

## PHYSICS

# Cosmic Rays May Originate In Destruction of Elements

Evidence Presented by Dr. Millikan to National Academy Indicates Sun's Magnetism Extends in Space

NEW evidence for the creation of powerful cosmic rays through the annihilation of the universe's commonest chemical elements, sparsely scattered in the far reaches of space, was presented to the National Academy of Sciences by Dr. Robert A. Millikan, Nobel prizeman, of the California Institute of Technology.

The first evidence obtained by science that the sun's magnetic field extends out into space, enveloping the earth and the whole solar system, has also resulted from Dr. Millikan's latest cosmic ray researches.

Dr. Millikan, with his colleagues, Drs. I. S. Bowen and H. Victor Neher, probed the earth's atmosphere with balloons practically to its top. They found that the way in which the energy in incoming, highly penetrating cosmic rays is distributed gives evidence for the annihilation theory of cosmic ray production.

The most abundant elements that are destroyed in creating cosmic rays are carbon, nitrogen, and oxygen, together with relatively high percentages of sodium, silicon, and aluminum. These are among the commonest elements in the universe. The elements that give rise to cosmic rays range in atomic weight between 6 and 28.

Hydrogen, and perhaps helium, are also known to be extremely plentiful throughout the universe, and the fact that no cosmic rays corresponding to their energy of annihilation have been found gave Dr. Millikan his lead to the newly recognized extent of the sun's magnetic field.

The earth's magnetic field has been known to change the direction of cosmic rays. Similarly, the sun keeps the less powerful rays of hydrogen and helium origin from getting to earth.

Dr. Millikan summarized the new findings under four heads:

1. The curve of energy distribution of the incoming cosmic-ray electrons has a maximum at about 6 billion electron-volts.

2. This curve falls to less than one-third its maximum value both at an energy of 1 billion e-volts and at 20 billion e-volts;

3. This type of banded structure renders it unlikely that the cosmic rays originate in portions of the universe in which matter exists in appreciable densities; and

4. The observed energies of the cosmic rays are about those to be expected if the abundant elements have the capacity to transform their mass-energy completely into cosmic ray-energy.

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Benjamin Franklin in 1727.

Prof. Fox, as pathologist to the Philadelphia Zoological Society, has had ample opportunity to diagnose the disease in many living animals. He has also examined skeletons in several museums. The total number of animals examined was 1,749, of which 77 proved to be definitely arthritic.

Occurrence of the malady among animals appears to be as little governed by rules as it is among us suffering humans. It is not correlated with climate, location, food, focal infections, or kind of animal. It was most easily detected as an affliction of the spine, but was also found in other parts of the skeleton.

Animal families (*Turn to Page 287*)

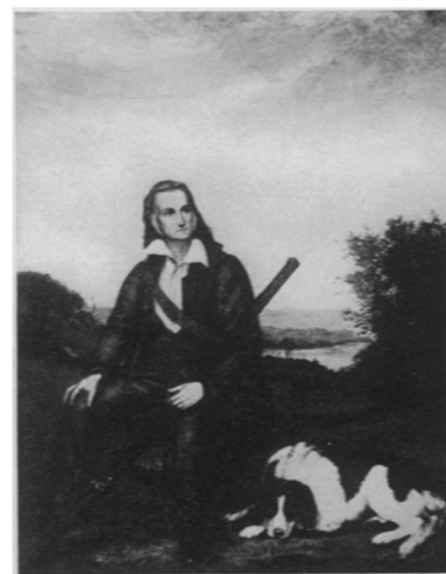
## ORNITHOLOGY

## Audubon 100th Anniversary Marked by Exhibit of Art

See Front Cover

MARKING the hundredth anniversary of America's greatest early work on natural history, John James Audubon's *Birds of America*, a national exhibition of the works of the famous artist-naturalist will be held at the Academy of Natural Sciences of Philadelphia from April 26 to June 1.

In 1838 Audubon published the completing section of his marvelous series of colored plates showing the principal spe-



HOW HE LOOKED

This portrait of Audubon by his son, John Wodehouse Audubon, shows the great artist-naturalist as he appeared when in the field. Tradition has it that the elder Audubon painted the dog himself.

## GENERAL SCIENCE

# Wild Beasts Have Arthritis But Rats and Bats Are Immune

America's Oldest Scientific Society Hears Also Of Successful Use of Lindbergh's "Glass Heart"

GRANDPA Gorilla has his bad days with "rheumatiz", no less than his human nth-degree cousins. Hyenas have it, too—presumably they don't laugh then. It seems to be the same kind of rheumatism—arthritis—most common and most painful in human beings.

Occurrence of arthritis in wild animals was described by Prof. Herbert Fox of the University of Pennsylvania, who addressed the meeting of the American Philosophical Society in Philadelphia. The Society is the oldest of American scientific bodies; it was founded by

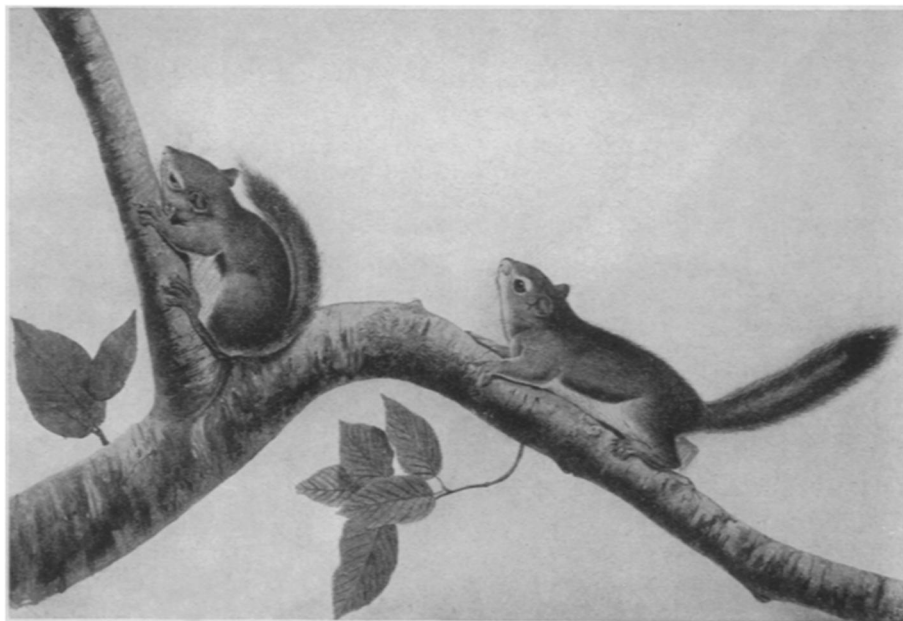
cies of American birds in vivid natural hues. These pictures were the best bird representations in existence then and for a long time afterward.

Audubon not only brought high artistic ability to his work; for the first time he showed birds as they are in the wild, and not in the stiff, "stuffed" style, then prevalent in natural history paintings. Audubon even dramatized his bird poses a little; it has been remarked, "All his birds are Frenchmen."

Audubon was born in the French colony of Santo Domingo in 1785. At four, he was taken to France for his education and remained there until he was eighteen, when he came to America. His headquarters were at Philadelphia, then the largest city in the United States and its chief scientific center.

He tried several ventures, but the call of his art and the lure of the wilderness were too strong. He wandered all over what was then the wild interior of the country, from Kentucky to Texas, observing, taking notes, painting, collecting specimens.

Among his bird portraits is a picture of one of the handsomest of all American bird species, the ivory-billed woodpecker, now almost extinct. It is shown on the cover of this week's SCIENCE NEWS LETTER. Audubon saw



#### LESS WELL KNOWN

*Audubon's popular fame rests primarily on his studies of birds, but he did not neglect other animals. Pictures of mammalian life, as vivid and vigorous as this sketch of two squirrels of the Rocky Mountain region, illustrate a book, "Viviparous Quadrupeds."*

and painted this pair in Kentucky in 1812. The original painting is now the property of the Library of Harvard College.

*Science News Letter, April 30, 1938*

"While sulfanilamide has been demonstrated to be a very valuable drug in medicine, it is far from being all-sufficient and the aim of investigators in both chemical and medical research is to find new compounds which will be more effective and less toxic than sulfanilamide," said Dr. Crossley, in presenting his report with Drs. E. H. Northey and M. E. Hultquist.

Dr. Crossley described new types of drugs of the sulfanilamide family which, in tests on experimental mice, have only one-tenth the toxicity of regular sulfanilamide and from 5 to 6 times the potency. Ten times the amount of these drugs may be used with only the same toxic effect, and the amount administered is many times as potent in killing infectious disease organisms. Sulfanilamide has been used, with often dramatic results, in treating gonorrhea, septice-mias (blood poisonings), gangrene, peritonitis, mastoiditis and pneumonia, said Dr. Crossley.

The new improvements in sulfanilamide drugs consist of linking two or more sulfanilamide molecules into larger molecules. Several of the drugs described by Dr. Crossley consist of two sulfanilamide molecules linked together into a dumbbell-shaped larger molecule. One can think of these new drugs, Dr. Crossley indicated, as being derived from the parent sulfanilamide and—like human

#### CHEMISTRY

## Improve Sulfanilamide for More Potency, Less Toxicity

### Use of New Compound To Protect Mice From Influenza Offers Hope of Eventual New Usefulness for Man

CONQUEST of influenza may be the next victory that will be chalked up to the credit of sulfanilamide, widely used chemical remedy that is already famous for speeding recoveries from blood poisoning (septicemia), gonorrhea, gangrene, peritonitis, septic sore throat, and other infectious ills. This appeared from the report of Dr. M. L. Crossley, research director of the Calco Chemical Company, to the American Chemical Society, meeting in Dallas.

Advising caution against translating, immediately, findings with animals into human benefits, Dr. Crossley nevertheless reported that a newly-prepared chemical relative of sulfanilamide showed

"marked protective action against experimental influenza in mice."

"Should this compound," he declared, "prove effective for human use against influenza, it would mean that mankind at least has a weapon against a scourge such as the world-wide epidemic of influenza which occurred in 1918."

The new compound is 2,5-bis sulfanilamidobenzene sulfonic acid. It is considered the most promising of a number of new sulfanilamide compounds described by Dr. Crossley because it appears to give 100 per cent. protection against streptococcus infections in mice as well as showing protective action against influenza in mice.