

## PHYSIOLOGY

**Physical Instrument  
Used to Study Heart**

ONE of the newer physical instruments has been put to use in the study of the human heart. The oscillograph has been adapted to this use by Dr. William D. Reid of the Evans Memorial of Massachusetts Memorial Hospitals and Prof. Samuel H. Caldwell of Massachusetts Institute of Technology.

At present, physicians are using an instrument known as the string galvanometer for making records of heart beats. This probably will be replaced by the oscillograph apparatus which Dr. Reid described. However, he pointed out that for the present physicians must continue to use the older instrument, while records and standards are being obtained for the new one.

The new instrument gives a more complete and detailed picture of the condition of the heart, it appeared from Dr. Reid's description of it and report of its use. The oscillograph is not so sensitive as the string galvanometer but works at much higher frequencies.

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## PLANT PHYSIOLOGY

**Plants Might Speed Growth  
With More Carbon Dioxide**

WHEAT plants are steady workers, but they could produce a lot more if they had enough essential raw material to match the available sunlight energy.

Studies at the Smithsonian Institution have shown that wheat plants start up gradually in the morning, reach their maximum efficiency as manufacturers of plant material early in the day, and keep steadily at this rate until evening twilight. They do not make carbohydrates any faster when the sun is at full noon-day blaze than they do early in the morning or late in the afternoon.

This, the Smithsonian scientists state, is because of the limited amount of carbon dioxide in the air. Green plants use this gas, present in the air in the proportion of about 350 parts in a million, in the manufacture of carbohydrates, capturing the energy of sunlight to do the work. Wheat plants get enough sunlight energy to use up all available carbon dioxide by the time the light has reached one-fourth of its average daylight intensity, so that all added light

energy after that is forced into the discard.

The Smithsonian researchers point out, however, that there is no knowing how much of the added carbohydrates that might be produced by the wheat plant if it had more carbon dioxide would go into useful grain, and how much into leaves and stalks of relatively little value. They also say that the figures for wheat do not necessarily hold for any other plant; each species must have its efficiency determined separately.

The scientific team that has made the investigations consists of W. H. Hoover, Earl S. Johnston and F. S. Brackett of the Smithsonian Institution staff.

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## PHYSICS

**Billion Volt Cosmic Ray  
Bursts Photographed**

THE MOST concentrated blasts of energy ever seen, cosmic rays totaling billions of volts, have been observed at Cavendish Laboratory, Cambridge, England. This is the exciting news brought to Pasadena scientists by Prof. R. H. Fowler, British physicist.

Dr. P. M. S. Blackett at Cambridge has obtained a number of photographs showing large groups of cosmic ray tracks radiating from a piece of lead at the same instant. Sometimes there are as many as thirty tracks in a group. The energy in each track is generally above one hundred million volts, so that the total energy is up in the billions. These bursts are therefore the most concentrated blasts of energy ever seen.

It was Prof. G. Hoffmann of the Physical Institute of the University of Halle, Germany, who first observed the bursts a few years ago. Dr. Carl D. Anderson of the California Institute of Technology has also photographed them.

Dr. Victor Neher of the California Institute of Technology on his recent trip to Peru got many important observations of them with his electroscope. In some cases he found that about a hundred million ions were suddenly formed. This is much more than the Cambridge photographs show, probably because the heavy positive particles which do most of the ionizing are absorbed before they ever get out of the lead in which the burst occurs. If there is no lead around the bursts apparently do not happen.

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## MEDICINE

**Sex Hormones Related to  
Cancer-Causing Substance**

TWO OF THE most potent known cancer-producing substances have the ability of hormones to awaken sexual desire, Dr. J. W. Cook of the Cancer Hospital and Prof. E. C. Dodds of the Courtauld Institute of Biochemistry, London, have discovered.

The discovery was the result of finding the similarity in chemical composition between the sex hormones and the cancer-producing substances known to chemists as 1:2-benzopyrene and 5:6-cyclopenteno-1:2-benzanthracene. These two substances are capable of producing cancer in mice when repeatedly applied to the skin.

Although the cell growth and multiplication which characterize the state of sex activity are in some respects reminiscent of cancerous growth, there is no evidence at present that cancer-producing substances arise in the human body from the sex-hormones, state Dr. Cook and Prof. Dodds in a letter to the scientific journal, *Nature*.

Experiments are in progress to find whether the known sex-hormones can produce experimental cancer in animals.

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## CHEMISTRY

**Two New Kinds of Mercury  
Discovered by Briton**

TWO NEW isotopes of the element mercury have been discovered by Prof. F. W. Aston of Cavendish Laboratory, Cambridge, England. They have atomic weights 197 and 203. The detection was made through the obtaining of mass-spectra of mercury on new, very sensitive photographic plates. Isotopes 197 and 203 are estimated to be present only to the extent of one hundredth of one per cent. and six thousandths of one per cent., respectively. The mean atomic weight used by chemists is therefore affected only negligibly.

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# OUR FIELDS

## ARCHAEOLOGY

### Stone Age Tools Mostly "Left-Handed"

**S**ENDING the greenhorn out to borrow a left-handed monkey-wrench, an ancient practical joke that still finds its victims, would have been no joke at all in the Old Stone Age, if the contention of Richard Kobler, German archaeologist, really holds good.

Stone Age men did not have monkey wrenches, it is true, but they had plenty of other tools, and most of them, Herr Kobler declares, can be used effectively only when held in the left hand. Because of this, he believes that these ancient ancestors of ours were predominantly left-handed.

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## ANTHROPOLOGY

### Eoanthropus More Human Than Neanderthal Man

**E**OANTHROPUS, the Dawn Man of Piltdown, England, of all human or near-human fossils the most knocked-about in anthropological dispute, has been given a new shove—this time upstairs. Dr. Hans Weinert, anthropologist at the Kaiser Wilhelm Institute, has examined the original specimens in England, and is convinced that Eoanthropus is more human than he has been given credit for being—more human, indeed, than Neanderthal Man—and that he is probably not as old as he has been considered by earlier investigators, who based their estimates largely on other animal bones found with his remains.

Dr. Weinert's argument turns to a considerable extent on the Dawn Man's teeth and lower jaw, which were found separately from the fragments of the upper skull. These have hitherto been considered to be quite definitely apelike, contrasting strongly with the massive, but just as definitely human cranium. So great has this contrast appeared to earlier workers that some of them would not believe that jaw and cranium belonged to the same being, but held that the skull was a man's, the

jaw an ape's. But the German investigator finds that the teeth are human after all, and is of the opinion that the jaw and skull do belong together.

Now, Dr. Weinert states, the English scientists agree with him in regarding the animal remains as older than the human fossils, so that the great antiquity heretofore assigned to Eoanthropus is at least open to question.

As for the apelikeness of the jaw teeth, he says, "the lower jaw is not so pronouncedly anthropoid as has been assumed; the teeth are human; what appears apelike about them can be found in other human teeth as well. And he adds, "If my work finds acceptance, then Eoanthropus is no 'Anthropus' and no ape, but a 'Homo' (man), indeed more 'Homo'—and therefore more truly human—than the Neanderthaler."

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## PHYSICS

### Slow Neutrons Smash Atoms With Release of Energy

**A**TOMS can be smashed by relatively slow-moving neutrons, Dr. W. D. Harkins and his associates, Dr. David M. Gans and Henry W. Newson, of the University of Chicago, have discovered.

Powdered beryllium metal was mixed with radiothorium which gave off alpha particles or helium hearts. These smashed into the beryllium and produced neutrons, the atomic building block that was experimentally demonstrated last year. The neutrons went off into the air and one of them smashed a nitrogen atom just as a photograph was being taken.

Dr. Harkins has figured out that the neutron had an energy of only 1,800,000 electron volts, which is smaller than any energies found in previous experiments. The nitrogen atom and the neutron combined to produce a boron atom and a helium atom, letting loose energy that corresponded to 15 ten-thousandths of a unit of mass. This is about a fourth of the excess mass of the neutron that can be converted into energy.

Such releases of energy from the conversion of the mass of matter into radiation give the scientists hope of some day tapping the internal energy of matter.

Dr. Harkins' report was made to the *Physical Review*.

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## PHYSICS

### New Kampometer Measures Heat Most Sensitively

**B**ELIEVED to be the most sensitive heat measurer known, the kampometer was introduced to the scientific world by its inventor, Dr. C. G. Abbot, secretary of the Smithsonian Institution.

It is a new instrument of extreme sensitiveness for measuring radiation and it is expected to aid scientists in determining the amount of heat from the sun, from distant stars, from planets and from feeble sources of heat on earth.

The kampometer's sensitivity promises to exceed the thermopile, the bolometer, and the radiometer, from which it differs in principle. It utilizes with great refinement the unequal expansion with heat of two metals, which allows the household thermostat to operate, and it applies magnetic fields to give control and sensibility to the mechanism.

The total weight of the suspended portion of the kampometer, including mirror, glass rods and bimetallic curls, is approximately four milligrams. Dr. Abbot is now constructing a new and refined instrument that he expects will be at least a thousand times more sensitive than the first model.

Because he observed that a galvanometer he was using 25 years ago deflected when sunlight fell upon it, due to being twisted slightly by the warmth, Dr. Abbot was led to construct the kampometer last summer at Mt. Wilson Observatory when he needed a more sensitive heat measurer. Dr. Abbot has not patented the kampometer and he has invited all scientists to feel free to use and improve on it. Its details are described in a special pamphlet of the Smithsonian Institution.

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## MEDICINE

### Fish Liver Becomes New Anemia Treatment

**F**ISH LIVERS have a new use—as treatment for pernicious anemia. This is announced by Prof. L. S. P. Davidson, of the University of Aberdeen, in a report to the *British Medical Journal*.

Prof. Davidson found that an extract from livers of cod, haddock, and whiting is effective in treating pernicious anemia. Beef liver is now widely used for this purpose.

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