blight, but later the surface of the bark was found to be thickly dotted with the pycnidia of *Sphæropsis*.

On visiting the orchard, which comprised about five acres, was found that the blight had been quite noticeable in 1897. In all cases noticed when once attacked the entire growth of the season had been killed, and in a few instances the disease had extended into the previous season's growth. The dead twigs varied from a few inches to a foot or more in length. But few twigs of the current season's growth were found to be attacked. The growth of the disease on the twigs is determinate, a definite constriction usually separating the dead from the living wood. A few miniature canker spots were found on the smaller limbs, but none were noticed on the larger limbs, as is usually the case. The trees were generally in good condition, and the black rot of the fruit was not specially abundant.

Some pear trees in a door yard about twenty-five rods distant from the orchard were found to be dying. The top of one tree had been entirely removed, while the other trees were a half or two-thirds dead. These trees were also found to be attacked by a *Sphæropsis*, the pycnidia being very abundant on the dead bark. The spread of the disease was from the top downward, a distinct boundary separating the dead from the living wood. A few black shrivelled pears were still attached to some of the dead branches.

A *Sphæropsis* was also found on the twigs of some quince trees that grew by the side of the pear trees. The injury in this case was slight.

At a later date a canker was found on some quince trees in the Experiment Station orchard. Here the appearance of the cankers and their effect was much the same as on apple trees. Pycnidia of a *Sphæropsis* were abundant where the fungus was in active growth. The disease was also found to be abundant in a large qunice orchard, in the vicinity of Geneva, where it has done a considerable amount of damage.

Cultures of the *Sphæropsis* were made from the twigs of the three different host plants, and fruits of the apple, pear and quince were inoculated with material from each of the three series of cultures. *Sphæropsis malorum*, Peck, was produced in each case, while check fruits, punctured but not inoculated, remained sound.

GENEVA, N. Y. W. PADDOCK.

SCIENTIFIC LITERATURE.

Lehrbuch der anorganischen Chemie. Von PROFESSOR DR. H. ERDMANN in Halle, mit 276 Abbildungen und vier farbigen Tafeln. Braunschweig, Vieweg. 1898. Pp. 756.

Professor Erdmann has taken the Gorup-Besanez text-book (1876) as a foundation, but has so changed, improved and modernized the work that it may fairly be considered entirely new.

The printing and illustrations are admirable; particular attention is called to the beautiful colored plates of the spectra of various elements, including argon and helium, which show a wonderful delicacy of tone.

In an introduction of eighty pages the author discusses chemical theory, temperature, gases, atomic and molecular weights, and similar topics. The remainder of the book is chiefly descriptive, yet modern theory is introduced when needed. The striking features of the book are its thoroughness, its completeness, and the particular attention given to technical methods, preparation and experiment. As to thoroughness and completeness the reviewer has not succeeded in detecting the omission of a single fact of importance in inorganic chemistry, which could suitably find place in a book of the size and which was mentioned in chemical journals before 1898.

As to technical methods a few examples must suffice. It is generally known that much or most of the chlorine now made is by electrolysis of aqueous potassium chloride; but that chlorine is technically obtained as by-product in the electrolysis of zinc from zinc chloride, magnesium from carnallite and sodium from salt, will be new to many, as will be the manufacture of hydrochloric acid on a large scale from magnesium chloride and steam: $MgCl_2 + H_2O = MgO + 2HCl$. If we turn to magnesium chloride we learn that, in addition to its use for hydrochloric acid and (as carnallite) for magnesium, 15,000–20,000 tons are yearly exported from Stassfurt to be used in cotton factories instead of oil, as concentrated magnesium

chloride solutions are oily to the touch and serve to make cotton thread pliable.

The reviewer does not wish to give the idea that this work is chiefly technical; it is not; it is a scientific text-book of the highest rank; but the author notices briefly many important modern uses of common substances which are not known to the average teacher of chemistry, but should be known to the average advanced student. We find descriptions and drawings of apparatus for making argon, helium, liquid air (Linde), liquid oxygen (both Pictet and Cailletet) and fluorine (Moissan). Each chapter has an appendix on 'Technique and Experiments,' in which the best laboratory and lecture-room experiments are described with drawings; the author's previous books on inorganic and organic preparations are guarantee that this part of the work is excellent.

One feature in the book calls for adverse criticism. No mention is made of relations between the atomic weights and properties of elements till the close of the book, where one page is given to relations like those existing between the atomic weights of the halogens, and two pages to the periodic system. No mention is made of the periodic law as a generally recognized law. The author says: "Mendelejeff has definitely stated that the properties of the elements are periodic functions of their atomic weights;" and this is the only reference to such a law. This seems to the reviewer a serious blemish in a book otherwise so excellent. It may be that the author feels towards the periodic law as the Irishman felt towards government, but at east a fuller discussion of the subject is desirable. Surely the recognition given of late years to the 'family' relations of the elements, and the use of the periodic system throughout text-books, have been a great help to students. One misses this in the author's treatment of the halogens, for example; yet the single halogens and their compounds are so well discussed, and the chapter on iodine is such a masterpiece, full of information, some of which will be new to most college professors, that it becomes hard to criticise anything so good.

This work is an excellent text-book for advanced college students; it is an excellent book of reference for the lecturer and high-school teacher, and it should be carefully read by college professors. E. R.

Lecture Notes on the Theory of Electrical Measurements. By WILLIAM A. ANTHONY. New York, John Wiley & Sons. Pp. 90.

This little volume is designed to furnish the student with the broad outlines of the subject treated, and to thus assist him in getting possession of the subject as more elaborately presented in a series of lectures. The fundamental equations upon which electrical measurements are based are given, and the physical conditions to which they apply are stated with clearness. The book opens with a short chapter on C.G.S. units. Then follow chapters on the magnetic field, current, potential and electromotive force and resistance, with a statement of Ohm's law. The international electrical units are then treated. The general plan of measuring resistance, current and potential is explained, the instruments used being represented in diagram. The second branch of the subject closes with a treatment of the methods of calibrating amperemeters, voltmeters, resistance sets and bridge wires. The remaining portion of the work, comprising sixteen pages, is devoted to the effects of the current in heating, glow and arc lighting, electrolysis and electro-magnetic induction. The electro-magnetic circuit is also discussed. The book is provided with an index and table of contents.

F. E. N.

The Mechanical Composition of Wind Deposits. By JOHAN AUGUST UDDEN. (Augustana Library Publications, No. 1.) Rock Island, Illinois. 1898. Large 8vo. Pp. 69.

Professor Udden has for some years been engaged in researches concerning the mechanical composition of the loess skirting Mississippi River, and has been led to a comparative study of the composition of other deposits, especially of eolic origin, and also to a highly-refined investigation of atmospheric dust; and his principal results, with many of the details, are incorporated in this memoir. For convenience, he classifies wind-deposits in eleven grades, from coarse gravel (8–4 millimeters in diameter) to very fine dust ($\frac{1}{128}$–$\frac{1}{256}$ millimeters in diameter), and the examination was so conducted as