

an earnest of still further progress in the future.

### More Research Needed

The effectiveness of such progress, however, would demand increasingly extensive and intensive research in human genetics and in the numerous fields of investigation correlated therewith. This would involve the cooperation of specialists in various branches of medicine, psychology, chemistry and, not least, the social sciences, with the improvement of the inner constitution of man himself as their central theme. The organization of the human body is marvellously intricate and the study of its genetics is beset with special difficulties which require the prosecution of research in this field to be on a much vaster scale, as well as

more exact and analytical, than hitherto contemplated. This can, however, come about when men's minds are turned from war and hate and the struggle for the elementary means of subsistence to larger aims, pursued in common.

The day when economic reconstruction will reach the stage where such human forces will be released is not yet, but it is the task of this generation to prepare for it, and all steps along the way will represent a gain, not only for the possibilities of the ultimate genetic improvement of man, to a degree seldom dreamed of hitherto, but at the same time, more directly, for human mastery over those more immediate evils which are so threatening our modern civilization.

*Science News Letter, August 26, 1939*



### FOR PROTECTION

*This spool, made of porcelain wound with copper wire and coated with zinc oxide, was developed by Westinghouse to protect transformers against electrical failures.*

### PHYSICS

## Only Radiation From Sunspots Causes Ionization of F<sub>2</sub> Layer

### Only in the Center of the Solar Disturbances Is The Temperature High Enough To Produce Effects

THE IONIZATION produced in F<sub>2</sub> reflecting layer, 150 miles and more above the surface of the earth, is caused by intense radiation that comes from the regions around sunspots, Dr. Fred L. Mohler of the National Bureau of Standards suggests. (*Science*, Aug. 11)

By studying the reflections of short-wave radio signals reflected off the F<sub>2</sub> layer and correlating them with sunspot numbers, very good agreement has been found, Dr. Mohler explains.

Dr. Mohler has been seeking an explanation for this correlation and believes he has found it in studies of the wavelength of the light rays emitted by the sun's flaming surface. The rays from the

disk of the sun as a whole, intense though they are, do not have enough energy (are not of short enough wavelength) to produce the amount of ionization found in the F<sub>2</sub> layer.

Only in the center of the sunspots, or flocculi with which they are associated, is the solar temperature high enough to produce radiation sufficient to give the observed effects. While the normal temperature of the sun's disk is 6,000 degrees absolute, only one per cent of the whole disk needs to have a temperature of 7,500 degrees to account for the close correlation of sunspot activity and ionization in the F<sub>2</sub> layer.

*Science News Letter, August 26, 1939*

### ENGINEERING

## "Spool" Spots Hydrochloric Gas in Huge Transformers

A SMALL spool made of porcelain, copper wire and common zinc oxide is the newest guardian for huge power transformers invented by a 26-

year-old chemist at the laboratories of the Westinghouse Electric and Manufacturing Company.

Emerson Venable is the young scien-

tist who has developed this new detector for corrosive, hydrochloric acid.

This acid is created when the newest type of transformers develop short circuits. These transformers no longer contain oil, as formerly, but now owe their insulation properties to a non-inflammable liquid known as inerteen. When an electric arc burns in inerteen, as in a short circuit, hydrochloric gas forms.

The new advance of Chemist Venable is a spool of porcelain on which are wound two copper wires carrying current and separated from one another by zinc oxide which provides electrical insulation. Zinc oxide, Chemist Venable has found, is especially susceptible to the fumes of hydrochloric acid.

As the acid attacks the zinc oxide its insulation properties quickly disappear and current "shorts" across the copper wires at this spot. This intentional short circuit trips a relay and throws off the huge current in the transformer.

Previous best protection for transformers was the use of a small diaphragm which broke when hydrochloric gas was created and built up ten pounds of pressure. The new device will detect as little as one ten-thousandth of a pound of hydrochloric acid.

Dr. Charles F. Hill, Westinghouse division manager on insulation, and J. C. Ford, section engineer, suggested the problem which has now been solved.

*Science News Letter, August 26, 1939*