PHYSICS

Device Tells Temperature Of Objects at a Distance

Jug of Melting Ice and Five-Gallon Can of Live Steam Used As Comparison Objects in Operation of New Pyrometer

A NEW kind of remote acting thermometer, that can measure the temperature of distant objects without ever going near them, has been developed by Dr. John Strong, physicist of California Institute of Technology.

The new device is a pyrometer. This name is a misnomer, in part, for ordinary pyrometers are commonly used only for measurements of temperatures of extremely hot objects such as the molten metal of an open hearth furnace in a steel mill.

As a metal gets hotter and hotter, it turns to dull red, bright red and finally virtually white in color. An ordinary pyrometer uses this change of radiation wavelength (for that is what the different colors mean) to determine temperature.

Dr. Strong's new instrument simply applies this same trick for invisible radiation wavelengths in the very far infra-red region of the spectrum. His pyrometer is useful in the temperature range from minus 100 degrees Centigrade to the temperature of boiling water, with an accuracy of 0.1 degree Centigrade.

To measure temperatures with the new pyrometer a small telescope attached to the device is pointed into the wide-mouthed neck of a jug of melting, cracked ice. This gives a reading on the scale of the instrument corresponding to a temperature of zero degrees Centigrade.

Next the telescope is pointed at an opening in an ordinary five gallon oil can containing live steam. The reading on the instrument is noted for this known temperature of 100 degrees Centigrade. Finally the object, whose temperature is to be measured, is picked up in the telescope and it produces a given reading on the instrument.

Knowing the two fixed temperature point readings (melting ice and steam at 100 degrees) one needs only to look on a conversion chart at the point observed by the instrument for the given object and its temperature can be read off.

In principle the new pyrometer is an infra-red spectrometer which—by means of a grating and multiple reflections off suitable crystal surfaces—picks out the single infra-red radiation wavelength of 8.8 mu. (1,000 mu corresponds to wavelengths one millimeter long). The emission of this particular wavelength in the infra-red region by the ice, the steam and the object whose temperature is being measured, is used and correlated into a final temperature reading.

Important applications await the new instrument. It can be applied for temperature measurements on objects that are inaccessible for ordinary thermometer devices.

It can be used, too, in meteorology to make determinations of the water vapor content of the atmosphere. In astronomical and terrestrial physics new uses are being studied.

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PSYCHIATRY

Brain Operations Found to Aid Some Hopeless Mental Patients

NEW types of brain operations, in which parts of the brain's frontal lobes are removed, are causing astounding recoveries of cheerfulness and ability to cope with the problems of everyday living for some types of mental patients, Dr. J. F. Fulton of the Yale University School of Medicine told the Sigma Xi chapter of the Mayo Clinic.

Speaking on the functions of the brain's frontal lobes, Dr. Fulton said that the new surgical methods are being studied clinically and compared with the results secured by the severe "shocks" now given to some mental patients to lift them out of their mental state. Insulin and the drug metrazol have been tried for such shock treatment of the insane.

Dr. Fulton did not discuss the astounding change in personality for some patients following such operations, but one of the most amazing on record is the case of an unsuccessful stock broker who became a millionaire in a short while following the removal of a portion of the frontal part of his brain, where a tumor was present.

The ex-stock broker became a salesman and his success was so phenomenal that in a few weeks his company had to enlarge its plant to take care of his orders. Soon he was made a vice-president and is now in the millionaire class.

Such brain operations are made only as a last resort to save a patient's life or mentality.

From studies on animals and man, Dr. Fulton said in his address, scientists are now making great progress in what may be called the geography of the brain; a knowledge of what regions control what functions.

Just as the young of animals, including men, tend to repeat the whole forward cycle of their evolutionary background, it has now been found that the neurological processes of young animals also tend to exhibit throwbacks to their evolutionary ancestors.

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When the 1930 census was taken, the United States had 93 cities of more than 100,000 population.