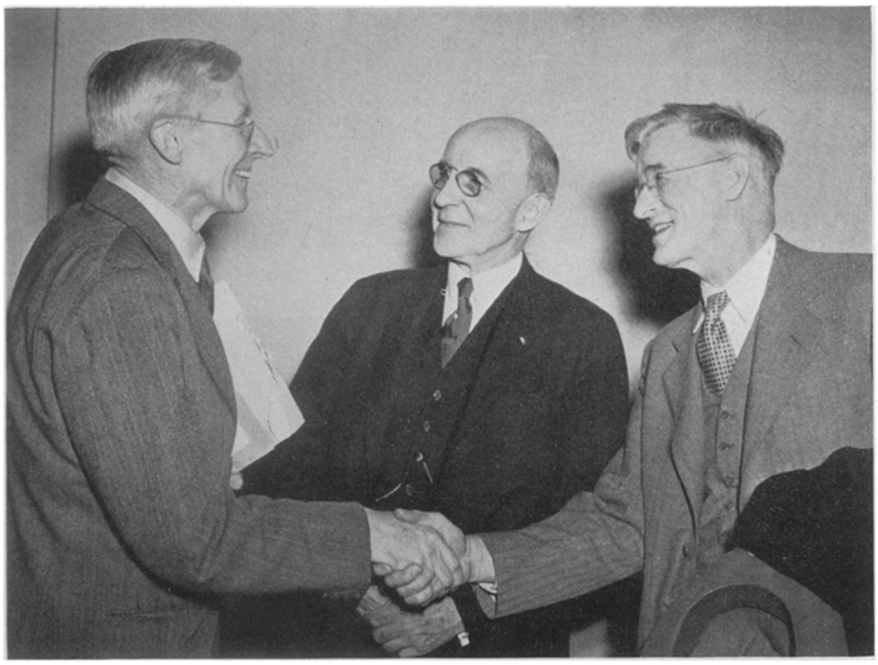

FROM ENGLAND—Dr. Edgar Douglas Adrian (left), British Nobelist in physiology and fellow of Trinity College, Cambridge, is greeted by Dr. Frank B. Jewett (center), president of the National Academy of Sciences, and Dr. Vannevar Bush (right), director of the Office of Scientific Research and Development, after delivering at the U. S. National Museum in Washington the second Pilgrim Trust Lecture before the National Academy of Sciences. Photograph by Fremont Davis, Science Service staff photographer.

PHYSIOLOGY

Brain Pictures

Electrical impulses from living human tissue will enable scientists of the future to probe human thought, British Nobelist predicts.

➤ ELECTRICAL impulses from the living human brain will be able to give scientists of the future a method of telling what a person is thinking about whether he wants to tell them or not, Dr. Edgar Douglas Adrian, British Nobelist in physiology and fellow of Trinity College, Cambridge, predicted in delivering the second Pilgrim Trust Lecture before the National Academy of Sciences in Washington.

The electrical pictures of practical thought will be possible only after "the young men come back from war and start doing research again," Dr. Adrian explained.

Not at all a matter of thought transference or any such thing, the brain physiological research of the post-war era has already had its path blazed for it by research that began as early as that which the British physiologist Sir Charles Sherrington reported in American lectures in 1905.

Even now, by tapping the electrical impulses in the brain, it is known that the nerve cells work simultaneously with the flickering of light seen by the eyes. The observer can tell how the brain pictures are developing because the electrical charges are widespread and not confined to any one area such as that which would be expected to be controlled by the eyes alone. By analyzing these general patterns of electrical brain waves it is even now possible to explore the vague borderlines of just what is happening in the brain.

Perhaps the brain research of the future, Dr. Adrian suggested, will give us a complete mechanical scheme of brain action, without recourse to something uncertain and indeterminate to explain what happens.

By applying radio amplifier methods to tune in on the electric impulses that are generated by brain activity, the so-called brain waves, Dr. Adrian was able to measure the current in single nerve fibers. He was the first scientist to do so and for this work shared the 1932 Nobel Prize in medicine and physiology with Sir Charles Sherrington.

Scientists can already tell "quite reasonably well" what sort of pictures are formed in the receiving area of the brain when we see things. How these pictures are analyzed or recognized is not known. At present there are only one or two ways of finding out about this in the conscious brain. One of these is the electro-encephalogram or brain wave record. The other makes use of the flickering light.

Dr. Adrian said this gives "an interesting suggestion of the borderland area between the region where the visual message is received and the rest of the brain, but I wouldn't like to say it tells exactly what goes on in that area."

It does tell that the messages from the eye apparently spread out over a pretty large area of the brain. This area can be mapped out to a large extent. It is much larger than the primary receiving area, so presumably the visual picture is analyzed by a pretty large brain area.

For mapping this area, the person whose brain mechanism is under study looks at a flickering light on a screen while records are made of his brain waves, that is of the electrical changes in his brain as he watches the light. The light flickers at a rate of from 10 to 20 flickers per second.

The electrical changes picked up by electrodes inserted in the back of the head have the same rhythm as the light flicker on the screen. By moving the electrodes to different parts of his head to pick up electrical activity from different parts of the brain, the scientists can tell by the change in rhythm from that of the light flicker which parts of the brain are working on the eye message of the flickering light.

Repeated noise does not produce such effects as measured by any of the methods used.

Some rather different physical method of probing brain activity will be needed in the future, Dr. Adrian said, but he feels it will be developed fairly soon when the old and new generations of scientists are working together again

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