Kansas City, to 825 feet, at Pilot Grove, in Cooper county. Except in Lafayette, Pettis and adjoining counties, it is never far beyond the recognized limits of the drift sheet. Along the Missouri river, especially at and near Kansas City, two divisions of the *loess* are recognized. The 'higher loess' is that which has the widest extension, being found nearly everywhere in association with the drift sheet, while the 'lower loess' forms high terraces along the Missouri valley. It is the latter which has furnished most of the data concerning the *loess* which have heretofore been reported from Missouri.

Much valuable information is given of the trough of the Missouri river, and the question of its age relative to the epoch of glaciation of its vicinity is discussed in considerable detail; also, the preglacial and present valleys of the Mississippi river between Montrose and Keokuk, Iowa. The sections of the old and new gorges are especially finely executed.

In the discussion of the origin of the Missouri Pleistocene formations, the following leading problems are recognized: 1. Waterlaid character of the *loess* and gray loamy clay. 2. Great difference of level between similar deposits in Missouri and southern Illinois. 3. Vastness of gorges of the Missouri and Mississippi rivers. 4. Absence of drift in the lower Missouri. The Missouri *loess* deposits are referred to a fluvio-lacustrine origin. A barrier in the form of a rocky ridge is supposed to have formerly extended from the present divide between the Osage and Glasconade rivers, across the present course of the Missouri river, through Warren, Saint Charles, Pike and Ralls counties, to and connecting with a ridge in Pike county, Illinois. This barrier, by preventing free drainage toward the lowlands in southern Illinois, is supposed to have enabled the waters flowing away from the melting ice sheet to deposit the *loess* and loamy clay on the drift plain to the northwest of it, while a similar formation was being laid down at a much lower level in the country southeast of it.

In summing up the Quaternary history of Missouri, Chamberlin's classification of the Pleistocene formations is adopted. The major portion of the drift proper is referred to the Kansan epoch. The Aftonian interglacial epoch is scarcely represented in Missouri, but its effects may be recognized in slight valley erosion, particularly in the extreme northwestern part of the State. During the Iowan epoch the ice sheet is believed to have again advanced into territory now included in Missouri, but to a less distance than formerly. The *loess* is also referred to this epoch. The succeeding Toronto and Wisconsin epochs are inseparable in this state, but their effects consisted largely of increased depth of stream erosion.

The present writer desires to suggest that the idea that the distinctive deposit commonly known as *loess* was deposited by broad semi-lacustrine stream floods, originated from the study of flat areas where the formation was laid down as a nearly uniform sheet upon a plain. This hypothesis would not have originated upon certain other areas, for instance, the upper Mississippi region, where a *loess* of the same age as that of Missouri and nearly identical in the lithological features, mantles almost equally as uniformly, a characteristically hilly land surface. Here, undoubtedly, a purely lacustrine or possible semi-marine origin must be assumed for the waterlaid silt and loamy clay which covers hill-tops, slopes and broad flat valley-bottoms alike. It may be possible that the great difference in altitude between the *loess*-covered plain of southern Illinois and the much more elevated drift and *loess* plain of northern Missouri may be the result solely of the original altitudinal diversity of the preglacial land surface upon which they are superimposed. The supposed barrier from the Osage-Gasconade divide to the driftless ridge in Pike county, Illinois, would thus become unnecessary.

O. H. Hershey.

Angewandte Elektrochemie. Erster Band. Von Dr. Franz Peters. Hartleben's Verlag, Wien; Leipzig.

Electro-chemistry is one of the most recent subdivisions of chemical science. The study of its theoretical side has been most actively promoted and splendid results have been brought to light. Applied electro-chemistry is of even

more recent date; still, it has become the subject of very general attention. Separate or special chairs devoted to this branch have been created at several of the foreign technical schools, and journals intended for the publication of its distinctive methods and practices have been established. Efforts are now being made to gather in the widely spread literature relating to this subject. The volume before us presents a very full, although not exhaustive, treatment of all the sources of electric energy, the dynamo excepted. The author aims, in this volume, to give a concise account of the various forms of primary batteries and storage cells which have been devised at various times, and adds information in regard to the same which will prove helpful both to those who are engaged in promoting electro-chemical processes and to students who are seeking to gain for themselves as complete a knowledge of this subject as is possible. Some idea of the contents of the volume may be obtained from the following topics: A. Galvanic Batteries: 1. Batteries with one electrolyte. 2. Batteries with two electrolytes. 3. Dry batteries. 4. Normal batteries. 5. Suggestions for the construction of batteries and their components. B. Batteries serving for production of electric energy directly from carbon. C. Gas batteries. D. Thermopiles. E. Accumulators.

The author has treated his subject understandingly and has prepared a work which will prove of great value to all interested in applied electricity. It is his purpose, at an early date, to issue companion volumes, dealing with the application of electricity to metallurgy, to galvanoplastic processes, to chemical analysis and to industrial chemistry. The subject-matter in these later volumes is to be discussed in a thoroughly practical manner.

EDGAR F. SMITH.
UNIVERSITY OF PENNSYLVANIA.

SCIENTIFIC JOURNALS.

AMERICAN JOURNAL OF SCIENCE.

THE April number opens with an extended article by A. M. Mayer, giving the results of a long series of investigations of the phenomena of flotation of disks and rings of metal. The author briefly reviews the early literature on the subject and notes the erroneous statement often repeated in treatises on physics that a film of grease is necessary to float a piece of metal on a water surface. With respect to this point his results confirm the idea that the film of air which adheres to the body is essential to its floating, since rings of metals, as also rods of glass, sank in water if they had been heated and the air expelled, but regained their power of flotation after being exposed to the air for some 10 or 15 minutes. The disks experimented upon were made of aluminum, but the rings were made also of other metals, as iron, copper, brass, etc. The method of experimenting made possible the accurate determination of the depression of the water surface and also of the weight required to just break it and allow the disks or rings to sink. In the case of the rings the form of the water surface was more complex and called for special investigation. The equation of forces acting upon the disk of aluminum allowed finally of a determination of the surface tension of water, which was found to be .0791 as the mean of three determinations. With rings of different metals the value obtained was .0809. The mean of twenty-eight determinations of this constant by various physicists during the past sixty years is .0772. The surface tension of a solution of sodium chloride of a density of 1.2 was also determined and found to be .0860 (using the value .0772 for water).

George F. Becker contributes a paper on the method of computing diffusion with special reference to the diffusion in the viscous fluids as applied to geological phenomena. This is in connection with an earlier discussion by the same author on rock differentiation, published in the January number. E. O. Hovey discusses the rock of a dike in the Connecticut Triassic area, a few miles east of New Haven. This rock is remarkable in that it departs from the usual diabase character which so remarkably characterizes the Triassic igneous rocks of the entire Atlantic border. It is distinctly acid in character and seems to belong to the group of keratophyres. F. A. Gooch and C. F. Walker discuss the application of iodic acid to the analysis of iodides. The granitic rocks of the Pyramid Peak district in the Sierra Nevadas