

METALLURGY

# New Method Makes Aluminum Plating on Steel Possible

## Inventor of Chromium Plate Process Now Announces Possible Substitute for Tin in Cans for Food

THE LONG-sought method of applying a non-corrosive coating of aluminum to steel and other ferrous materials appears to have been solved on a commercial scale by Prof. Colin G. Fink, electrochemist of Columbia University.

The new aluminum plate offers advances in such diversified fields as the packaging of foods in cans, building construction, the theater, railroading, and the fabrication of electric toasters and heaters.

Prof. Fink, while holding many basic patents in the field of electrochemistry, is perhaps best known for his process of chromium plating, on which many million dollars have been spent in developing work to bring it to its present state of perfection.

As described in recently issued British patents, Prof. Fink's aluminum plating process for steel or iron consists of inserting the properly pretreated metal into a bath of molten aluminum. Past troubles with coating iron wire or plate with aluminum, explains Prof. Fink's patent, arose in part from the presence of the high surface tension film of aluminum oxide on the top of the molten aluminum metal. The oxide would prevent the aluminum metal from coating the steel or iron surface. By special heat treatment of the steel this difficulty has finally been overcome.

The ductility of the aluminum-plated steel is such that the plated material may be bent or crimped without cracking the plated surface. The aluminum coating may be dyed in a variety of shades with both organic and inorganic dyes. Corrosion tests exposing the plate to various salts and acids show no disintegration of the coating.

Uses foreseen for the aluminum plate indicate a new entrant into the competitive field of non-corrosive coatings for metals and even non-corrosive alloys.

The canning of food, now accomplished by tin plate, should receive a particularly serious challenge from the new product. Aluminum, rather than tin plated cans, will probably be the point where the public will come into

closest contact with the new development. Aluminum, one need only recall, costs only one-seventh as much per cubic foot as does tin.

Another field of exploitation for aluminum plating is that of window and other screening in tropical climates.

Fire-proof curtains for theaters offer still another possible use. While the present-day asbestos curtains afford partial protection, their material will not withstand, without crumbling, the high temperatures that a woven screen of aluminum-plated iron wire will. Heater coils for toasters provide another possibility.

And finally there is perhaps the largest field of all, metal roofing and par-

titions in the construction industry, awaiting the coming of a non-corrosive plating on sheet iron or steel.

Technically the success of the method depends on something else besides inserting the iron or steel below the surface of the molten aluminum bath. The surface of the steel must be treated with hot hydrogen gas prior to the plating stage.

*Science News Letter, November 16, 1935*

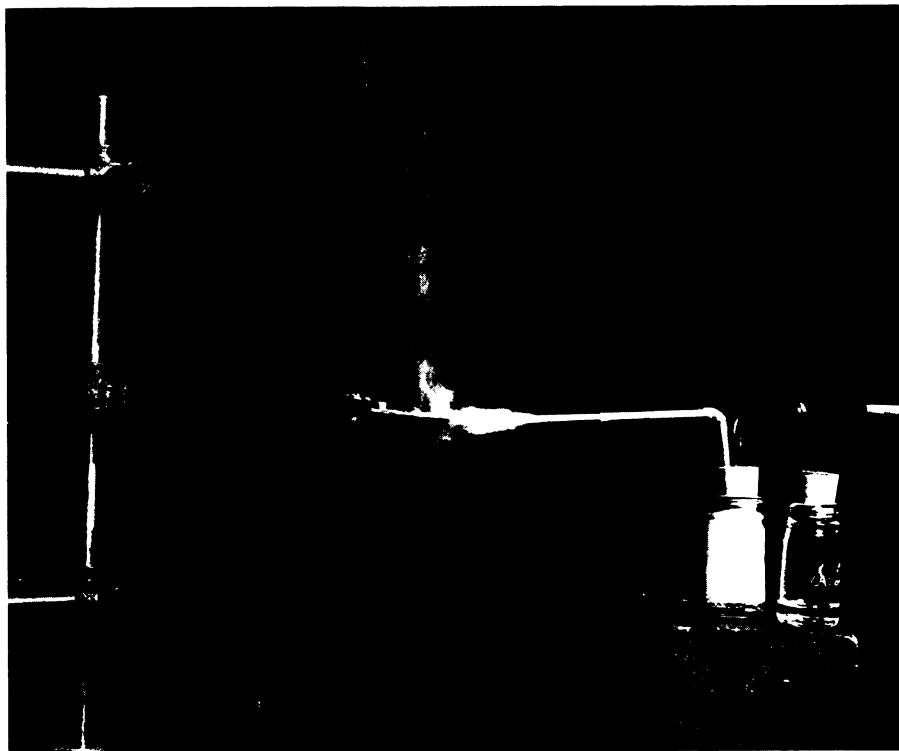
ARCHAEOLOGY

## Find Bowl Used in American Ball Games 800 Years Ago

DISCOVERY of a large oval "bowl" where prehistoric America's exciting games were played 800 years ago is announced by Dr. Harold S. Colton of the Museum of Northern Arizona.

The discovery, pronounced amazing, was made in northern Arizona near Flagstaff, by a joint expedition of the Museum and Arizona State Teachers College of Flagstaff, led by J. C. McGregor.

The find surprises archaeologists, because never before has it been realized that ball games—national sport of



### WORLD'S MOST COSTLY ELECTRIC FAN

Engineers of the Bell Telephone Laboratories recently demonstrated the real, but unseen, vibration of quartz crystals that control the frequency of radio stations, by making one of them serve as an electric fan. Shown above is the exhibit wherein a smoke stream splits into two parts on encountering the flat surface of the quartz crystal. Despite the fact that the vibration is only three 100,000ths of an inch or about the thickness of a layer of air eight atoms deep it moves the air with a velocity of seventeen feet per second.

Mayas, Aztecs, and other Indians of Mexico—were popular over so wide an area of ancient America.

The game court now excavated is an oval bowl about 100 feet long and 45 feet wide, with slightly pointed ends. The sloping sides, Dr. Colton said, must have been seven or eight feet high, and the floor was level. Entrances were in the north and south walls, and a goal made of four rocks in the floor was at the south end. The plan resembles ball courts used in prehistoric Mexico.

Still uncertain as to what kind of game the northern Arizona Indians play-

ed in their elaborate bowl centuries ago, the Museum-College expedition is excavating another game court located east of Flagstaff.

A well-known Indian ruin in this region, long believed to be an ancient reservoir, is now recognized as another of the courts. In southern Arizona, last winter, an expedition first discovered that the Mexican-type ball courts spread north into what is now the United States.

"That the courts should be found as far north as Flagstaff," said Dr. Colton, "is indeed striking."

*Science News Letter, November 16, 1935*

#### PHYSIOLOGY

## Sex Gland Cancer Produces Female Hormone in Male Body

**EVIDENCE** that male human beings under certain conditions will produce large amounts of a hormone identical with that occurring in the body fluids of women during pregnancy was presented to the American College of Surgeons by Dr. Herbert M. Evans, Professor of Biology at the University of California.

Dr. Evans stated that with the collaboration of Dr. Miriam E. Simpson he has been able to demonstrate that when the male sex glands are invaded by tumor, a hormone is produced which reacts exactly the same on other animals as "prolan," the hormone produced in women during the development of the embryo. In other words, the rapidly proliferating tumor cells lead to the same result as the proliferating cells of a fetus, although one occurs in the male and the other in the female.

This determination, it was pointed out, indicates the necessity for extreme care in measuring the strength of hormone dosage. When experiments on the hormone from males with tumor of the gonad were first started it was believed that this substance was far stronger in its effects than "prolan" from pregnant women. The conclusion was that it compared in strength of effect with the sex-stimulating hormone from the anterior lobe of the pituitary gland or the hormone from pregnant mares.

#### Checked Measurements

However, suspicions were later aroused as to the accuracy of the unit measurements commonly used in hormone administration. Careful checks were made and these revealed that when care was taken to equate the unitage of

"prolan" and the hormone from males with tumor of the gonad, the effects were identical. With the cooperation of Drs. Horlein, Schulemann and Laqueur of the chemical laboratories of the Interessen Gemeinschaft at Elberfeld, Germany, it was shown that both hormones led to the same stimulation of the ovaries in immature rats. It was found that when immature female rats were given between 5,000 and 20,000 units of either hormone, ovaries weighing 200 or more milligrams were produced.

#### Tried on Pigeons

A recheck of the comparative effects of the two hormones on pigeons indicated that in this case also when the true unit value of "prolan" was determined it yielded the same gonad stimulation as the newly-obtained hormone from men suffering from the disease, *teratoma testis*. The effect of the two hormones is also the same when given to rats lacking the pituitary, both male and female.

In conclusion Dr. Evans said, "Ovarian weights will increase fairly rapidly following injections of the pregnancy hormone prolan in doses of 50 to 100 times the minimum rat unit. Very slight increases occur as the dose is increased up to 5,000 rat units. But when the dose is raised to 10,000 or 20,000 units, the ovaries increase to giant size, comparable to that achieved by administration of the male tumor hormone or ordinary doses of extracts from sheep pituitary glands. In every case the male tumor hormone shows its close relationship to the female pregnancy hormone prolan."

*Science News Letter, November 16, 1935*

#### GEOLOGY

## Movie Compresses Millions Of Years Into Minutes

**M**ILLIONS of years are compressed into minutes of viewing time, in a series of remarkable new scientific motion pictures that have just had their première showing in Washington, D. C. They portray, by a well-thought-out combination of pictures taken out of doors and moving animated diagrams, a number of phases of the geologic processes that have made, and are still making, the earth we live on. A running fire of explanation is "talked on" to the film, so that it delivers its own well-synchronized lecture.

Although these pictures were designed primarily for use in college geology classes, the way the first general audience who saw them "ate them up" indicated that they will find wide use elsewhere. It is already planned to show them in the C.C.C. camps.

It is appropriate that the men of the C.C.C. should be among the first to see them, since some of them had a considerable part in the production. The pictures are the products of collaborative effort on the part of the U. S. National Park Service, the University of Chicago, and Erpi Picture Consultants. The Service provided the actual geology, the University developed the script, and Erpi supervised the work of the corps of C.C.C. men who made the animation drawings and developed the films.

#### Incessant Change

The films show dramatically and vividly the incessant change that is the real secret of the seemingly unchanging ocean, the transitoriness of the "everlasting hills." The phenomena range from the swishing fall of the rain and the incessant gnawing tooth of erosion to the slow, mighty creep of glaciers and the slower but even mightier creep of the earth's crust to form mountain ranges. Waterfalls thunder, geysers roar, volcanoes rage.

What will impress the observer most, probably, is the manifold activities of water. These films bring home anew the often-emphasized fact that the "universal solvent" long sought by the ancients is really to be found in the common water they disregarded in their search. Water is shown cutting down the earth banks of streams, wearing away the solid granite of mountains. Water insinuates itself into limestone strata and opens up tremendous awesome caverns.

Water forms wedges of ice that split