Central-Battery Systems, Secondary Cells, Secondary-Cell Working, Repeaters, Test Boxes, Telegraph Testing, Aerial Lines, Underground Lines.

As will be seen from the above list, the plan of development opens with the elementary theory of the subject, and then proceeds with detailed descriptions of the various types of apparatus in most general use. Finally, the circuits and lines are dealt with.

A number of useful appendices on special topics are inserted near the end of the book. The index of subject-matter has been prepared with great care.

As a practical telegraphist's guide, and as an elementary text-book of the principles of wire telegraphy in Great Britain, the volume deserves high praise. A. E. Kennelly

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

The first number of Volume 3 of the *Proceedings of the National Academy of Sciences* contains the following articles:

Inferences concerning Auroras: Elihu Thomson, General Electric Company, West Lynn, Massachusetts. Auroras consist of vertical streamers which, seen from different points of perspective, give the various optical effects observed.

Application of the Laws of Action, Reaction and Interaction in Life Evolution: Henry Fairfield Osborn, American Museum of Natural History, New York City. In each organism the phenomena of life represent the action, reaction and interaction of four complexes of physico-chemical energy.

The Resistance of Metals under Pressure: P. W. Bridgman, Jefferson Physical Laboratory, Harvard University. Twenty-two metals are examined up to 12,000 kg.

The Rate of Discharge of Central Neurones: Alexander Forbes and W. C. Rappleye, laboratory of physiology, Harvard Medical School. The normal frequency of nerve impulses discharged from the ganglion cells in voluntary contraction must lie between 300 and 5,000 per second.

A Physiological Study of Noctiluca, with Special Reference to Light Production, Anesthesia and Specific Gravity: Ethel Browne Harvey, Cornell University Medical School, New York City, and department of marine biology, Carnegie Institution of Washington. These animals are able to regulate their specific gravity. Anesthetics seem to attack the mechanism of the utilization of oxygen in the absence of which light is not produced.

Physiographic Subdivision of the United States: Nevin M. Fenneman, department of geology, University of Cincinnati. The basis of division shown on the map is physiographic or morphologic. There are twenty-four major divisions, some with six to ten subdivisions.

On the Composition of the Medusa, Cassiopea Xamachana and the Changes in it after Starvation: S. Hatai, Tortugas Laboratory, Carnegie Institution of Washington.

Studies of the Magnitudes in Star Clusters, IV. On the Color of Stars in the Galactic Clouds surrounding Messier 11: Harlow Shapley, Mount Wilson Solar Observatory, Carnegie Institution of Washington. The frequency curve for colors shows great diversity of color index and general resemblance to the curve for the brighter stars in the neighborhood of the sun. A striking progression of color with decreasing brightness is shown.

The Color of the Standard Polar Stars Determined by the Method of Exposure-Ratios: Frederick H. Seares, Mount Wilson Solar Observatory, Carnegie Institution of Washington. The colors of the Polar Standards, brighter than the 13th magnitude, have been determined to about the same precision as was reached in the investigation of the magnitude scale, with an expenditure of time and labor perhaps a tenth of that in an earlier investigation.

Terracing of Bajada Belts: Charles Keyes. The feature of desert bajada-terracing, when explained upon a strictly aqueous basis, can not but lead to complete misinterpretation. It is far more largely the result of wind-action.

Relation of the Apex of Solar Motion to proper Motion and on the Cause of the Differences of its Position from Radial Velocities

and Proper Motions: C. D. Perrine, Observatorio Nacional Argentino, Córdoba.

Hydrology of the Isthmus of Panama: Brig. Gen. Henry L. Abbot, United States Army, retired. Extensive tables for rainfall, outflow, evaporation, etc., are given and discussed.

The Meteor System of Pons-Winnecke's Comet: Charles P. Olivier, Leander McCormick Observatory, University of Virginia. The elements of the meteor's orbit are determined from more than 1,000 observations.

Improvements in Calorimetric Combustion, and the Heat of Combustion of Toluene: Theodore W. Richards and Harold S. Davis, Wolcott Gibbs Memorial Laboratory, Harvard University. The improvements are: Means of effectively closing the bomb with less risk to the lining and cover; means of burning volatile liquids without loss; a method of automatically controlling the temperature of the environment; means of evaluating the incompleteness of combustion. The heat of combustion of toulene is determined as 10,155 calories (18°) per gram.

The Mass of the Electric Carrier in Copper, Silver and Aluminium: Richard C. Tolman and T. Dale Stewart. A continuation of experiments on currents produced by acceleration in metals.

The Silver Voltameter as an International Standard for the Measurement of Electric Current: E. B. Rosa and G. W. Vinal, U. S. Bureau of Standards, Washington, D. C. A summary of eight years' experimental work which has shown how the voltameter can be used as a reliable current standard and as a means of checking the constancy of the value of the Weston normal cell.

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SUGGESTIONS FOR THE DEVELOPMENT OF SCIENTIFIC LIBRARIES; WITH SPECIAL REFERENCE TO AUTHORS' SEPARATES

THE communication from Tracy I. Storer in SCIENCE for November 24, on the care of pamphlet collections, brings up a matter which has interested me for several years. It has been my task to rearrange a few scientific libraries and my privilege to consult several others, and I have found in nearly all of them considerable room for improvement, especially in the method of handling authors' separates and other pamphlets.

It seems to be a common, if not the prevailing, custom in private and semi-private scientific libraries to arrange pamphlets alphabetically by authors, as Mr. Storer recommends. This has the advantage of obviating the mental exertion of classifying them by subjects (which ought to be an important consideration with that apparently increasing class of persons who prefer to follow a mechanical routine rather than exercise judgment) and of keeping together the writings of one's friends, so that if a friend comes for a visit one can see at a glance just how many of his papers one has. But in most other respects the alphabetical arrangement is an undesirable expedient. For there is no important difference between a pamphlet and a book, and no good reason for putting a pamphlet on a different shelf from a book on the same subject (unless of course there happens to be a considerable difference in size of page or the pamphlet belongs to a series of bulletins).

Large libraries use some sort of subject classification, and this is equally desirable for small ones. When one is carrying on a particular line of research one likes to have all the literature bearing on it together as far as possible. It is out of the question to keep in mind every one who has written on a given subject, and unless a library is pretty fully catalogued (which is not usually the case with private working libraries), some pamphlets are pretty sure to be overlooked if they are not classified by subjects. Another objection to the alphabetical arrangement is that every scientist receives many pamphlets on subjects that he is not particularly interested in,[1] and with any other system than a subject classification these will always be in the way, unless they are relegated to a special "limbo."

[1] See *Torreya*, 16, 101–102, April, 1916.