# MYSTERY OF RAYS REMAINS HIDDEN

## Dr. Millikan Reveals New Measurements of This Terriffic Force.

BY THOMAS R. HENRY,
Staff Correspondent of The Star.

PITTSBURGH, Pa., December 29.—The mystery of the origin of cosmic rays is greater than ever with the discovery that some of them have energies nearly 500,000 times the highest dreamed of a few years ago, Dr. Robert A. Millikan of the California Institute of Technology told the American Association for the Adancement of Science here today.

Until three years ago the energies of this radiation, consisting of far shorter wave-lengths than X-rays in the energy spectrum, were calculated from the penetrating powers. Some of it would go through a foot of lead or to the bottom of a deep lake. The highest particle energies found in this way were approximately 15,000,000 electron volts, an almost unimaginable energy.

The new measurements by Dr. Millikan's coworkers at the California Institute of Technology, he reported, showed particle energies ranging at least as high as 6,000,000,000 electron volts. The indications are, he said, that they will almost certainly be found to range to at least 10,000,000,000 electron volts.

This discovery Dr. Millikan described as "one of the most amazing of modern physics."

There can now be little question, Dr. Millikan said, that the cosmic rays originate "somewhere beyond the milky way."

**N. R. A. Procedure Criticized.**

Dr. Charles F. Roos, former N. R. A. economist, declared that while he was associated with this organization under Gen. Johnson, it "consisted mostly of wishful thinking."

"It reminded me," he said, "of a ship without a rudder in a night without a star. Since the same treatment was applied to durable and nondurable goods and services, one may well suppose that things done just about canceled each other. The final net gain seems to have been an absorption of housing vacancy."

Dr. Roos had just presented statistics showing that the two should have been considered from entirely different viewpoints.

Mankind, by departing from the tooth-and-claw life of its ancestors, may be killing itself with kindness, Dr. Earnest A. Hooton, professor of anthropology at Harvard University, told the association.

Considered as an organism in the process of evolution, Dr. Hooton said, the human race has shown hardly any improvement throughout its history, and argued for the elimination of the unfit—without, however, making any very clear definition of unfitness.

"We are faced by the sinister necessity of ascertaining whether or no man's most benevolent cultural efforts—medical science and idealistic humanitarianism—are eating him alive by eliminating the evolutionary effect of natural selection.

"What we must avoid is a progressive deterioration of mankind as a result of the reckless and copious breeding of protected inferiors. We have not the knowledge to breed supermen, but we can limit the reproduction of criminals and mental defectives. Let us cease to delude ourselves with the belief that education, religion or other measures of social amelioration can transform base metal into gold."

**Ancient Ancestors.**

Turning from the future to the past, Dr. Hooton said an increasing body of anthropologists is turning to the belief that the living creature closest to man's ultimate ancestor is a tiny, nocturnal, ratlike animal of the Borneo jungles, which claims charter membership in the "Daughters of Human Evolution."

This animal is the tarsier, a tree dweller with a long tail, enormous eyes, seemingly directed inward; large ears, a pinched nose and which hops on its hind legs like a kangaroo. In some respects very primitive, it combines human characteristics in a surprising degree. It sits erect, feeds itself with its hands, has a short snout and a dry nose. Perhaps most important of all, it has frontally directed eyes and clawless, opposable thumbs.

Its front paws, Dr. Hooton said, "seem to be adapted for all the varieties of mischief Satan finds for idle hands to do." Perhaps most important of all, they enable it to lift things to its eyes, nose and mouth and "become forerunners of all the tools and appurtenances of material culture."

# Einstein "Explains" Theories to Reporters

Prof. Albert Einstein (seated, center) shown as he was interviewed by reporters in the home of a friend in Pittsburgh shortly before he delivered a lecture at a meeting of the American Association for the Advancement of Science at Carnegie Institute of Technology. In his lecture he gave additional proof of a theorem advanced by him in 1905 that energy and matter are two different forms of the same thing. Seated at the extreme right in the photo is Thomas R. Henry, science writer on the staff of The Star.
—Associated Press Photo.

# WALLACE VISIONS LONG PRICE RISE

## Tells Science Association That U. S. May Not Return to Gold.

By the Associated Press.

PITTSBURGH, December 29.—Secretary of Agriculture Henry A. Wallace today told the American Association for the Advancement of Science that we may be entering a century-long period of rise in prices and added we may not return to the gold standard.

"For all we know to the contrary," he said, "we may be entering upon another 100-year-long rise in prices such as was seen in the century beginning with 1815."

Wallace said "there is a possibility that the United States may not return to the gold standard, but we may be feeling our way toward a goal, which logical minds cannot perceive at the moment."

The Secretary spoke informally at the request of Carl Snyder of the Federal Reserve Bank of New York, chairman of the meeting.

**Sees Prosperity.**

Wallace assured his audience that the United States was well on the way to prosperity, but issued a warning to statisticians and business analysts that "certain psychological tendencies" may be more significant than barometrics or econometrics in charting the course of recovery.

"I believe," the Secretary said, "that recovery in the United States has reached that of Great Britain and perhaps has proceeded a little further. I think that future hope lies rather with the United States."

Women are just as smart as men, despite old ideas—including men's—to the contrary, a scientist reported today. The intelligence of the two sexes is so nearly equal you practically can't tell the difference.

"Any notion of significant sex differences in intelligence must be dispelled," Prof. Paul A. Witty of Northwestern University told the Association. Prof. Witty studied 14,149 boys and 13,493 girls in high schools. Their intelligence averaged the same in all four years of high school. Their average I. Q. or intelligence quotient was 104, compared to 100 for the general population.

**Droughts Predicted.**

More droughts as bad as the disastrous one last Summer were forecast by a Weather Bureau expert today.

At the same time he voiced belief that much of the damage done in the last one could have been avoided if previous scientific warnings had been heeded by farmers.

J. B. Kinzer, chief climatologist of the Weather Bureau, told the association there are recurring cycles of dry and wet weather in much of the Great Plains region of the United States which will make future droughts inevitable.

Kinzer pointed out that as far back as 1919 Weather Bureau scientists had warned against the extension of farming into greater and greater areas of comparatively arid land.

"The answer is fewer cultivated fields, more natural vegetation, more grass lands without too close grazing and any device that would diminish the surface velocity of the wind and conserve soil moisture."

**Lists Recovery Factors.**

A balance sheet of "our chief concern"—permanence of recovery—showing capacity for overproduction wiped out, was presented today by Claudius T. Murchison, director of the Bureau of Foreign and Domestic Commerce, Washington. He held that the hopeful column outweighs the doubts.

He based the production statement upon four years' failure to replace obsolescent machinery, serious disrepair of housing, new housing construction lagging behind increase in population, and the "enormous potential demand" for autos, radios, mechanical refrigerators and general household equipment due to the public postponing replacements.

The second fundamental, he said, "is relief recently gained from our agricultural surpluses, with the one important exception of cotton."

Third—Reduced vulnerability of the financial system. Fear of bank failures, he said, is a thing of the past with a "rapidly developing attitude of greater confidence on the part of bankers."

Fourth—Refinancing of farm and home mortgages and reduction of the aggregate debt burden.

Fifth—World-wide scope of the recovery movement.

## Entertains

GIRL TO DANCE BEFORE WAR VETERANS.

MISS BETTY JANE MAHAN, Who will entertain Rainbow Division veterans at their annual dance at the Willard Hotel next Saturday night. She lives at 1007 Upshur street.

## POMONA MILLS SOLD

$649,000 Bid Obtains Plant for New York Firm.

GREENSBORO, N. C., December 29 (AP).—The Hunter Manufacturing and Commission Co. of New York today purchased at a court sale all the properties and assets of Pomona Mills, Inc., with a bid of $649,000.

The mill sale is subject to confirmation at a hearing in Superior Court here Monday, January 7.

The mills employ about 550 workers and will resume operations January 3 with sufficient orders booked to remain in operation steadily for several months, it was said.

# *Sun Rays Measured More Accurately By New Apparatus*

## *Minnesota U. Physicist Claims Device Aids Radiation Study.*

By the Associated Press.

MINNEAPOLIS, December 29.—A new and more accurate device for recording the percentage of sunshine, which was expected to advance the measurement and study of vital rays emanating from the sun, has been perfected by Prof. L. F. Miller, University of Minnesota physicist.

Dr. Miller said his apparatus also would enhance the study of various wave lengths of radiation from the sun and their relation to vegetation.

The apparatus consists of two bulbs, in one of which is a thin, hollow silver sphere blackened externally. This bulb is connected to the other empty one with a wire made of two metals.

The blackened sphere absorbs the sun's rays, which cause heat, that in turn warms the wires to produce an electric current. The measurements are recorded on a galvamometer as well as on a photographic recorder chart.

## STOCK PURCHASED

Fire Insurance Company Control Bought for $110,222.

CHICAGO, December 29 (AP).—Controlling interest in the Iowa National Fire Insurance Co. of Des Moines went to Frank C. Harvey of Kansas City, Mo., today when Judge John J. Prystalski approved Harvey's bid of $110,222 for 15,746 shares of stock.

The block was opned by the Fire Insurance Co. of Chicago, and was sold under a court order after the company went into receivership last March. Assets consisted almost entirely of stocks in other concerns.

For the Iowa National Fire of Des Moines stock Harvey will pay $7 a share.



# PICCARD FIGURES RECORDED CLEARLY

## Apparatus Worked Well in Stratosphere Flight, Report Says.

*The contributions to knowledge of cosmic rays and to aeronautic information gleaned from his 10-mile ascent into the stratosphere last October 23 are reviewed here by Prof. Jean Piccard, whose wife accompanied him on the flight.*

BY PROF. JEAN PICCARD.

DETROIT, December 29 (N.A.N.A.).—From the hour our balloon dropped through the clouds and landed in the woods near Cadiz, Ohio, we have been asked frequently to tell the scientific results of the flight. Our results have been of two kinds—the ones connected with the construction and piloting of the stratostat (a term describing the balloon and its gondola) and the results obtained from our cosmic ray apparatus.

Our instruments—taking up that portion of our results first—were brought by our balloon to the desired height and made to work according to the plan of our enterprise.

We have received word from Pasadena that the Millikan apparatus, recording the harder cosmic rays, worked properly. It has registered the intensity of such cosmic rays which have not been absorbed by 4 inches of lead. The instrument, made in the California Institute of Technology under the direction of Dr. Millikan and Dr. Neher, measures the speed with which an electroscope is discharged under the influence of cosmic rays, which ionize air and make it conductive to electricity. By measuring the conductivity of air, the apparatus measures the intensity of the cosmic radiation. This measure is recorded photographically on a film moving with constant velocity. From time to time we made an impression on this film and recorded the exact moment in our board book, where the barometer readings also were recorded in relation to time.

**Receives Barogram.**

We have received our official barogram (the record traced by the barograph), calibrated by the Bureau of Standards. This has been checked with the written records of our own barometer readings. Then a complete table of heights was calculated and sent to Pasadena. By comparing this table with their film, our California collaborators will be able to calculate the effect of varying altitude on such cosmic rays as have penetrated the 540-pound lead shield which covered the instrument. By means of the several impressions which we made on the film of the instrument, it will be possible, assuming a constant speed of the film, to know the exact altitude at which the records were made.

Another copy of our table of heights was sent to the Bartol Research Foundation of the Franklin Institute in Swarthmore, Pa. The cosmic ray apparatus, made there by Dr. Swann and Dr. Locker, is of a more complex nature. We have received word from our Swarthmore collaborators that this apparatus worked well.

There are, apart from several continuous graphs, 4,869 photographs, taken at half-minute intervals, of dials which must be read and tabulated to form the basis of complicated calculations.

We sincerely hope that, when this is done, we shall be able to look back with satisfaction. Another step in the knowledge of cosmic rays will be behind us. We then shall know more about the nature of the rays and be in a better position to make hypotheses about their origin and about the deeper significance of these extraordinary travelers of the universe.

**Needs More Data.**

The more we know, the more we want to know. For many years to come, humanity will be in need of more information and of more accurate information about cosmic rays. New and more elaborate instruments will be carried up by manned balloons and by unmanned balloons. The controversy about the relative merits of these two kinds of exploration will go on. One fact will remain:

We brought down to earth in our sealed gondola more scientific material than any unmanned balloon of the kind now used possibly could have gathered. When our stratostat rose from Ford Airport near Detroit, its total weight, including hydrogen, was 7,700 pounds. The weight of the crew and the necessary air regeneration plant was only 400 pounds; that is, a little over 5 per cent. A machine which would have been able to do all that we did has not yet been invented. It certainly would be complicated, heavy and expensive.

My brother's first stratosphere balloon has a large appendix at its bottom and a stiff ring holding it open. This ring, called Poeschelring, after its inventor, allows air to enter the balloon. It is not always used in free balloons, but for a stratostat it seems to be a necessity. It is surprising how many purposes this ring serves. Let us study one of its functions.

**Uneven Tensions Result.**

When the big bag of stratostat is inflated, only its upper part is filled with hydrogen. If no air is allowed to enter the lower part of the balloon, this part will remain empty. The suction of the hydrogen above makes the lower part of the bag appear to be glued together. If one begins the ascension under such conditions, the fabric may or may not unfold while the balloon is rising and the gas expanding. If it does not unfold properly, all kinds of uneven tensions will result, which will, at best, produce a forced landing. In order to prevent any accident of this sort, we provided our balloon with an appendix 100 inches in diameter, held open by a Poeschelring.

During the inflation of our balloon, the whole bottom of the bag was sucked up, and one could crawl under the edge of the material which formed a large dome. This was a dangerous sign. Would all this material come down properly during the ascension? What if a pleat got caught by another pleat? What if some pleats were wet and froze together before the balloon was entirely spherical? This was the moment to make use of our large appendix and Poeschelring.

We pulled down the cap of our appendix and air streamed into the bag. All the air in the dome formed by the material, about 250,000 cubic feet, flowed through the appendix and stratified itself under the hydrogen in the bag. In 15 minutes the balloon was ready for the final starting operations.

The blasting of the four cardinal ropes, the last ones to hold the balloon, worked beautifully. Each one of these ropes was cut by a 2-inch piece of TNT fuse. We started 50 pounds light. Our experience showed that it would have been better to start considerably lighter. We had plenty of ballast and we could have discharged about 100 or 200 pounds before firing the cardinal ropes. We also could have blasted them in more rapid succession.

The ballast release, by means of electric blasting caps, was very satisfactory. One by one, our large sandbags, hanging outside the gondola, had to be discharged while we were high in the stratosphere. I turned toward a little switchboard in a small wooden box. In a square, not larger than the palm of my pilot's hand, were 16 brass screws in four rows. I knew that touching any of these screws with one pole of a small banner battery should detonate a cap and open one bag. Would it work?

Emotion made me hesitate. What if any of the 120 solderings which my system contained would fail? What if at any place a wire was broken or an insulation defective? Sixteen lacquered wires entered the gondola through an air-tight cement plug in a brass tube. No air had leaked through this plug. It had functioned properly in that way, would it also function electrically? If I did not believe in the eternal laws of electricity, there was no use working on cosmic rays . . . encouraged by this thought, I touched off the first cap. The detonation was muffled by the sand. The sudden release of 80 pounds of ballast caused the gondola to vibrate perceptibly. Not one of the 16 bags failed, not one went off too soon.

**Would Release Ballast.**

We have concluded from this experience that, in another flight, we would release all of our ballast, or nearly all of it, by this convenient method. Even our batteries would hang outside the gondola and would be fired, parachutes attached, by electrict blasting caps.

As we came down through the clouds we were heading straight toward a farm house. The time was too short to unfasten, one by one, our batteries, to attach each to a parachute and use them as emergency ballast. Fortunately, we had kept two heavy sandbags outside the gondola. It did not take more than two seconds from the time the pilot called "Fire two sandbags!" until 160 pounds of sand were in the air. We went up again, and, five minutes later, we landed safely in a group of trees, our cosmic ray instruments intact.

They showed, in the first summary examination by Dr. Locker, that, at the altitude which we reached, the cosmic rays coming down from the zenith were 60 times as numerous as they are at sea level, while the cosmic rays coming horizontally increased in the ratio of 1 to 600. To be sure, cosmic rays themselves are noiseless, but, judging from the ever-increasing noise which our cosmic ray recorders were making, we had expected something of this kind.

The photographic records, indicating the relative position of our compass at half-minute intervals, show that our balloon rotated with the desired regularity. The rotor of our little electric motor is not larger than a good-sized walnut and yet, by spinning around, and by thus activating a small propeller, it had, for hours at a time, kept our 600,000 cubic foot balloon rotating steadily while the cosmic rays were measured as they came down from the south, from the west, from the north and from the east.



# *Paralysis Vaccine Affords Immunity In Only One Week*

## *New Treatment Gained by Weakening Virus With Formalin.*

By the Associated Press.

CHICAGO, December 29.—The immunity to infantile paralysis from the recently announced New York vaccine develops within a week.

This was reported to the Society of American Biologists today by Maurice Brody, M. D., of New York, one of the physicians who collaborated with Dr. William H. Park in developing the vaccine.

It is made by treating the infantile paralysis virus, the invisible living organism that causes the disease, with formalin. This reduces the virulence of the virus to the point where it does not cause the disease, yet its presence causes the body to manufacture immunizing substances, afterward found in the blood serum.

Dr. Brody said two groups of children have been given the vaccine. The blood of all these children, he said, showed before the vaccination a small amount of immunizing substance, but all of them showed a gain as a result of vaccination.

There were 12 children in this first completed test. The blood serums of six of them neutralized between 100 and 200 doses of virus. A dose means, in these experiments, sufficient virus to cause "complete and rapid paralysis of a monkey."

The other six children's blood serums neutralized from 200 to 600 virus doses three weeks after they had been vaccinated.



# WOMEN'S SPORTS HELD DESTROYING CHARM

## Boston University Dean Says Ban on Players Who Earn Cash Is Hypocritical.

By the Associated Press.

BOSTON, December 29.—Competitive sports for women were branded destructive of feminine attractiveness today by Frederick Rand Rogers, dean of Boston University. Dean Rogers also charged as "the most hypocritical of all rules" those which bar students from athletics for having earned money as salesmen of athletic goods or as playground leaders, swimming instructors or instructors in other sports.

Dean Rogers spoke before more than 200 delegates from all parts of the United States who are attending the tenth annual congress of the National Federation of America.

Dean Rogers attacked the systems of eligibility in effect in colleges and universities, particularly transfer and freshmen rules.

# CABLES ARE SEIZED

## Post Office Strike in Rio Spreads Rapidly.

RIO DE JANEIRO, December 29 (AP).—Troops occupied the telegraph building on Quinze de Novembro Square today as a three-day post office strike spread to the national telegraphs.

Foreign cables handled by Western Union and all America cables were not affected, but all telegrams to the interior of Brazil faced delay. Executives of the national telegraphs said skeleton crews remaining on duty might be insufficient to handle the traffic.

Many interior newspapers thus were cut off from the rest of the country and the world since Rio de Janeiro is Brazil's clearing house for news.

**Teeth Trap Snakes.**

Snapping at the same frog, two tiger snakes in Australia bit each other, and because of the backward curving of their teeth, neither could release itself, so they starved to death.