

## ASTRONOMY

**"Shooting Stars" Found Light as Cigarette Ashes**

SOME 15% of the meteors or "shooting stars" hitting the earth's atmosphere have the consistency of cigarette ashes, Dr. Richard E. McCrosky of Harvard College Observatory reported at a meeting of the Society of Photographic Scientists and Engineers at Rochester, N. Y.

Dr. McCrosky said photographs taken with a Baker Super-Schmidt meteor camera revealed that about 15% of the meteors striking the upper fringes of the earth's atmosphere have a density only about a twentieth that of water.

The density was calculated from studies of meteors that reach their greatest brilliance at the instant they encounter any air resistance, he said. At this time the pressure on the speeding meteorite is about one-third of a pound per square inch. This is about the pressure on an object dropped out of a second-story window just before it hits the ground, he explained.

Dr. McCrosky suggested that a meteor of this kind begins as dusty gas frozen into a small ball. As the ball passes around the sun, the gases are vaporized, leaving the fragile structure of dust. Something similar happens with dirty snow as it melts, he said.

The fragile piece of dust is what eventually falls to earth as a "shooting star." This explanation seems most applicable to comets, and scientists believe that most meteors are derived from comets rather than asteroids, Dr. McCrosky said.

Science News Letter, December 5, 1959

## ORNITHOLOGY

**African Weaverbird Builds "Lovenest"**

THE AFRICAN weaverbird, sometimes known as birdland's foremost architect, literally builds a "lovenest" for he uses avian architecture to attract a mate.

This is pointed out by Dr. Nicholas E. Collias, University of California, Los Angeles, zoologist, who spent a year studying weaverbirds in their native African haunts and now maintains a colony of them on a campus hilltop.

The male village weaverbird weaves an elaborate nest, then hangs out his "open house" sign by clinging to the underside of the nest and giving a noisy display, Dr. Collias explains. The female inspects the nest, and if she likes it, the two become mates.

Some energetic male weavers go in for "tract housing." In Dr. Collias's campus colony 11 males built 67 nests during the past breeding season. If the male can "sell" more than one nest he becomes polygamous.

In his African observations, the UCLA zoologist noted one successful avian "real estate salesman" who had seven different mates in a season, five at one time.

The elaborate weaverbird nest, woven with such sophisticated techniques as hitches, includes a thick dome, affording

protection from the tropical sun and rains. The bottom-side entrance is often characterized by a spout, thought to afford protection from snakes.

Another type of weaverbird, the sociable weaver, builds "apartment" nests. These projects, so big that they appear to be tree haystacks, may house as many as 100 birds. But each couple has its own separate apartment and entrance.

Science News Letter, December 5, 1959

## BIOLOGY

**Ultraviolet Reduces Mutations of Wheat**

ULTRAVIOLET light protects wheat seeds against the chromosome changes that usually follow exposure to X-rays.

However, the protection is only effective at certain levels of irradiation, M. S. Swaminathan and A. T. Natarajan of the Indian Agricultural Research Institute, New Delhi, India, report in *SCIENCE* (Nov. 20).

Studies such as this one help point the way to improved plants and animals by indicating how changes or mutations are caused and what is involved when they do occur.

Pretreatment of the bread wheat seeds with ultraviolet for one hour significantly reduced the mutation rate following irradiation at 11,000 and 16,000 roentgens. Yet, the scientists find, there was an increase in the mutation rate when the pretreated seeds were exposed to higher doses at 22,000 and 33,000 roentgens. No mutations occurred in seeds irradiated with ultraviolet light alone.

Although the types of mutations that showed under the various irradiations were mostly similar, chlorophyll deficiency or the albina mutation turned up in plants treated with ultraviolet plus 16,000 roentgens of X-rays. Albinas have not previously been recorded in mutation experiments with bread wheat, the scientists point out.

They suggest that ultraviolet pretreatment induces a mutation in the "factors" that control chlorophyll development in the plant.

Science News Letter, December 5, 1959

## PHYSICS

**New Method for Making Very High Vacuum Found**

A NEW method for making extremely high vacuums, some ten-billionths less than normal, is reported by Dr. Jesse W. Beams of the University of Virginia, Charlottesville, Va.

He found the vacuum-producing system while studying the effects of rotors spinning at very high rates in a vacuum. Its advantages include the fact that the extremely high vacuum can be achieved very quickly, and the apparatus can be refrigerated to very low temperatures while in operation.

The pumping system does not use any lubricated bearings, Dr. Beams reports in *Science* (Nov. 20).

Science News Letter, December 5, 1959

**IN SCIENCE**

## OCEANOGRAPHY

**Woods Hole Gets Ship From Foundation Grant**

A \$3,000,000 National Science Foundation grant will enable the Woods Hole Oceanographic Institution to construct a 175-foot research vessel.

The new vessel will replace the R/V *Atlantis*, 28-year-old "flagship" of the Institution's fleet and the only research vessel in the nation originally designed as a research vessel.

Preliminary design of the new ship shows that it will make possible effective oceanographic research in the North and South Atlantic, where most Woods Hole investigations are carried on. She will have a range of 7,500 miles at cruising speeds of 12 knots, and have a loaded displacement of 1,040 tons.

Incorporated in the design are roll and pitch damping devices, wide speed control and high degree of maneuverability, superior laboratory spaces, and excellent working facilities. Additional design features considered for possible inclusion include anti-rolling tanks, acoustical "quietness" for studying underwater sound characteristics, a gravity laboratory, an aquarium, and ample freezer space for preserving sediment cores and biological specimens.

Total complement of the vessel will be 37, of which 19 will be scientists and the rest officers and crew.

Science News Letter, December 5, 1959

## ENGINEERING

**Phone Line Baffles "Bugs" With Petticoats of Foil**

A TELEPHONE line that thwarts "bugging" by persons who want to eavesdrop has been perfected. It even counteracts eavesdrop equipment that works on the induction principle, rather than by a direct line-tap connection.

Furthermore, by sounding an alarm, the cable indicates that someone is trying to tamper with the wire, thus providing the opportunity to catch the eavesdropper with his receiver down.

Mosler Research Products Inc., New York, reported the cable will guard television, telephone, or wire photos on international communications networks. The cable's secret is a series of foil "petticoats" around the wire. These sheaths are connected to a highly sensitive relay. The relay is activated when electric current changes in the cable as little as two one-millionths of an ampere. As a further safeguard, a noise generator "talks" into the cable and makes such an unfilterable howl that it is impossible to listen-in with induction equipment.

Science News Letter, December 5, 1959

# E FIELDS

## RADIO ASTRONOMY

### Space Research Center To Probe Jupiter's Air

THE WORLD'S largest radar antenna soon to be built in Puerto Rico will be used to probe the surface of the planet Jupiter.

If radar signals are reflected by Jupiter, United States scientists expect to gather new information about the planet's surface. If no signals are reflected, scientists will know for the first time that this largest of the outer planets is shrouded in a deep atmosphere that absorbs radio waves.

The giant radar, to be the largest in the world, is being financed by the Department of Defense and will be used by Cornell University's new Center for Radiophysics and Space Research.

The radar is to have a 1,000-foot receiving dish nestled in a natural bowl of coral limestone. This antenna is four times larger than Britain's powerful Jodrell Bank unit which now holds the record for contacting Venus.

The Cornell-designed radar unit is to be able to probe at distances of 400,000,000 miles. It will operate on a peak power of 2,500,000 watts and a frequency near 420 megacycles a second. The finger-like radar beam will be able to sweep 20 degrees in each direction, and may shed new knowledge on the earth's own ionosphere. In addition, the radar will be able to bounce signals from the moon, Venus, Mars, Mercury and the sun.

The Center for Radiophysics and Space Research will be directed by Dr. Thomas Gold, 39-year-old professor of astronomy, physics and electrical engineering. Other installations planned for the Center will include a radio astronomy receiving station south of Ithaca and a transmitting station on Cornell's campus.

Science News Letter, December 5, 1959

## PUBLIC SAFETY

### Cesium-137 Measures Strontium-90 in Soil

A CHEAPER measurement of the amount of deadly strontium-90 in a particular bit of soil now appears possible.

Monitoring another fission product, cesium-137, is the answer, Dr. Philip F. Gustafson of the Argonne National Laboratory, Lemont, Ill., reports in *Science* (Nov. 20).

Detecting cesium-137 can be done comparatively easily, he points out, because the gamma rays emitted by this radioactive substance have a much greater penetrating power than the beta rays emitted by strontium-90. Time-consuming and costly chemical processes are needed to detect the strontium.

Relatively inexpensive surveys of wide coverage could be undertaken by monitoring cesium-137 not only in soil but also in a great variety of important materials, Dr. Gustafson concludes.

Nine samples of soil which had already been analyzed chemically for their strontium-90 content were analyzed for cesium-137 by scintillation spectrometry. According to the results, the soil strontium concentration can be determined within an error of 20% by measuring the cesium-137 content and dividing by 1.6.

There is, however, an "obvious" need to extend these observations to soils in other places, Dr. Gustafson points out.

Science News Letter, December 5, 1959

## ZOOLOGY

### Expedition Brings Back "Down-Under" Opossum

A FAST-MOVING, rock-dwelling opossum from northern Australia is one of more than 1,000 rare animals recently acquired by the American Museum of Natural History, New York, as the result of an expedition headed by Russell F. Peterson.

The specimens, which include reptiles and amphibians as well as mammals, arrived after traveling two months from Brisbane, Australia.

A bat with long, rabbit-like ears and wings that appear to be pure white is among the rarities. Some 16 snakes new to the Museum's collection, a side-necked turtle, an 11-foot amethystine python, and a striped ringtail (an opossum whose fur has a greenish tinge) are also included in the new collection.

Science News Letter, December 5, 1959

## ANTHROPOLOGY

### Find Shanidar Man Not "True" Man

FRESH EVIDENCE that modern man is not descended from the Neanderthaler is presented by the 45,000-year old skull, found badly crushed below the floor of a cave in what is now northern Iraq by Dr. Ralph Solecki about three years ago when he was with the Smithsonian Institution. The skull was reconstructed by Dr. T. Dale Stewart, physical anthropologist of the Smithsonian.

It is notable that a form so primitive as the Shanidar Cave Neanderthaler should have lived so close to the time of the earliest known modern men. Despite its recency, Dr. Stewart points out that it shows no signs of a transition to modern man. Any evolution from this Neanderthaler to modern man would have required many generations if it could have occurred at all.

In fact, Dr. Stewart says, there is considerable basis for speculation that the Neanderthalers may have survived in this isolated corner of the world into the age of true men. It may have been the "true" men who destroyed the Neanderthalers and caused them to become extinct.

Science News Letter, December 5, 1959

## PHYSICS

### Advance Made in Thermonuclear Theory

A THEORETICAL advance by United States scientists trying to harness the hydrogen bomb's energy for peaceful purposes has been reported.

The discovery modifies recent Russian calculations and makes the outlook for ultimate success in taming the H-bomb fusion reactions much more promising. Dr. Marshall N. Rosenbluth, physicist with General Dynamics Corporation's General Atomic Division, reported the new contribution concerning the physics of hot ionized gas to a Symposium on Nuclear Fusion meeting in Austin, Texas.

The calculations of Russian scientists had indicated that if power-producing fusion reactors were built, they probably would have to be as large as hundreds of feet in diameter. Dr. Rosenbluth and Dr. William E. Drummond, also of General Atomic, found in their calculations that thermonuclear machines could be made considerably smaller than predicted by the Russians, and therefore of a reasonable size.

Drs. Rosenbluth and Drummond showed that the radiation emitted by a very hot plasma held in a magnetic field goes only in planes almost perpendicular to the magnetic field, not in all directions as the Russians had assumed. The U. S. scientists also showed reflectors could be used to reduce further the radiated energy.

Science News Letter, December 5, 1959

## ENTOMOLOGY

### Insects Winning Resistance Battle

INSECTS appear to be winning the costly battle—\$500,000,000 is spent each year on control—to keep them in check.

Resistance to insecticides is now virtually nation-wide according to results of an extensive study. Fairfield Chemicals, Food Machinery and Chemical Corp., New York, reported that only two states, Montana and Wyoming, are free of insecticide-resistant insects.

"Some chemicals, introduced as recently as three years ago, are already less effective in many parts of the country," John Rodda, Fairfield general manager, said.

Resistance can take many forms, research has shown. Some of these are: slow rate of absorption which prevents the insect's getting a lethal dose of insecticide; enzymatic changes that render the insecticide harmless; storage of the insecticide in non-sensitive parts of the insect's body; or, avoidance of the insecticide such as is seen by some insects changing their normal habitat.

The chemical industry, which produced some 575,000,000 pounds of pesticides in 1958, is constantly attempting to develop effective new insecticides and devise stronger formulations, Mr. Rodda said. They are needed, he pointed out, to "place us far ahead of the super insect."

Science News Letter, December 5, 1959