EDWARD DRINKER COPE.

BY MARCUS BENJAMIN, PH.D.

American science honors its representatives by an election to the National Academy of Sciences or by an election to the presidency of the American Association for the Advancement of Science. This year the last-named organization is fortunate in having as its presiding officer a scientist who is also a member of the National Academy, for it was at its Springfield meeting last summer that Prof. Edward Drinker Cope, who ranks among the foremost of American paleontologists, was chosen to preside over its forthcoming Buffalo meeting.

Prof. Cope was born in Philadelphia, Pa., on July 28, 1840, of distinguished American ancestry. His great-grandfather was Caleb Cope, a Quaker of Lancaster, Pa., who protected the ill-fated Major André from a mob in 1775. His son, Thomas Pym Cope, whose line of ships made regular trips across the ocean, founded the great linen house in Philadelphia, which on his retirement passed into the hands of his sons Henry and Alfred, who then formed the well-known firm of Cope Brothers. Prof. Cope is the son of the younger of these two brothers.

His academic education was acquired at Westtown Academy and at the University of Pennsylvania, but he did not graduate, and turned his attention to science. He studied comparative anatomy in the Academy of Sciences, in Philadelphia, and in 1859 he joined the group of young naturalists who were associated together in the Smithsonian Institution under Prof. Baird. Their names are best recalled by the following stanza, improvised by one of their number, after a hotly contested argument on some disputed point in natural history:

Into this well of learning dip with spoon of Wood or Horn,
For students Meek and holy silver spoons should treat with scorn.

If Gabb should have the gift of Gill
(As Gill has gift of Gabb),
'Twould show a want of judgment still
To try to Cope with Meek.

Then he went abroad and spent the years 1863-64 in study in the universities of Europe, returning in 1864 to accept the chair of natural sciences in Haverford College, which he resigned three years later. Meanwhile he became paleontologist to the government geological surveys, serving at first under Hayden, on the survey of the Territories, and then under Wheeler, on the survey west of the 100th meridian. His work in this connection has resulted in the discovery of more than one thousand new species of extinct and as many recent vertebrata. There is not space here to consider these in detail, or, indeed, to even mention them, but, as has been well said, the titles of his papers, some four hundred in number, "form a systematic record of the development of paleontology in the United States." Of his larger works on this branch of science, most of which are contained in government reports, the following are the more important:

"Systematic Arrangement of the Lacertilia and Ophidia" (1864); "Primary Groups of the Batrachia Anura" (1865); "History of the Cetacea of the Eastern North American Coast" (1866); "Synopsis of the Extinct Cetacea of the United States" (1867-68); "Systematic Arrangement of the Extinct Batrachia, Reptilia, and Aves of North America" (1869-70); "Systematic Relations of the Fishes" (1871); "Systematic Relations of the Tailed Batrachia" (1872); "Extinct Vertebrata of the Eocene Formations of Wyoming" (1873); "Cretaceous Vertebrata of the West" (1877); "Tertiary Vertebrata" (1885); "Catalogue of the Batrachians and Reptiles of Central America and Mexico" (1887); "The Batrachia of North America" (1889); and he has just completed for the press "The Snakes and Lizards of North America," which will be issued by the Smithsonian Institution during the coming year.

Philadelphia has for many years been the home of Prof. Cope and, on the death of Prof. Joseph Leidy, in 1889, Prof. Cope was called to the vacant chair of geology in the University of Pennsylvania, which post he still fills. Besides the duties of his chair he has long been the senior editor of the American Naturalist.

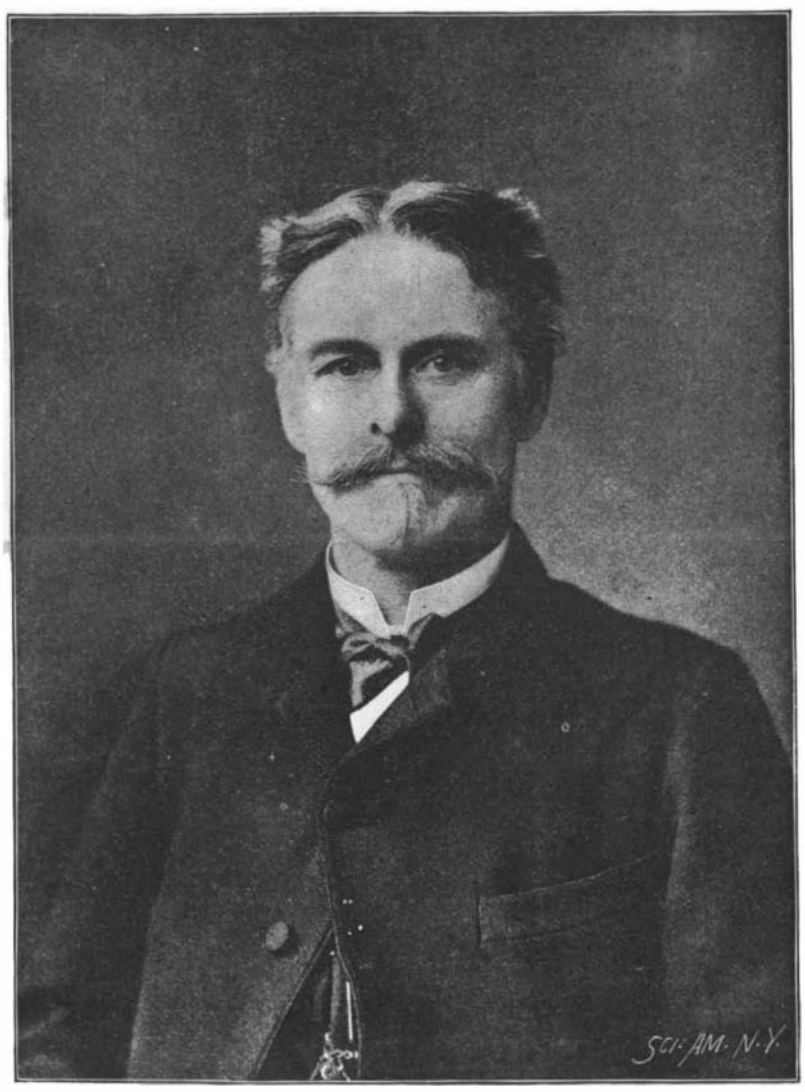
Prof. Cope is also well known as the graceful writer of numerous popular contributions in book form to the literature in favor of the now generally accepted doctrine of evolution. These include:

"On the Origin of Genera" (1868); "Hypothesis of Evolution, Physical and Metaphysical" (1870); "Method of Creation of Organic Types" (1871); "Evolution and its Consequences" (1872); "Consciousness in Evolution" (1875); "Relation of Man to Tertiary Mammalia" (1875); "On the Theory of Evolution" (1876); "The Origin of Will" (1877); "The Relation of Animal Motion to Animal Evolution" (1878); "A Review of the Modern Doctrine of Evolution" (1879); "Origin of Man and Other Vertebrates" (1885); "The Energy of Life Evolution and how it has Acted" (1885); "The Origin of the Fittest" (1886); and "The Primary Factors of Organic Evolution" (1896).

He is a formidable antagonist, and his strong pen was wielded relentlessly until the victory was won.

Honors have come to him. The Bigsby gold medal was conferred on him by the Geological Survey of Great Britain in 1879, and his name is on the rolls of many of the scientific societies in this country and abroad, including our own National Academy of Sciences, to which he was admitted in 1872.

He joined the American Association in 1868, and in 1875 was advanced to the grade of fellow. The section on biology made him its presiding officer in 1884, and in the following year he addressed the society on "Catagenesis." His name has frequently been urged upon the association for its highest office, but it was not until last year that the well merited honor came to him.



EDWARD DRINKER COPE.

The Discoverer of Zinc Etching.

But few of the readers of this journal [The American Art Printer] know that photo-zinc etching and photo-lithography, in so very many ways the same thing, were invented by two different men at almost the same time, the one being in England, the other nearly on the opposite side of the globe, in Melbourne, Australia. It was in the year 1859 that Mr. Osborn, of the Survey Department of Australia, sent a young man to England to confer with Sir Henry James about the new Australian method of reproducing and making printing plates for publication. Sir Henry James was surprised that the method was so very much like his own invention, which he made—nearly—by accident, and he showed the young man some very good prints, and told him the story of how he came to invent this great medium of modern reproduction.

According to a book on zinc etching, published in 1862, by A. D. C. Scott, Sir Henry James was visiting friends at Ryde, on the Isle of Wight, and made the acquaintance of a young lady artist who had great skill and talent in copper etching. She mentioned to Sir Henry James that it would be of great advantage to the public if there could be a way of producing art subjects in a cheaper manner than that of copper etching or steel engraving. That idea aroused in Sir Henry James the desire of finding some means of duplicating the etching made originally by the artist, so that prints might be obtained in quantity. After trying several methods of fixing a picture on a metal plate, he tried to make a print on chrome carbon paper, which process was used at that time (1859) in photography. He prepared the paper, printed a picture on it, then inked it in and developed it, and obtained a very nice copy, which he transferred to a sheet of zinc. He further prepared and etched it, and his pleasure knew no bounds at the satisfactory result he attained in etching his plate deep enough to print many thousand copies from it. He began to improve his method day by day, and in a short time he found himself overworked on reproducing old manuscripts and masterpieces of ancient art. Handwriting of Edward I and the great Doomsday Book, written in the year 1086, at Winchester, were among the first great works of reproduction by this invention. Day after day new treasures of art of long forgotten masters, authors, and celebrities came to light, and brought refinement and education to mankind.

A Great Historic Tablet.

Last winter I was permitted to excavate along a part of the ruin-strewn desert at Thebes, and to examine the sites of temples which stand there. On these few furlongs I found that there had been seven temples of the kings or the eighteenth and nineteenth dynasties, about 1450-1150 B.C. Most of these I entirely cleared out; the largest piece of all—the great buildings around the Rameseum—being the clearance of the Egyptian Research Account worked by Mr. Quibell. Each site gave us some return in information or objects; but the most valuable of the sites, as it proved, was one of the least inviting. A field of stone chips showed where the funeral temple of Merenptah had stood; and, left in the ruins, I found the great granite tablet bearing the long inscription of Merenptah about his Libyan war and his Syrian war, and naming Israel.

This tablet is over ten feet high, over five feet wide, and over a foot thick, of one flawless block of very fine grained granite, or, rather, syenite. It was first cut by one of the most sumptuous kings of Egypt, Amenhotep III; brilliantly polished as flat and glassy as a mirror, and engraved with a scene of the king offering to Amen, the god of Thebes, and an inscription of about three thousand hieroglyphs recording his offerings and glorifying the god. His son Akhenaten, who strove after a higher faith, erased all figures and inscriptions of Amen, and so effaced most of his father's fine carving on this great tablet. This, however, was all re-engraved by Seti I, about fifty years later, as a restoration. Then, some two centuries after it had been erected in the temple of Amenhotep III, Merenptah cast an envious gaze on the splendid stone, and stole it for his own purpose.

Not taking the trouble to rework it, he simply built the face of it into his own wall, and engraved on the comparatively rough back of the block. At the top he figured a scene of the king offering to Amen, and below an inscription very nearly as large as that of Amenhotep III on the other side. The painting of the sculptured figures still remains as fresh as on the day it was done; for, as the tablet fell face forward when the temple was destroyed, the side belonging to Merenptah lay downward, while that of Amenhotep III was uppermost. In the ruins, then, amid the fragments of columns and foundations, heaped over with a foot or two of stone chips, this grand block had lain since about the time of the Trojan war. All Greek history, Roman, and mediæval—the prophets, Christianity, and Islam—have swept along while this was waiting unsuspected, with its story of the wars of Pharaoh of the Hard Heart, and his crushing of Israel.—Prof. Flinders Petrie, in the Century.

Molybdenum Bronzes by Electrolysis.

Among the future products of electrolysis at high temperatures, it seems probable that useful alloys may find a place; at any rate, electro-metallurgists are demonstrating the possibility of preparing many new compounds, some of which may turn out to be of considerable industrial utility. In the Berichte, says the English Electrical Review, Stavenhagen and Engels describe some molybdenum bronzes which they have recently succeeded in preparing. Among these, there is one which bears a great resemblance to tungsten bronze, and is formed by electrolyzing fused acid, sodium molybdate. The fusion is performed in a platinum crucible, with a current of 8·5 amperes and generated by three accumulators (4·9 volts) placed in series. The bronze separates quickly at the cathode in crystals, which have to be washed with boiling water and dilute hydrochloric acid. It is soluble in alkalies, in nitric acid, and aqua regia, but not in hydrochloric or sulphuric acids; its composition is found by analysis to correspond to the formula, $N_2Mo_6O_{15}$. For further details consult the original paper in the Berichte der Deutschen Chemischen Gesellschaft, xxviii, page 2280.