METALLURGY

Faraday's Research on Metals Anticipated Modern Steel

Scientist's Pioneering in Metallurgy Revealed From Analyses of Specimens Found During Summer

MICHAEL FARADAY was a pioneer of modern alloy steel, and his metallurgical researches 107 years ago "anticipated in a remarkable manner the facts and principles on which the present enormous development of alloy steel is based." Sir Robert Hadfield, himself the father of modern alloy steel, revealed at the Faraday Centennary Celebration held in London this week, analyses of 79 small specimens of steel and alloys, discovered during the rebuilding of the Royal Institution this summer, in a small box labeled in Faraday's own handwriting.

This forgotten cache, examined by modern metallurgical methods, shows that Faraday alloyed thirteen metallic elements, and also carbon, silicon and sulphur, with iron, using a forced-draft furnace capable of high heat. By adding chromium and nickel, Faraday anticipated present post-world-war developments of stainless steel. Using the noble metals—gold, iridium, osmium, palladium, platinum, rhodium and silver—Faraday surpassed present-day technical development.

Small knives, made from a piece of Faraday's original high-platinum steel, were presented to the president of the British Association for the Advancement of Science, Gen. Jan Christian Smuts, and to a few other scientists attending the celebration.

Sir Robert Hadfield's study into Faraday's alloys required nearly five hundred chemical analyses, utilizing, however, less than half a pound of the priceless relics. A full report of the work will soon appear as a large book.

Discovery of Faraday's metallurgical pioneering heaps new honors on his memory, while he is memorialized for the hundredth anniversary of his epochal magnetic induction experiment, fundamental to the electrical industry.

Prof. Elihu Thomson, American electrical pioneer, credited Faraday with the invention of the transformer, which makes power transmission possible. Lord Rutherford hailed his fundamental research on electrolysis. Sir William Bragg called attention to his discovery of benzene, which is fundamental to all modern organic and physiological chemistry and to the chemical industries depending on these sciences. Prof. Peter Debye of Leipzig, told how he recognized the identity of chemical affinity and electricity. Prof. P. Zeeman of Amsterdam credited the great English pioneer with demonstrating the effect of magnetism on light, fundamental to modern physics, and the Marchese Marconi told how he planted the seed whence wireless has sprung. The Duc de Broglie, of Paris, paid tribute to his laying of the foundation of modern physics, and Prime Minister Ramsay Macdonald related his contributions to the welfare of the British Empire.

Faraday, in making alloy steel, was far ahead of his time. Although his alloys were made at Sheffield on a comparatively large scale, into cutlery, razors, fireplace fenders, etc., lack of industrial demand turned Faraday to electrical investigations which are fundamental to industry today.

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BOTANY

Tiny Cellulose Balls May Be Smallest Plant Units

LITTLE CELLULOSE spindles are no longer the smallest known units which make up the structure of a plant; spherical bodies, tinier still, have been discovered. These minute spheres, observed for the first time at the U. S. Forest Products Laboratory, Madison, Wis., measure about one fifty-thousandth of an inch in diameter. They were found through microscopic examination in the spindles which are larger structural units of the plant fiber.

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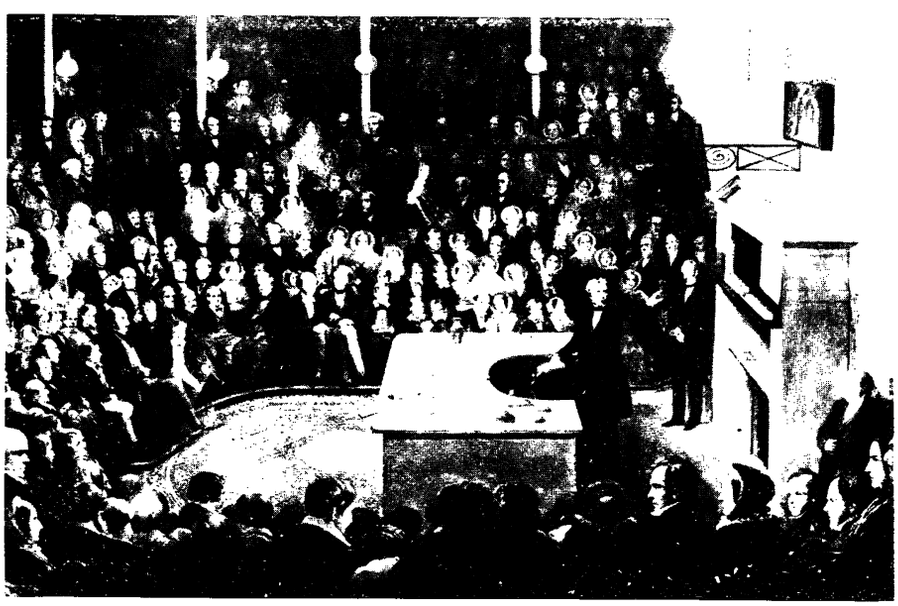
ARCHAEOLOGY

Indian Writing Moved From Bottom of Future Lake

WHEN the waters of the huge Safe Harbor hydro-electric dam cover islands in the Susquehanna River at Safe Harbor, Pa., to a depth of 40 feet, archaeologists will have no cause for regret. For the objects which made these islands archaeologically valuable—picture writing chiseled in the surface of the rock—have been carefully removed, cut out of solid rock in huge chunks with compressed air drills, to be saved for future study.

The work of removal has been going



DESCRIBING HIS DISCOVERIES

Michael Faraday lecturing before the Royal Institution, December 1855. A reproduction of the original painting by Alexander Blaikley.

PICTURE WRITING

And the method of its removal from the bottom of a future lake for study. The watch indicates the comparative size of the symbols.

on for a year and a half during which time 65 groups of ancient rock writings have been taken from the river. Many of the rocks weighed hundreds of pounds and had to be chiseled away above dangerous rapids.

More than 300 complete pottery vessels and many other objects were also taken from the area of the rock writing. Valuable archaeological data were collected and many charts, and molds of the picture writing were made.

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METALLURGY

Ultra-Violet Light and High Frequency Current Harden Steel

Use, Other Than in Dentistry, of Some 8,000,000 Precious Alloys, Also Urged Before Steel Treating Society

HARDENING the small metal parts of typewriters, sewing machines, and the like may be speeded up by the use of high-frequency radio currents, ultraviolet light, and the electric spark, according to a report presented by John J. Egan, research metallurgist of Long Island City, N. Y., before the American Society for Steel Treating, in Boston.

The steel is given this desired "case hardening" by nitriding, Mr. Egan explained. This previously has been a slow process, involving the heating of the steel while it is placed in a nitrogen atmosphere. After many hours of heating in contact with the nitrogen gas, it is cooled and its surface or "case" has become hardened.

But by subjecting the metal to ultraviolet light or to electrostatic fields caused by the electric spark or high-frequency radio currents, nitriding is speeded up and hard satisfactory cases are made in a short time, he reported. While Mr. Egan does not believe these methods to be commercially applicable at the present time, he thinks that further experimentation should make them so.

Alloys of precious metals should prove useful in other fields than dentistry, the society was told by Prof. R. C. Brumfield, of Cooper Union, New York City.

Gold, silver, platinum, palladium, and other rare elements, when alloyed with the baser metals, have service qualities that can be known only by actual experimentation, according to Prof. Brumfield. It is estimated that eight million combinations are possible, each with its unique characteristics. Only a few of them have ever been developed, and these have been used in dentistry. The resistance of these alloys to discoloration and their possibilities for heat treatment recommend their use elsewhere, Prof. Brumfield said. The ultimate strength of some of these metals is as much as 90 tons per square inch. The strength of steel ranges from 50 to 100 tons per square inch.

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ECONOMIC ZOOLOGY

Eugenie Hats Demand Feathers; Ostrich Breeding is Revived

EMPRESS EUGENIE hats, and other feather-decorated feminine headgear now sweeping into fashion, have resulted in a sudden revival of the ostrich-breeding industry that had all but died out in South Africa.

So low had the industry fallen that there are now only about 13,000 birds in this district, and with breeding going on at a capacity rate it is estimated that it will take at least two and one-half years to bring the number up to 50,000, and at least fifteen years to reach the pre-war total, which was 300,000 birds.

Before the present boom six-month-old ostrich chicks sold for about $5, but today there are few for sale at any price; some ordinary flock birds are selling for $20 each, while breeding birds bring as high as $75 a pair. Incubators that have been idle for years are being repaired to receive batches of eggs.

So badly had the ostrich feather industry fallen off that only seventy sorters of feathers could be mustered.

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ARCHAEOLOGY

American Archaeologists Make Finds in Italy

THE FIRST non-Italian expedition to be granted permission to do archaeological excavating in Italy reports great success after less than one month's work. Dr. Jotham Johnson, field director of the University of Pennsylvania Museum's expedition to Minturno, Italy, reports to Horace H. F. Jayne, director of the Museum, the discovery of a remarkable series of architectural terra cottas dating from the third to first centuries B. C., as well as a fine sculptured head of the Emperor Tiberius and a statue of the Emperor Augustus.

No less than eighty inscriptions have also been found, but for the most part these were built into walls of a later temple, and have not yet been read. A late mosaic landscape of the Nile has also been unearthed by Dr. Johnson.

This "dig" at Minturno marks the first time in history that a foreign institution has been permitted to work in the Italian field, and permission was due