

PHYSICS

3,000 Degree Temperature In Spinning Electric Furnace

New High For Commercial Type Furnace Obtained When Rotation Throws Melting Thoria Against Outer Walls

THREE thousand degrees Centigrade, a new high for temperatures attained by electric heating furnaces of the commercial type, was obtained in a new type rotating furnace reported to the meeting of the Electrochemical Society by Henri George, director of the Electrothermal Laboratory in Paris, France. Prof. Colin Fink, electrochemist of Columbia University, read the report.

M. George's reported high temperature was considered so important to the electrochemists that discussion of the paper lasted more than a half hour.

With the new type rotating furnace it is possible, said the report, to fuse large batches of such oxides as thoria at 3,000 degrees Centigrade, despite the fact that the refractory walls of the furnace ordinarily melt when a temperature of but 1,800 degrees Centigrade is reached.

By rotating the furnace at high speed the thoria powder is thrown up against the outer walls of the furnace and held there by centrifugal force; thus making, in effect, an inner furnace lining of the high-melting point thoria.

Graphite resistors, used for the heating elements in the furnace, are capable of carrying currents up to 500 amperes per square centimeter. They are 3.5 centimeters in diameter.

"The furnaces," reported M. George, "might be compared to a tungsten incandescent lamp, the graphite resistor corresponding to the lamp filament. The furnaces attain the high temperatures in a very short time and carry out metallurgical reactions rapidly and at high efficiency."

The graphite resistor occupies the axis of the furnace, is fixed at one end and makes electrical contact at the other end by a special spring. The furnace shell rotates about the central heating element.

Technical criticism of the paper was comparatively one-sided in the absence of the author, turning mainly on the "life" of the graphite resistor at temperatures of 3,000 degrees centigrade, and also on what means M. George

used to determine his claimed 3,000 degrees temperature.

While specific criticism will be delivered and answered by correspondence, disinterested observers saw a partial answer as to the workability of the rotating furnaces in pictures of commercial installations with capacities up to 200 kilograms.

Science News Letter, November 9, 1935

MEDICINE

Head Hurts More Dangerous At Age of Forty and Over

THE DANGEROUS forties hold a peril unsuspected by most persons in those years, it appears from a report of Dr. George W. Swift of Seattle.

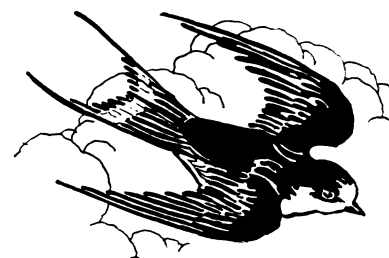
The danger Dr. Swift pictured is that following injuries to brain and spinal cord. Persons forty years of age or older are less likely to recover from such injuries than those in the younger age groups, Dr. Swift found from study of mortality figures.

Advances in surgical practice have reduced the mortality following external head injuries from 60 per cent. to 20 per cent. in ten years, Dr. Swift said. He cited cases from King County Hospital, Seattle, showing that the mortality from head injuries was less than 10 per cent. for those under 15 years, about 13 per cent. for those from 16 to 40 years, and more than 24 per cent. for those from 40 to 60 years. The mortality is also high for persons over 60 years but this, Dr. Swift pointed out, is due to the general condition of the body at these ages rather than to the specific injury.

Each year about 125,000 injuries involving the head and spine occur in the United States. The number is increasing year by year because of the increased speed of transportation and mass production in industry.

In treating head injuries of men and women over 40 years, Dr. Swift urged physicians to pay especial attention to regulation of the pressure of the fluid in the brain and spinal cord.

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Daylight and Breeding Cycles

BIRDS flying southward, mating activities of some animals, blossoming of late fall flowers like gentians and wild asters, are all governed by one master factor—the days have grown shorter. They are all tied up with a common physiological condition, too—change in their respective cycles of reproductive activity.

The physiological importance of changes in length of day has been closely studied by Prof. T. H. Bissonnette, head of the zoology department of Trinity College, Hartford, Conn.

Modern realization of the importance of changing length of day, or "photo-periodism," was reached first through studies on plants, by Drs. W. W. Garner and H. A. Allard of the U. S. Department of Agriculture. They found that some plants could be stimulated to produce flowers and fruit by artificially lengthening the daylight period with electric light, while an artificial shortening of the day had the same effect on others. "Long-day" plants are typical spring flowers, "short-day" plants are fall flowers.

That shortening days stimulate birds to fly southward was first noted by a Canadian scientist, Prof. W. Rowan of the University of Alberta, who also noted changes in their sex glands that occurred at the same time. He became convinced, however, that these sex changes are due to increased exercise rather than direct response to change in daylight.

Prof. Bissonnette, who took up similar studies at about the same time and independently of Prof. Rowan, has become equally convinced that sex changes in many birds, and in some mammals as well, are directly due to the daylight changes. He has conducted his researches

largely on starlings and ferrets, experimenting with the latter animals in England as well as in this country.

Not merely the length of exposure to light, but other factors as well, have to do with bird migration and other sex-controlled changes in bird and mammal behavior, Prof. Bissonnette concludes, on the basis of his own and other scientists' researches. The intensity of light is one factor: changes occurred more rapidly under bright electric light than under dim illumination of equal duration. Color is another factor: red stimulates sex-gland development, green retards it, at least in starlings. With ferrets, all visible light is about equally effective. Food is a third: starlings kept

on a strict lenten diet of bran mash developed no interest in mating, though light conditions were made favorable.

Experiments both in England and in America indicate that the light factor becomes effective through the hypophysis, a sex-controlling gland situated just under the brain. The hypophysis is stimulated by light falling on the animal's eye. Blind animals, and animals kept with hooded eyes, are not affected by day-length changes, while "control" specimens with normal vision go through the changes in sex activity in regular predictable fashion, in relation to seasonal variations of lighting.

Science News Letter, November 9, 1935

PUBLIC HEALTH

Nation-Wide Grading Of Milk Urged to Prevent Epidemics

A NATION-WIDE uniform system of grading all milk produced in the country so that consumers would know the quality of the milk they were using, whether at home or traveling, was urged by Leslie C. Frank, sanitary engineer of the U. S. Public Health Service, at the American Public Health Association meeting.

Such a system would be of advantage to both consumer and producer, Mr. Frank pointed out.

There are in this country each year at least 30 to 50 outbreaks of disease resulting from infected milk, Mr. Frank said. Most people who use milk know that not all milk supplies are safe, but they have no way of distinguishing a safe from an unsafe supply.

Milk producers would benefit also from the plan Mr. Frank presented. The problem of the producers is one of over-production, or of production of more milk in certain areas than can be profitably sold. Price-fixing efforts have failed and curtailing production would be unwise, in Mr. Frank's opinion.

From the public health viewpoint, not enough milk is being used in the country as it is.

"The only logical solution of both problems is that consumers and industry members coordinate their efforts in a unified nation-wide program to increase milk consumption to the optimum," Mr. Frank declared. "This can be done best by increasing the desirability and safety of milk.

"The voluntary local adoption and strict enforcement of the uniform Pub-

lic Health Service Milk Ordinance, with the rating of all communities periodically by the State authorities, and with occasional check ratings by the Public Health Service, is offered as the form which the coordinated effort should take. Thus America will not only have safeguarded its most important food-stuff, but will also have promoted the economic welfare of the industry which produces and distributes it."

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OCEANOGRAPHY

From the Top Down

● "So far as climbing is concerned, the mountains on the ocean are just the opposite of those on land. Our mountain climbers on the land start out at the foot of the mountain . . . But when a man wishes to explore an ocean mountain he starts at the summit and tries to walk down its sides; for the summit is usually an island like Bermuda."—W. Maxwell Reed and Wilfred S. Bronson (*Harcourt, Brace & Co.*).

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Honey bees are about fifty times as valuable for their work of cross-pollination in orchards and fields as they are for the honey they make.

Making a bonfire of autumn leaves is often short-sighted, warns a Cornell agriculturist, for decayed leaves form humus and humus helps soils to hold more of the water they need.

MARINE BIOLOGY

Starfish Are Dyed Blue To Trace Wanderings

B LUE starfish are staring startled oystermen in the face, along the Long Island Sound oyster beds. The orthodox color for starfish in those waters is pink.

The oystermen, however, are being told what it is all about. (*Fisheries Service Bulletin*, Sept. 3). The starfish have been dyed blue for the same reason that migrating birds have aluminum bands fastened about their legs by scientists: to tell where they came from, and how far they have traveled.

Starfish, as is well known, are among the worst enemies oysters have. They fold themselves over the oysters' shells, smother them until they open up, and then devour them. Starfish devastate oyster beds by the square mile in this way.

During the recent session of Congress, funds for the scientific investigation of starfish and other enemies of oysters were appropriated, and research begun at several points. One of the things Victor Loosanoff, Bureau biologist, wanted to learn was the rate of starfish travel—for starfish can move, despite their not-very-motile appearance.

Hard to Tag

But it proved impossible to fasten the customary types of tags or bands on them. They could wriggle out of any kind of knot, and if a tag were stapled right through an arm the starfish calmly shed the arm and grew another. Starfish can do that kind of thing pretty easily.

But a starfish cannot get outside its own hide so easily, so the scheme was finally hit upon of dyeing them a conspicuous color and then turning them loose in thousands. Nile blue, a powerful anilin dye, proved well adapted for the purpose. One ounce of the dry powder provides enough solution to stain more than 25,000 starfish blue.

The process is very simple. The captured stars are dumped into the dye-vat for about a minute, held on deck for an hour, and pushed back into the sea. It costs far less, in both money and time, than any other method of "tagging" living specimens.

Oystermen and all other persons finding blue starfish are requested to write to the U. S. Bureau of Fisheries Laboratory at Milford, Conn., stating the exact location, depth of water and time of capture.

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