

METALLURGY

**Steel Made Super-Hard
By Rapid Chromium Plate**

AN INTENSELY hard surface is put on steel tools to increase their usefulness many times by a process of rapid chromium plating reported to the Electrochemical Society by Lieut. A. Willink of Frankford Arsenal, Philadelphia.

As an alloy, chromium made steel stainless; as an electroplate, it gave automobile parts an ever-shiny, non-rusting finish and it hardened tools and parts of machinery subject to great wear. Now, by a method of rapid plating at high temperatures described by Lieut. Willink, it imparts to tool steel a coat of super-hardness.

He said that a certain die plated by the new method would stand up for 85,000 impressions in the Frankford Arsenal. Protected by an ordinary chromium plate it had a life of about 25,000 impressions and without chromium protection it was useless after a 4,000 run.

The new method has the additional advantage of requiring much less time than the old. Plating is done in a bath at about 150 instead of 65 degrees Fahrenheit and the current density is at least 1,000 amperes per square foot of plating surface.

Science News Letter, April 30, 1932

PUBLIC HEALTH

**Eradication of Leprosy
In U. S. Held Possible**

IT OUGHT to be possible to eradicate leprosy in the United States in the space of a few years," declared Dr. Victor G. Heiser of the International Health Board at the meeting of the American Philosophical Society.

There are said to be 2,000 cases of leprosy in the United States at the present time. The disease is only transmitted now in Florida, Louisiana, Texas and California, though it is not so long since cases originated in other states as well, Dr. Heiser said. There still are cases of leprosy in some of the other states, but no new cases occur, he explained.

Leprosy cannot be eradicated by direct attack, as can be done in the case of diphtheria or bubonic plague, for instance, because too little is known about the disease. But much may be accomplished by securing hygienic living for the patients, by early treatment, isolation, and other "common sense" methods, Dr. Heiser stated. Speaking of

wiping the disease out of the United States, he said:

"In the light of present knowledge it would only be necessary to send all the afflicted persons of Louisiana, Florida, Texas and California to the Federal hospital at Carville, Louisiana. In these states active steps should be taken to find the early cases and have them brought under treatment.

"In countries like India, China, and Japan, where the large numbers of sufferers would involve prohibitive hospital costs, outdoor or dispensary treatment could be given and patients taught how to avoid endangering others."

Dr. Heiser reviewed the present methods of treating leprosy and pointed out that in those having a good effect, it may be due to their capacity to cause fever, which has recently been found helpful in treating other diseases.

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ASTRONOMY

**Electric Waves May Cause
Variability in Stars**

VARIABLE stars, the flashing signs of the sky that periodically wax and wane in brightness, may do so as a result of electrical changes. R. W. Revans, Commonwealth fellow from Cambridge University, who is working in the physical laboratories of the University of Michigan, makes this suggestion as a result of his experiments with an artificial variable star.

Mr. Revans used a spherical glass tube containing gas, to which was connected a source of high voltage. He found that the electrical discharge inside the tube occurred in oscillations, starting at the center and spreading to the outside. These oscillations occur at the rate of 10,000 times a second, while the variations of a star may take days. But he applied his experimental data to a hypothetical tube of the size of a star, and found that the period would then be about the same as those actually determined by astronomers.

This may prove important in determining the actual brightness, or candlepower, of a variable star. By means of the spectroscope, the external temperature may be measured, and from the work of Mr. Revans, the diameter may be calculated. Thus the intrinsic brightness may be found. By comparing this with the apparent brightness, as the star is seen in the sky, the distance can be measured.

Science News Letter, April 30, 1932

IN SCIENCE

ASTRONOMY

**Great Groups of Stars
Have Same Candlepower**

STARS that are not as hot as the sun are sharply separated into two classes, giants and dwarfs—enormous bubbles of glowing gas of very low density, and smaller globes, still gaseous, but more highly compressed in their interiors. And between these two classes the cooler stars show no examples of intermediate size.

This was among the new facts about stars presented before the meeting of the National Academy of Sciences by Dr. Walter S. Adams, director of the Mt. Wilson, Calif., Observatory of the Carnegie Institution of Washington, based on observations which he has made on 4,000 of the brighter stars. The examples with which he was particularly concerned were those that showed temperatures from 10,000 down to 3,000 degrees Centigrade.

Dr. Adams made the further discovery that all of the cooler giant stars are of about the same brightness. Similarly, all the cooler dwarfs shine within definite narrow limits of luminosity.

"An immense majority of such stars," he said, "have almost exactly the same candlepower."

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PLANT PHYSIOLOGY

**Shade Trees May Detect
Slow Leaks In Gas Mains**

IF ONE or two shade trees in a row along the street begin to put forth their leaves and flowers prematurely, while their companions still remain dormant, it may mean that the gas main beneath their roots has developed a slow leak.

This suggestion is made by Prof. Carl G. Deuber of Yale University. Prof. Deuber states that illuminating gas, long recognized as poisonous to plants, acts as a stimulant when present in low concentrations. In this it resembles many other poisons.

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FIELDS

GENETICS

All-Male Cornstalks Produced by Scientist

CORNSTALKS that are all male, and their counterparts that are exclusively female, have been bred by Prof. R. A. Emerson, Cornell University geneticist, who reported on his researches before the meeting of the National Academy of Sciences.

The ordinary type of corn is both male and female. The female flowers, that produce the seed, are grouped in the ears; the male, or pollen-bearing flowers, occur in the tassel. In Prof. Emerson's all-male corn the tassel is of the ordinary, pollen-producing type, but there are no ears. In his all-female corn the ears are present, and the tassels, instead of producing pollen, bear female flowers that give rise to grains of corn.

Prof. Emerson has succeeded in analyzing the Mendelian hereditary characters that are responsible for this strange behavior in his two corn strains, and described them to the Academy.

Science News Letter, April 30, 1932

MEDICINE

Infantile Paralysis Germs Reach Brain Through Nose

THE GERM or virus causing infantile paralysis is not carried by lower animals but is confined to man. It enters the body chiefly through the membranes of the nose, and passes along the nerves of smell to the brain and spinal cord, where its main attack on the body is made. These are the conclusions which Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, reported to the National Academy of Sciences.

The germ's chief avenue of escape from the body is back along the nerves of smell from brain and spinal cord to nasal membranes, Dr. Flexner said. This indicates that the nasal secretions carry the germ and may be the means of spreading it to cause new cases of the disease.

Dr. Flexner also described experi-

ments intended to develop successful methods of giving monkeys lasting protection against or immunity to the disease, and studies on the variation of the causative virus under varying conditions of growth.

Monkeys can be protected for relatively short periods of time, he explained, by inoculating them with blood serum from human beings who have recovered from the disease, from monkeys given the disease experimentally, or from certain adult persons not known to have had the disease, but whose blood sera nevertheless give protection.

Lasting, active immunity to the disease can be given monkeys by inoculations of the infantile paralysis virus or germ itself. The methods heretofore used to produce this type of immunity have been uncertain because in a few instances they have been followed by paralysis. For this reason active immunization has never been tried in man. Dr. Flexner's latest experiments were undertaken in the hope of improving the method of giving active immunization to monkeys.

Science News Letter, April 30, 1932

CHEMISTRY

Double Weight Hydrogen Unit in Atom Building

HYDROGEN atoms of double weight, recently discovered at Columbia University, are fundamental building blocks in the cores of other atoms, Prof. William D. Harkins has shown by assembling the data on the frequency of occurrences of atom species. His findings have been reported to the *Journal of the American Chemical Society*.

The most abundant kinds of atom cores, Prof. Harkins points out, are those which can be made up entirely of the cores of the new double-weight hydrogen isotope. This unit, consisting of two positive protons and one negative electron firmly bound together, is next to the proton itself in simplicity as a structural unit of matter. Two such "isohydrogen nuclei," themselves tightly bound, make up the alpha particle already widely recognized by scientists as a building stone in the formation of atom cores.

The double-weight hydrogen atom was discovered a few months ago, by Prof. H. C. Urey and Dr. G. M. Murphy of Columbia University in collaboration with Dr. F. G. Brickwedde of the U. S. Bureau of Standards.

Science News Letter, April 30, 1932

BACTERIOLOGY

Years Fail to Change Old Bacterial Cultures

BACTERIA do not wholly deserve the reputation they have been getting lately, of being exceedingly fickle and changeable creatures, never "staying put" for long, under laboratory conditions.

So in brief, said Prof. E. B. Fred of the University of Wisconsin, who spoke before the meeting of the National Academy of Sciences.

Bacteria in the laboratory undergo two types of change, said Prof. Fred. One is the type that has been receiving much attention lately: the kind of rapid evolution that produces a strain or variety of bacteria recognizably different from the culture as it started out but keeping the new characters indefinitely. The other type of change might be termed, with a little poetic license, the production of "slum" bacteria; for in this kind of change the germs suffer degenerative changes from the "unnatural" conditions to which they are subjected on being kept in culture flasks and tubes for long periods.

However, if attention is paid to keeping laboratory conditions right, these degenerative changes need not set in, Prof. Fred declared. He cited the cases of a number of bacterial cultures he had kept in his laboratory for periods as long as twenty years. When the physiological reactions of these "ancient" cultures were compared with those of brand-new cultures of the same species, the old bacteria proved to be indistinguishably similar to the new.

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ASTRONOMY

Planet Discovered in 1930 Was Photographed in 1914

NEARLY sixteen years before the ninth planet, Pluto, was discovered, it was photographed at Harvard College Observatory. Its image has just been found on a photographic plate by Miss Arville D. Walker after Dr. E. C. Bower of the University of California had computed where the planet should have been on the night of November 11, 1914, when the plate was exposed through the 16-inch Metcalf telescope at Cambridge. Pluto was discovered at Lowell Observatory, Ariz., early in 1930.

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