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.

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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.

Science News Letter, November 9, 1935

PHYSIOLOGY

NATURE RAMBLINGS by Frank Thone

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 "photoperiodism," 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