library, which he gave to Brown University. To it also, or at least to his native State, he made handsome legacies for botanical instruction, as well as other benevolent bequests. These benefactions, and his many good offices, should preserve a pleasant memory of a useful life, the end of which was obscured and afflicted by mental trouble. In Botany his name is commemorated by a remarkable Leguminous tree of Arizona (*Olneya*) and by several species of his own discovery. Mr. Olney was unmarried, and was for most of his life engaged in business, at first in Augusta, Georgia, and afterward in his native town.

James Watson Robbins, M.D., died at Uxbridge, Massachusetts (where he resided and was an esteemed physician for the greater part of a long life), on the 9th day of January, 1879, at the age of 77. With the exception of Dr. Bigelow he was the oldest New England botanist, and perhaps the oldest in the United States; and, within his range, he was certainly one of the most careful and accurate. He was a colleague of William Oakes, who had the pleasure of naming several species discovered by him in his honor, and he had an extended correspondence with all our botanists. He collected not only throughout New England, but in Virginia and Maryland, where he resided for several years when a young man, and on the shore of Lake Superior, where he spent four years. Of late, he devoted his attention mainly to aquatic phænogamous plants, especially to the difficult genus *Potamogeton*. He contributed the monograph of this genus to the last edition of Gray's Manual. He first detected that simplest and smallest of flowering plants, *Wolffia*, in this country. His excellence and amiability secured the attachment of all who knew him. He was born at Colebrook, Conn., November 18, 1801, graduated at Yale College in 1822, and there took his medical degree in 1828. In his death we have lost the most critical student of the botany of New England and the Northern Atlantic States.

Jacob Bigelow, the most venerable of botanists, even more distinguished as a physician, a cultivator of the fine and useful arts, and a scholar, one of the most rounded and symmetrically developed men of his time and place, died at Boston, on the 10th of January ult. The notice due to his life and services must be deferred to the next number. A. G.

IV. Miscellaneous Scientific Intelligence.

1. *Technologisches Wörterbuch;* I. Deutsch-Englisch-Französisch; bearbeitet von E. Althans, L. Bach, u. A., herausgegeben von Carl von Albert, mit einem Vorwort von Dr. Karl Karmarsch. Dritte verbesserte und bedeutend vermehrte Auflage. 743 pp. 8vo. Wiesbaden, 1877. (J. F. Bergmann; B. Westermann & Co. in New York.)—This Technological Dictionary deserves high commendation both for its completeness and its accuracy. The subjects which it embraces include all the prominent branches as well of pure as of applied science, so that the work is alike valuable to the student and the manufacturer, the technologist and the merchant. This volume gives the English and French equivalents of the German technical and scientific words and expressions; the other two volumes of the series are arranged for English and French readers respectively. The names of seventeen specialists are given, who have assisted in the preparation of this the third edition of the first volume, and they alone are a sufficient proof of the excellence of the work.

2. *Chromometry.*—Under this name Professor Kœnig describes a new branch of quantitative analysis with the blowpipe. The method depends upon the observations of the color produced in the borax bead by various metallic oxides, with the "Chromometer"; in the hands of the describer it is made to yield very accurate results.—*Amer. Soc. Philadelphia*, Oct. 4, 1878.

3. *Additional characters of the Sauropoda;* by O. C. Marsh.—Beside the characters of the *Sauropoda*, already made known by the writer,* others of importance have been since brought to light.

The skull, of which so little has been known hitherto in the Dinosaurs, presents in *Morosaurus grandis* some strongly lacertian characters. It is short, high and narrow, something like that of the Chameleon. The supra-occipital is very large, and forms the upper part of the foramen magnum. The ex-occipitals have long par-occipital processes. The occipital condyle is formed entirely of the basi-occipital. The long basipterygoid processes are of the lacertian type. The quadrate is elongated, very slender above, and has a small articular head. Below, it is fixed by the pterygoid, which unites with it by suture. On the outer side of the quadrate, below the middle, the quadrato-jugal joins it by suture. Its posterior end is cup-shaped, with the cavity opening outward, and partially closed by a thumb-like process. This bone divides in front, one branch going upward, and the other forward, to join the jugal and complete the lower arch. The bones of the cranium were united by open sutures, and there are large parietal fossæ. The orbits are large, and there is a vacuity in front of the lachrymal. The upper jaws are especially short and deep, and each maxillary contained nine teeth. The nasals and premaxillaries were narrow. The lower jaws were not coössified at the symphysis, and each dentary bore twelve teeth. This bone was very deep in front, and pointed behind.

Episternal bone.—A bone, found with the remains of *Apatosaurus ajax*, so strongly resembles the episternal element in lizards, that it must be regarded as an episternal bone. It is cruciform in shape, and symmetrically bilateral. The posterior process is abruptly truncated; the anterior is short and obtuse, and the lateral processes are the longest. The lower surface of this bone is slightly convex on the median line, and more strongly convex transversely. The upper surface and sides indicate that it was surrounded mainly by cartilage. By this interpretation of the bone, the posterior truncated process abutted against the sternum,

* This Journal, vol. xvi, p. 411, and vol. xvii, p. 85.

the posterior reëntrant angles were met by the coracoids, or the intervening cartilage. This would leave the anterior concavities for clavicles, no evidence of which has hitherto been found in Dinosaurs. Their existence in *Apatosaurus*, if not in other *Sauropoda*, seems therefore a necessity. The large rugose facet on the anterior projection of the scapula offers the natural place for union with that bone. No clavicles were found with this episternal bone, but a single specimen from a neighboring locality agrees closely with what we should expect the corresponding clavicle to be. These interesting remains will be more fully described by the writer in another communication.

Yale College, January 22, 1879.

4. *Portrait of Humboldt.*—An excellent portrait, of natural size, painted by Steuben, belongs to Madame de Schœnfeld, of Paris, and is to be disposed of. It should be in some of the Galleries or Museums of this country. Information respecting it may be sought of the distinguished botanist, E. Cosson, 7 Rue Abbatucci, Paris.

THE

AMERICAN

JOURNAL OF SCIENCE AND ARTS.

[THIRD SERIES.]

ART. XXI.—*On the Variability of the Ultimate Molecule;* by Professor W. A. NORTON.

I PROPOSE, in the present article, to adduce numerous facts which seem to afford decisive evidence that the ultimate molecules of bodies, under varying conditions of pressure and other relations to surrounding molecules, are subject to change in the intensities of the forces of attraction or repulsion they are capable of exerting, at a given distance, on such contiguous molecules; while retaining the same temperature and the same chemical constitution.

The first evidence I shall present that the ultimate molecule may, under certain conditions, experience a change in the intensities of its active forces, is derived from the *facts and phenomena of the set, or permanent distortion of materials*, which remains after they have been temporarily subjected to a force of stress.

Numerous series of experiments have been made by Fairbairn, Hodgkinson, Chevandier and Wertheim, Morin, and other experimenters, the writer included, with the view of determining the amount of set experienced by various materials, after a certain fraction of the breaking load has been applied and withdrawn; and of ascertaining all the laws of the set, under varying loads, variations in the duration of stress, varying conditions in the application of repeated stresses, etc. The following are some of the principal facts and laws that have been experimentally determined.

(1.) If a bar of any material (e. g. wood, iron, or steel) be subjected to varying forces of stress—whether tensile, compres-