids. The index was then computed by Fresnel's formula. The values obtained were 8.85 for water and 3.2 for alcohol. It thus appears that there is considerable dispersion by alcohol between the wavelengths 260 and 5 cm.

A New Electrolytic Generator for Oxygen and Hydrogen : By W. S. FRANKLIN.

An Apparatus for Illustrating the Laws of Falling Bodies : By H. M. RANDALL and W. A. MARKEY.

Books reviewed : GRAY and MATHEWS, *Bessel Functions;* GROTH, *Physikalische Krystallographie ;* JAHN, *Grundriss der Thermochemie ;* PRESTON, *Light.*

SOCIETIES AND ACADEMIES.

NORTH CAROLINA SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE second meeting of the North Carolina Section of the American Chemical Society was held in Chapel Hill, N. C., on July 7, 1896. The Secretary reported ten new members as received since the last meeting. After the transaction of some routine business the following papers were read: 'Crystallized Aluminium,' by F. P. Venable; 'The Detection and Purification of Saccharin,' by B. W. Kilgore; 'Reduction of Sulphuric Acid,' by C. Baskerville; 'A Comparison in Digestibility of Raw and Steamed Cotton Seed,' by J. A. Bizzell and A. H. Prince; 'An Attempt to Form Some Organic Compounds of Zirconium,' by Thos. Clarke; 'The Determination of Sulphur in the Presence of Iron,' by W. A. Withers and R. G. Mewborne; 'The Action of Phosphorus Trichloride upon an Ethereal Solution of Hydrogen Dioxide,' by W. A. Withers and G. S. Fraps; 'Some Difficulties in the Way of the Periodic Law,' by F. P. Venable. The Section then adjourned to meet in Raleigh next winter. The Section has doubled its numbers in less than six months.

NEW BOOKS.

Herbart's A B C of Sense—Perception and Minor Pedagogical Works. Translated with Introduction, Notes and Commentary, by WILLIAM J. ECKOFF. New York, D. Appleton & Co. 1896. Pp. xviii+288. $1.50.

Grundriss einer exacten Schöpfungsgeschichte. By HERMANN HABENICHT. Wien, Pest, Leipzig, A. Hartleben. Pp. viii+135. Plates vii.

Tenth Report of the New York State Entomologist, for the year 1894. J. A. LINTNER. Albany, University of the State of New York. 1895. Pp. 341–633.

Manual of Midwifery. W. E. FOTHERGILL. New York and London, Macmillan & Co. 1896. Pp. xiiii+484. $2.25.

The Monetary and Banking Problem. LOGAN G. MCPHERSON. New York, D. Appleton & Co. 1896. Pp. iv+135. $1.00.