which deserve special mention are Nos. 16 and 17, from which the position of any of the five brighter planets may be determined for a number of years; No. 23, which ingeniously illustrates the tide-raising forces; No. 54, illustrating the moon's rotation; No. 121, illustrating the determination of parallax of the fixed stars.

Of the many apt illustrations contained in the book, the following, page 121, is one of the best: "Every such timepiece, whether it be of the nutmeg variety which sells for a dollar, or whether it be the standard clock of a great national observatory, is made up of the same essential parts which fall naturally into four classes, which we may compare with the departments of a well-ordered factory: I. A time-keeping department, the pendulum or balance spring, whose oscillations must all be of equal duration. II. A power department, the weights or main spring, which, when wound, store up the power applied from outside and give it out piecemeal as required to keep the first department running. III. A publication department, the dial and hands, which give out the time furnished by department I., IV. A transportation department, the wheels, which connect the other three and serve as a means of transmitting power and time from one to the other.

"The case of either clock or watch is merely the roof which shelters it, and forms no department of its industry. Of these departments the first is by far the most important, and its good or bad performance makes or mars the credit of the clock."

The last chapter, growth and decay, deserves special mention. It is a clear, philosophic treatment of the best theories of sidereal evolution, and although not out of place in a high-school text, it might well form a part of a larger treatise.

SIDNEY D. TOWNLEY.

UNIVERSITY OF CALIFORNIA,
May 1, 1901.

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*SCIENTIFIC JOURNALS AND ARTICLES.*

THE *Journal of Physical Chemistry*, June, 1901. 'The Theory of Electrolytic Dissociation as viewed in the Light of Facts recently ascertained,' by Louis Kahlenberg; 'On the Generalization of Clapeyron's Equation,' by Paul Sorel; 'On the Phase Rule,' by Paul Sorel. This paper by Dr. Kahlenberg demands more than passing mention. Since its enunciation by Arrhenius in 1887, the theory of electrolytic dissociation has received a recognition which has rarely been accorded a scientific theory in so short a time, and few theories have been so productive of results. Unhesitating assent has been by no means accorded it by many, especially of the older, chemists, but few attempts have been made to reveal its weaknesses experimentally. Dr. Kahlenberg, himself a pupil of Ostwald, has been one of the few who have from time to time called attention to experimental facts which were not in accord with the theory. In his present paper, the author first details a large amount of experimental work on the electrical conductivity of solutions at low and at high temperatures, and on molecular weight determinations by boiling point and cryoscopic methods, in solutions of gradually increasing strength, in which is shown often a great discrepancy between the results and those required by the dissociation theory. He then proceeds to discuss at length these and many other failures of the theory, drawing the conclusion that the theory is applicable to a decidedly limited class of solutions. The true nature of solutions must be reached by a study, not of those extremely dilute, but first of the concentrated solution, approaching the dilute solution as a limiting case. In conclusion, he says: "It must be fully and freely admitted that the dissociation theory has done much good in stimulating research in many lines. It has been fruitful in proportion to the amount of truth contained in it. Like other theories founded upon too narrow a basis of induction, it has gradually been outgrown—the facts are too much for it. It would be difficult of course to say of any theory—even of one long ago discarded—that it is entirely worthless, and so the writer has no inclination to make such a statement concerning the dissociation theory. * * * It is solely because of the rapid growth of the erroneous idea that the deductions drawn from the indiscriminate application of the simple gas equation to solutions and from the notion that all well-known facts harmonize with the theory

of electrolytic dissociation, that I have felt compelled to call attention to the real status of the experimental facts underlying these deductions."

J. L. H.

*The Popular Science Monthly* for October has for its opening article 'The Progress of Science,' by R. S. Woodward, being the address of the retiring president of the American Association. George Stuart Fullerton discusses 'Free-will' and the 'Credit for Good Actions' and Alexander McAdie presents some 'Fog Studies on Mount Tamalpais,' hinting at the possibility of dissipating such fogs as the one in which the steamer *Rio de Janeiro* was lost. Hugh M. Smith describes 'The French Sardine Industry' pointing out incidentally improvements that might be made in that of the United States. 'The Late Epidemic of Smallpox in the United States' is considered by James Nevins Hyde who makes a strong plea for vaccination. Edward Atkinson treats of 'Food and Land Tenure,' considering that the free land tenure of the United States is at the bottom of our great agricultural development. The final article is by W. Ramsay on 'The Inert Constituents of the Atmosphere,' describing the methods by which some of these have been discovered. The number completes Vol. LIX. and the index is appended.

*The American Naturalist* for September contains the third instalment of W. M. Wheeler's important and interesting description of 'The Compound and Mixed Nests of American Ants,' which includes in the present part the slave-keeping ants. The bulk of the number is taken up with the seventeenth of the 'Synopses of North American Invertebrates,' in which H. S. Jennings treats of the Rotatoria, the paper being illustrated by nine plates comprising 171 figures.

The *Museums Journal* of Great Britain for September contains a brief account of the work of 'The International Zoological Congress,' which includes some notes on the museums of Berlin and Hamburg, a paper by H. M. Platnauer, 'To Utilize Specialists,' and an account of the 'Museum of Science and Art, Edinburgh,' a very popular institution if one may judge by the annual attendance of 350,000. A number of samples of labels used in the U. S. National Museum are given and there are notes concerning various museums and art galleries in different parts of the world.

## *SOCIETIES AND ACADEMIES.*

### NEW YORK ACADEMY OF SCIENCES, SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

The section met on October 7, at the Chemist's Club. Professor Wm. Hallock reported that he had tried and failed to obtain permission of the Calumet and Hecla Company to make measurements of underground temperatures in their shaft at Keweenaw Point during the summer. He described and exhibited before the Section a new and very simple form of wind musical instrument which he found on sale at the Buffalo Exposition. The instrument was operated by blowing through the nose, the mouth cavity of the operator acting as the resonance chamber of the instrument. The tone quality was very similar to that of a flute.

Professor J. K. Rees reported that the Astronomical Department of Columbia had received from the Lick observatory a number of star photographs which were to be measured for the determination of parallax. Professor Harold Jacoby reported upon some photographs of stars near the celestial poles which had been received by the department.

Professor R. S. Woodward reported the results of an investigation he had carried on upon the effects of secular cooling and meteoric dust on the length of the terrestrial day. His investigation showed that, due to secular cooling, the length of the day will not change or has not changed, as the case may be, by so much as a half second in the first ten million years after the initial epoch, and that the total effect from secular cooling will accrue before the effect from meteoric dust will begin to be appreciable.

Professor DeRemus gave a brief account of the research laboratory in chemistry which had been lately established at Schenectady, N. Y.

F. L. Tufts,
*Secretary.*