

PHYSICS

Cosmic Rays Bombard Earth With 40,000 Million Volts

New Estimate Based on Evidence from Various Sources Places Energy Forty Times as High as Previously Thought

COSMIC radiation bombards the earth with energies of some 40,000 million volts, which is about forty times the highest energies usually assigned to the ultra-penetrating radiation being so intensively studied by physicists throughout the world.

The new estimate is made by Dr. Thomas H. Johnson, assistant director of the Bartol Research Foundation of the Franklin Institute, Swarthmore, Pa., who in a communication to the American Physical Society, interprets evidence obtained by various investigators and his own experiments.

It has been recognized as a result of photographs made by Dr. Carl D. Anderson at the California Institute of Technology (*SNL*, Dec. 12, 1931, p. 373; Dec. 19, 1931, p. 387.) that at least some of the tracks of particles measured and photographed in the form of water droplets in cloud chamber apparatus or detected by various sorts of electron or particle counters are not caused by primary cosmic radiation but by the secondary radiations that result from collisions of the cosmic rays with earthly materials in their path.

Interpreting the measurements of the German physicist, Dr. H. Schindler, Dr. Johnson develops the idea that the measured intensity of the radiation depends upon the particular kind of material through which the rays have just passed. This led to an estimate of the energy of each of the secondary radiations produced by one cosmic ray, which in turn allowed him to arrive at the sum of energies of the secondaries from a single primary ray at the earth's surface at some 20,000 million electron volts. Since these rays have already passed through the atmosphere, dissipating energy as they traveled, Dr. Johnson doubled this figure to obtain the energy of a cosmic ray entering the earth's atmosphere.

Such immense energies discourage the hopes of scientists that some day it will be possible to produce artificial cosmic radiation here on earth. When Dr. Rob-

ert A. Millikan estimated in his early work on cosmic rays that some cosmic rays had energies of the order of ten million volts there was hope that synthetic cosmic radiation might be produced. As research has progressed the energy assigned to cosmic rays has increased. From 100 to 1000 million volts have been the favorite figures until this latest estimate by Dr. Johnson.

Science News Letter, October 1, 1932

MEDICINE

Find Fever Treatment Relieves Stubborn Asthma

ARTIFICIAL fever, which has been helpful in treating paresis, is now being turned to the treatment of another ailment, chronic asthma. Thirty cases of the disease in which relief was obtained by this means have been reported to the American Medical Association by Drs. Samuel M. Feinberg, Strafford L. Osborne and Meyer J. Steinberg of Northwestern University Medical School.

In nineteen of these patients the relief of symptoms was complete and lasted from several days to nine and one-half months. In the other eleven cases, there was improvement without complete remission of the symptoms.

The fever was induced in these patients by high frequency electric currents, or diathermy. In all of the cases, other means of treating asthma had been tried without success.

Science News Letter, October 1, 1932

ENGINEERING

New Ventilation Standards Would Save Fuel

THE specifications of municipal building codes that govern ventilating practice in buildings throughout the United States are based on tradition and are without scientific foundation. This is the belief of the American Society of Heating and Ventilating Engineers, which seeks the establishment of new

national standards under the auspices of the American Standards Association.

Fuel bills will be lowered if recommendations of the engineers are adopted, it was stated, because the new specifications reduce the amount of outside air required by present codes to a minimum of ten cubic feet per occupant per minute. However, standards are also given for temperature, humidity, air quality, movement and distribution. The recommended code is based on recent research at the Society's laboratory in Pittsburgh.

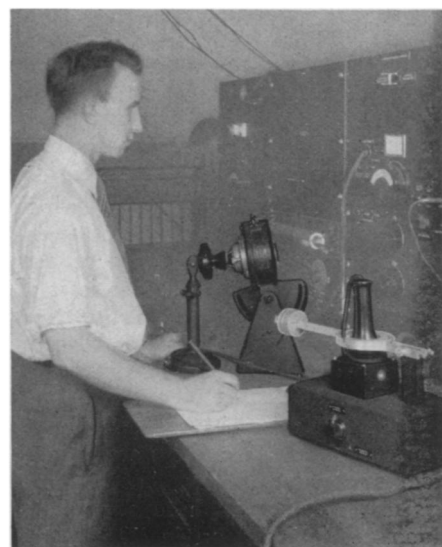
Science News Letter, October 1, 1932

PHYSICS

Artificial Voice and Ear Excel Human Counterparts

A MECHANICAL speaker that talks better than the human mechanism and an artificial ear that hears more effectively than man's auditory organ, for testing telephone transmitters and receivers, are at work in the Bell Telephone Laboratories in New York. This newly developed apparatus replaces the human voice and ear in research devoted to the production of telephones that will transmit speech more effectively.

An electrical phonograph is the source of the voice in the artificial speaker and a number of electrical circuits assure its natural qualities. The artificial mouth is so carefully built that its speech is distorted by objects in front (*Turn Page*)



A MAN'S WORK

The mechanical speaker is facing the mouthpiece and the artificial ear is clasping the receiver to test the telephone. It does this work better than the human voice and ear.

of it just as sounds from a human mouth are broken up, it is explained by A. H. Inglis, C. H. G. Gray and R. T. Jenkins.

Not only does the artificial speech check within a few per cent. by diagrammatic analysis with the original human product, the engineers state, but it also

sounds natural. An important advantage of the mechanical mouth and ear is that they reproduce exactly the same sound and hear with precisely the same sensitiveness and distinction every time they are used. Their human counterparts vary with mood and physical condition of the person talking or listening.

Science News Letter, October 1, 1932

GEOGRAPHY

"Wild West" Gorges Found in Sea Bottom Off New England

By DR. FRANCIS P. SHEPARD, Department of Geology, University of Illinois; Collaborator, U. S. Coast and Geodetic Survey

A WHOLE SERIES of vast canyons, rivalling anything that the West has to offer, have been found in the bottom of the ocean off the New England coast by the U. S. Coast and Geodetic Survey during the season which has just closed. Corsair Gorge, which created something of a sensation a couple of years ago when it was first discovered, is only one feature in this stupendous submarine landscape.

This summer it was decided to examine in much more detail some of the valleys in the Corsair Gorge neighborhood, to see if they might be used as landmarks for navigators. The last survey revealed an area with such relief and irregularity that it dwarfs by comparison anything above water in eastern North America and must rival the grandest topographic features of the West. The area charted represents only the upper mile of the two-mile-high continental slope.

The preliminary contour map which I have drawn shows a series of steep-walled canyons cut thousands of feet deep into this escarpment. The least of these is deeper than the Yellowstone Canyon and the greatest must be comparable with the Grand Canyon of the Colorado.

Some geologists have attempted to show that submarine valleys are not the product of river erosion, but the valleys under discussion have every indication of a fluvial origin. They have the typical sinuous shape of river valleys, as well as the branching tributaries and the V-shaped cross sections characteristic of canyons cut by streams. Since the valley floors are traceable to depths of at least 7,000 feet, it is evi-

dent that during the valley cutting stage New England must have been a plateau a mile and a half above sea level.

The steepness of the canyon walls, probably exceeding 45 degrees in places, make it appear very probable that they were cut in solid rock rather than in the soft sediments of the ocean floor. The finding of fragments of weakly cemented conglomerate on the wall of one canyon partially confirms their rocky nature. Unfortunately only a few samples were collected since the soundings were made by echoes using the "fathometer," and it takes a long time to get samples from deep water.

The outer portions of the valleys have hummocky topography suggestive of landslide accumulations. It seems probable that the sediments which were deposited in the inner valleys after they were submerged have been shaken loose and have slid out into the outer valleys where they lodged because of the decrease in gradient.

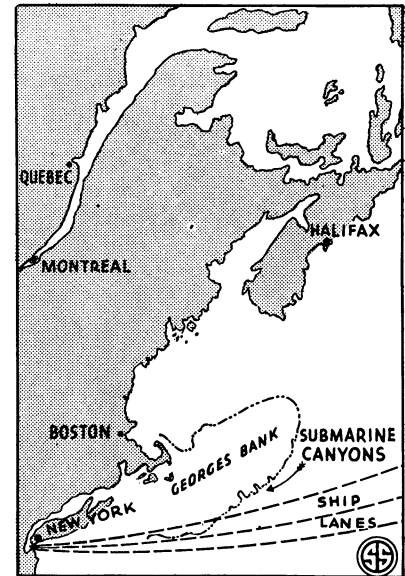
Science News Letter, October 1, 1932

ASTRONOMY

Year May Bring Record For Comet Discoveries

AT LEAST one business, that of discovering comets, seems to have passed the corner. Already the record of 1927 has been equaled, and there is every likelihood that it will be surpassed. In 1927 ten comets were reported by astronomers, six new, and the rest periodic visitors on regular returns. This was a greater number than had ever before been discovered in a single year.

The figures for 1932, with more than three months yet to go, are identical with those for 1927, although one of the new discoveries this year, by A. Schmidt, of the University of Algiers,



AID SHIPPING

Some trans-Atlantic liners are already using the new underwater gorges as "landmarks" to guide them safely over the dangers of Georges Bank. A sonic depth finder automatically reports the irregularities of the sea bottom. When the record shows the gorges in their expected positions, the pilot is assured that he is exactly on the right course, though fog obscures both the sun and the stars.

was not confirmed by later observations. Four of the 1927 comets, two of them new, were discovered during the last quarter of the year. Several periodic comets, expected this year, have not yet appeared, and thus it is quite likely that 1932 will set a new record.

The new comets of 1932 were found by H. E. Houghton, at the Royal Observatory, Cape of Good Hope, on April 1, by P. Carrasco Garrorena, at the Madrid Observatory, April 25; by Newman, at the Lowell Observatory, in Arizona, June 1; by Geddes, at the Melbourne Observatory, June 22; by Schmidt, at Algiers, on June 25, and independently by L. C. Peltier, of Delphos, Ohio, and Dr. F. L. Whipple, of the Harvard Observatory, on August 8. All these comets are now called by the names of their discoverers. In addition, two very remarkable asteroids, or tiny planets, were found, the first on March 12, by Dr. E. Delporte, of the Royal Observatory of Belgium; and the second on April 27, by Dr. K. Reinmuth, of the Konigstuhl Observatory, Heidelberg. Both of these asteroids come closer to the earth than any previously known object except the moon.

The periodic comets that have returned this year are those of Grigg-Skjellerup, Kopff, Borrelly and Faye.

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