

Do You Know?

In what is called cold cathode *fluorescent lighting*, the lamp has a similar appearance to other fluorescent lighting but the cathode operates relatively cool and no pre-heating is required; when the switch is pressed it lights immediately.

The wily *crow* will abandon a tree formerly used as a roost if he detects any changes made in the vicinity of the roost; he is quick to detect such things as a dynamite bomb installed to destroy him and his flock.

The so-called "*Boston Stone*," recently rededicated in Massachusetts, is a stone two-barrel trough brought from England late in the 17th century and used for grinding oil and pigments for paint by means of large stone ball.

Wheat was practically the only raw material available in large quantities during the war for the production of alcohol, an essential for making munitions and synthetic rubber; corn and molasses, normal sources of industrial alcohol, were scarce.



Measure Current Precisely With K-2 Potentiometer

Scientists at Institute for Atomic Research, Iowa State College, Ames, Iowa, chose this K-2 potentiometer for its precision and facility of use. They determine current in the magnetic coil of a Beta-Ray Spectrometer by measuring voltage across a standard 0.01 ohm shunt.

Catalog EH22(1), free on request, describes Type K Potentiometers.



Jr. Ad E-51-241 (1b)

energy probably comes from ionized particles in outer space.

Scientists now believe that the energy comes from protons, positively charged particles which are part of the core of atoms, and negatively charged particles, electrons, in outer space. Radio frequency energy is sent out to earth when an elec-

tron, which has been attracted by a proton until it circles around and around the tiny particle as a comet circles around the sun, finally manages to pull away. When this happens, energy of radio wave frequency is released. This process is called free-free electron transition.

Science News Letter, September 4, 1948

ASTRONOMY

Stars Eject Cosmic Rays

► COSMIC RAYS, created in the atmospheres of certain stars whose magnetic field fluctuates violently, are shot forth periodically from these stars.

This latest theory of the birth of cosmic rays is advanced by Dr. Horace W. Babcock of Mount Wilson Observatory of the Carnegie Institution of Washington.

The random directions from which cosmic rays approach the earth would thus be explained, Dr. Babcock points out. Full details concerning his new theory appear in the *PHYSICAL REVIEW* (August 15).

The number and distribution of magnetically active stars is not yet definitely known, but they are probably fairly numerous throughout the disk-shaped galaxy.

It was Dr. Babcock's continued study of the peculiar star HD 125248 that led him to picture such stars as ejecting cosmic rays. In this star, the polar magnetic field regularly changes from plus 7,800 gauss to minus 6,500 gauss, and back, in 9.295 days.

The star's alternating magnetic field sug-

gests that at certain phases the suppressing effect of space charge that tends to keep cosmic rays close to the star will be eliminated. Periodically positive ions and electrons, Dr. Babcock reasons, are ejected alternately from the polar regions of the star at certain phases of each magnetic cycle.

Lines in the star's spectrum change in intensity as indicators of the changing magnetic cycle. The width of the europium lines, for instance, is greatest when the star's magnetic field reaches maximum; the chromium lines are widest when the greatest negative magnetic intensity is attained.

About a score of these peculiar variable stars, brighter than the sixth magnitude and thus visible to the naked eye, are known. All are suspected to have varying magnetic fields. But these magnetic variations are more fundamental than the mere changes in line intensity would indicate, the Mount Wilson astronomer says.

Science News Letter, September 4, 1948

ASTRONOMY

Satellite Missile Needed

► DEVELOPMENT of a satellite missile which, like a moon, will continuously circle around the earth—600 miles or so above the surface—is being seriously considered by American scientists.

This was revealed to the Association of Terrestrial Magnitude, affiliate of the International Union of Geodesy and Geophysics, Oslo, Norway, in a communication from Dr. James A. Van Allen of the Applied Physics Laboratory of Johns Hopkins University.

Such a missile would carry scientific instruments needed to collect data about the rarefied atmosphere surrounding the earth. Once started, no fuel would be needed to keep the missile circling around our planet.

In the even dimmer future is the prospect of astronomical flights into space Dr. Van Allen's statement said.

Today rockets enable scientists to explore the upper atmosphere by carrying apparatus high above the earth. Many missing links in the physics of the upper air will be filled in through the help of these instruments.

Since this rocket research began two years ago, scientists have:

1. Measured the cosmic ray intensity above the atmosphere.
2. Captured samples of air 35 miles above the earth's surface.
3. Produced smoke puffs and smoke trails at high altitudes to study wind velocities.
4. Measured the atmospheric temperature and pressure up to 40 miles.
5. Extended the solar spectrum far into the ultraviolet.

Up to July 1, some 31 V-2's had been fired with upper atmosphere equipment as the primary payload. Twenty-one of these flights have been successful, attaining summit altitudes ranging from 62 to 114 miles, with an average of 84 miles.

Data obtained through rockets have been captured by two principal methods:

1. By radio from a suitable multi-channel transmitter in the rocket to a system of receiving and recording stations on the ground. This is called telemetering.

2. By actually recovering the records produced within the rocket during flight.

It was soon realized, Dr. Van Allen continued, that captured German V-2's, converted from war to peacetime use, would provide at best a series of high altitude

flights of limited extent. Furthermore, the V-2's are extremely complicated and expensive. Consequently a small, relatively inexpensive rocket called the Aerobee was developed for use in carrying equipment into the upper air.

Leading research agencies primarily responsible for the rocket experiments are: the Naval Research Laboratory; the General Electric Company, under the sponsorship of the Army Ordnance Department; the Air Material Command of the Air Force; the Army Signal Corps Labora-

tories; Princeton University; and the Applied Physics Laboratory of Johns Hopkins University, under the sponsorship of the Navy Bureau of Ordnance.

Dr. Van Allen pointed out that all high altitude experiments to date have been made over the White Sands, N. Mex., Proving Ground. Before we begin to really learn about the upper air, he said, repeated flights with identical instruments must be made at different geographical locations, at different seasons, at different times of year.

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Dr. Elberg revealed that there was a rather high incidence of the disease among certain laboratory personnel during the experimentation, carried on during the war at the Army's Camp Detrick, Md., bacteriological warfare laboratories.

Airborne transmission was indicated in many of these cases. Frequently there were no accidents which could explain transmission of the disease on the basis of handling or drinking of infected material. Air and dust tests in the laboratory showed the organisms existed in these media, and strengthened the possibility of airborne transmission.

Brucellosis is a generalized infection marked by intermittent undulatory fever, malaise, cervical pain, headache, sweating, weakness and anemia. There are three types of the infection: porcine (swine); bovine (cow) and caprine (goat). The last was the first type reported, being discovered on the island of Malta.

The occurrence of swine type brucellosis is high among stockyard workers, and the three varieties are frequently found in the general population. While 27,299 cases were reported in the U. S. for 1940-46, scientists estimate the actual number of cases is much larger.

Science News Letter, September 4, 1948

MEDICINE

New Artificial Kidneys

Two methods for removing wastes from the blood when the kidney has stopped functioning, are presented. These devices simulate natural processes.

➤ ARTIFICIAL man-made kidneys can now be hooked onto the human body's blood vessels in an emergency to cleanse the vital fluid of wastes that would cause death.

Two artificial kidneys are being announced to the scientific world. One of these is a completely new type that is simply a sheet of cellophane sandwiched between two rubber pads.

This imitates the action of the natural kidney by allowing blood to pass through its "vessels" which in this case are grooves. On the other side of the cellophane another set of grooves in the rubber carry chemical solutions in the opposite direction. These snatch the impurities from the blood and return it, cleansed, to the body.

This new apparatus is reported to the journal, SCIENCE (Aug. 27) by Jack R. Leonards of Western Reserve University in Cleveland and Leonard T. Skeggs, Jr., formerly of Cleveland, now with the Crile Veterans Administration Hospital in Parma, Ohio.

Chemical solutions do the work which the kidney neglects because of disease or absence. They separate the sugar, salt and water in the blood, concentrate the waste products which are urine, and remove them.

They explained that this apparatus shows promise both as a laboratory tool and as an artificial kidney. It has the advantage, they declared, of being efficient, easily sterilized since the entire apparatus can be immersed in a laboratory pressure cooker, and of having a large surface through which solutions can be passed.

Another artificial kidney which filters the waste products in the blood through a cellulose membrane has been developed by three Canadian researchers. Dr. Gordon Murray, Dr. Edmund DeLorme, and Newell Thomas, of Toronto, report their developments in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 28).

A pump is used by this machine to remove by means of a tube the blood from the large trunk vein of the body, pass it through the membrane and into the opposite vein of the flank.

The membrane is subjected to a chemical bath while the blood passes through it so that the poisonous body substances can be removed. In addition, heparin, an anti-blood-clotting substance, is added.

The Canadian scientists report that the apparatus has been successfully used on patients and several days of treatment causes no ill effects.

Science News Letter, September 4, 1948

VETERINARY MEDICINE

Brucellosis Found To Be Transmitted Through Air

➤ BRUCELOSIS, also called undulant fever and Malta fever, can be transmitted through the air, it is revealed in the JOURNAL OF INFECTIOUS DISEASES (Aug. 30).

A British scientist, Dr. David W. Henderson, and Dr. Sanford S. Elberg, of the University of California, reported that monkeys, mice and guinea pigs were infected by exposing them to an artificial cloud containing brucellosis organisms.

Infection by the drinking of infected milk or through the skin from the handling of diseased livestock are the only routes that previously had been scientifically demonstrated, though the air route was suspected.

The scientists said that man can probably be infected by the air route as well as animals, though this remains to be proved by definite evidence. Drs. Henderson and Elberg reported they were able to determine the concentration of Brucella organisms in the air needed to cause infection; and that it is probable that such a concentration would be present in stockyards during the slaughtering season.

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