(9) Toxic nodular goiter and toxic diffuse goiter are less apt to occur when there has been no previous enlargement of the thyroid (endemic goiter); at least this would seem a safe conclusion based on our experience.

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A NEW OCCURRENCE OF THE FLYING REPTILE, PTERANODON

THE U. S. National Museum has recently received as a gift from Tom H. Wells, of Austin, Texas, the upper half of the left humerus of a flying reptile, probably referable to the genus *Pteranodon*. The specimen is of much scientific interest, since it records for the first time the presence of this reptile in the Eagle Ford formation (Upper Cretaceous), and also from the fact that it greatly extends the geographical range of these animals in North America. Previously they have not been known to occur south of western Kansas.

On account of the scanty nature of the specimen, its assignment to the genus *Pteranodon* must be regarded as provisional, although its relatively large size is in keeping with such an identification. However, the great pneumasticity of the bone, the peculiar sculpturing of its surface and the presence of a large characteristic deltoid process clearly indicate its Pterosaurian affinities.

C. W. GILMORE

U. S. NATIONAL MUSEUM

THE FIRST SCHOOL OF CHEMISTRY

IN March, 1862, a committee of the Trustees of Columbia College recommended the granting of the petition of Charles A. Joy, professor of chemistry in Columbia, that he be allowed to start a School of Chemistry. A college catalogue issued early in 1863 carries an announcement of the School of Chemistry; advertisements stating that the School of Chemistry would open on November 1, 1863, were published in the *New York Evening Post*, the *Times*, the *Tribune*, the *Herald* and the *American Journal of Science*. On June 1, 1864, Professor Joy gave President King a check for $500, representing the excess of the receipts of the school over its expenditures. Curiously enough, the announcement of 1863 in the college catalogue also lists 32 "graduates" of the "School of Chemistry," which at that time consisted of Professor Joy and his assistant, Maurice Perkins. Some of those listed do not appear in the official Columbia alumni register as having taken any degree in 1863, others seem to have taken the A.M. degree from the college in that year or their A.B. in previous years, so the "school" was evidently not privileged to grant degrees. The simultaneous and much stronger impulse to establish a School of Mines at Columbia led to the School of Chemistry being dropped after 1864.

Being curious to know whether this was the first advertised "School of Chemistry" in the United States I turned to the usual sources of reference and was surprised to be unable to find anything in print on the subject: C. A. Browne, who is naturally the first person to turn to with such an inquiry, is now in Europe and I solicit the help of readers of SCIENCE, some of whom must know, in answering the question. Chemistry had, of course, been taught in medical schools and colleges in the United States since 1767, but when was the first "School of Chemistry" established? I would be glad to correspond directly with any one who may wish to debate whether the "school" at Columbia really had any authorized existence since it did not grant degrees.

THOMAS T. READ

NEW YORK, N. Y.

SCIENTIFIC BOOKS

ELECTRON EMISSION AND ADSORPTION PHENOMENA

Electron Emission and Adsorption Phenomena. By J. H. DE BOER. Translated from the manuscript by Mrs. H. E. Teves-Acly, 398 p., Cambridge, England: at the University Press; New York, The Macmillan Company, 1935; $5.50.

THE book covers the intimate relation between adsorption on surfaces and the phenomena of electron emission. It is a well-written monograph, which should be welcome to those interested either in adsorption or electron emission phenomenon or in both. The author, who with his associates has contributed much to the subject, has succeeded in developing a satisfactory concept of photoelectric and thermic emission of electrons from dielectrics or metals upon which alkali or alkaline earth metals are adsorbed. Without entering into highly mathematical derivations it is shown that the majority of such phenomena are easily interpreted with the aid of potential curves, the latter visually representing the relations between adsorbed atoms or ions and their adsorption energy. Thus it is even possible to predict the phenomena which will occur upon heating or radiation in cases in which the necessary energy data are available. Although the author, in his function as director of chemical research at the Philips Gloeilampen-fabriek, Eindhoven (Holland), is intimately connected with the incandescent

and radio lamp industry, he has avoided a technical discussion of the subject and has kept the contents purely theoretical. Still, the great number of facts discussed throughout the text should prove to be of great value to those especially interested in the industrial aspects of the subject.

The fundamentals concerning electron emission from metals (work function) and the nature of adsorption forces are treated in a concise but very systematic way in the first two chapters. Incidentally, the two extreme classes of chemical compounds, the polar and apolar molecules, are shortly discussed, and it is clearly demonstrated that compounds which in the solid state are constituted of ionic lattices, may form ionic or atomic molecules in the gaseous state, depending upon the location of the minimum in the potential curves for the atomic and ionic compound. The clear distinction which is made between adsorption of ions and adsorption caused by dipole attraction, electrostatic polarization and Van der Waals's forces is also valuable. Here the author has an opportunity to emphasize the significance of active places on the surface, where electrostatic adsorption is maximal and Van der Waals's adsorption minimal. Later on, the active surface of sublimated salt layers is shown to be of great significance.

The third chapter deals with the adsorption of caesium on a tungsten surface in which Langmuir's classical work is discussed from de Boer's point of view. The next three chapters consider the influence of the adsorption of metals and gases on metal surfaces on the emission of conduction electrons. Before the selective photoelectric effect is discussed, a more detailed treatment of absorption of light by matter in the gaseous and adsorbed state is given. Chapters X to XIV deal with photoelectric phenomena of adsorbed atoms on the internal surface of alkali halides and the photoionization of such atoms. Atoms which are adsorbed on an external surface of a dielectric may be ionized by the absorption of light as well as by increase of temperature. If the electrons liberated are emitted to the outside we are concerned with photoelectric or thermionic emission. Atoms adsorbed on the internal surface within a salt lattice may also be ionized by light as well as by increase of temperature. The electrons in this case are emitted into the salt lattice and it is made clear that we are concerned with the phenomena of photoelectric conduction and electronic semi-conduction. In the last chapter (XV) is discussed the possibility of atoms adsorbed on an external surface, which upon ionization may emit their electrons to the inside, *i.e.*, into the salt lattice. In this connection the theory of rectifiers is also presented.

The foregoing is only a very brief survey of the rich contents of the book. The author is to be complimented for his broad, original, highly modern, critical and concise treatise and his attempt to explain a multitude of phenomena on the basis of the same fundamental concepts. Many of the potential curves given seem to be hypothetical, but this fact should stimulate further research. The translator deserves praise, since it is hardly noticeable that the original manuscript was not written in English. Cover and print of the book are attractive.

I. M. KOLTHOFF

THE STRUCTURE OF CRYSTALS

The Structure of Crystals. Supplement for 1930–1934 to the 2nd Edition. By R. W. G. WYCKOFF. Reinhold Publishing Corporation, New York, 1935. 240 pages, $6.00. American Chemical Society Monograph Series.

THIS book, following the form of the second part of the well-known book which it supplements, contains descriptions of the new atomic arrangements in crystals reported in the literature of 1930–1934, together with a bibliography of about two thousand references. Its greatest usefulness will probably be as a convenient source of reference preliminary to the study of the original papers. As in his earlier books, the author here shows excellent judgment regarding the reliability of structure determinations, and his critical remarks should be of great value to the general reader.

The description of an atomic arrangement usually includes the size of the unit, the space group, a table of atomic coordinates, and one or two drawings, with in some cases a discussion of coordination, interatomic distances, and other structural features. In most cases this gives the reader a satisfactory understanding of the structure. In the opinion of the reviewer, however, the value of such a book would be still further increased by including more complete qualitative descriptions of the structures, with omission of long tables of atomic coordinates, which could be found in the original papers by any one sufficiently interested to make use of them. For example, very little information as to the nature of the structure reported for vesuvianite is given in the one page devoted to this crystal (p. 114–5), most of which is used for tabulating the atomic coordinates; and a half page is used for tabulating coordinates for epididymite (p. 117–8), even though the author points out that the reported structure can not be correct.

By providing this reliable survey of the extensive crystal structure literature of the last five years, the author has earned the gratitude of everyone interested in the field.

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