

## ASTRONOMY

**Saturn's Rings Less Than One Foot Thick**

► SATURN'S RINGS, the most beautiful telescopic sight in the solar system, are less than eight inches thick, not the ten miles previously thought.

This was discovered by two astronomers who studied some 1,000 photographs of Saturn taken from a South African observatory. At the same time, they measured the brightness of the planet and the rings by photoelectric means.

While the measurements were being made, the rings, sun and earth changed their relative positions. Thus the measurements gave information on which more accurate calculations of the rings' thickness than ever before possible could be made. The rings are about 45,000 miles wide.

The astronomers found that the relationship of length to width of the rings was 356,400,000 to one, a ratio never before found in nature. However, Drs. Allan Cook and Fred Franklin of Smithsonian Astrophysical Observatory at Cambridge, Mass., have as yet no theory concerning the reason for this unusual ratio—they are too busy making further calculations.

These may show that the vast rings are even less than eight inches—only four inches—thick.

Saturn's rings were discovered by Galileo in 1611, and posed two major questions: "What are they made of, and how thick are they?"

About 100 years ago, the first question was answered by Clerk Maxwell, who showed that they are almost certainly composed of dust, snow and/or ice particles.

• Science News Letter, 83:168 March 16, 1963

## GEOPHYSICS

**Scientists Measure Drift Of Ionospheric Clouds**

► HORIZONTAL movements of clouds of ionization in the ionosphere surrounding the earth are being measured by scientists of the Commerce Department's National Bureau of Standards.

The technique of measuring the movements, developed by J. M. Watts and Kenneth Davies of the Bureau's Boulder, Colo., Laboratories, is based on Doppler changes in the frequency of a reflected radio signal.

Movements of ionized clouds have been shown in experimental use of the technique by means of a transmitter and spaced receiver.

The new technique showed that reflection levels bob up and down.

The earth's ionosphere is neither homogeneous nor stable, but consists of layers of ionization at various levels which change position from time to time, largely in characteristic daily and seasonal patterns.

The NBS Central Radio Propagation Laboratory at Boulder, Colo., has collected ionization and height data from stations in all latitudes for a number of years.

Many of these measurements were obtained from the ionosonde, a radar instru-

ment developed by NBS to record distances to the ionized layers in terms of the times taken by radio pulses to travel to the reflecting levels and back, on various frequencies.

The ionograms obtained from such an instrument give layer heights sampled at regular time intervals, from which long-term changes can be deduced, but not short-term variations in height. A frequency-sensing instrument was devised at the Bureau to supplement ionogram data.

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## PHYSIOLOGY

**Heavy Cigarette Smoking "Ages" Lungs 20 Years**

► IF YOU ARE a heavy cigarette smoker, your lungs may "age" as much as 20 years more than normal.

Dr. Roger Larson, a medical researcher at the University of California, Los Angeles, investigated lung function in more than 600 smokers and nonsmokers in Fresno, Calif. Questions were asked about their smoking habits and their medical history.

X-rays were taken of each subject and at least two tests of breathing capacity, known as spiograms, were made. The subject exhaled into a device that plotted a graph of his lung function, or breathing capacity.

Those who had abnormal X-rays, a history of lung or heart disease, technically poor spiograms, incomplete medical histories, or who smoked only cigars or pipes were eliminated from the final analysis.

This left a total of 418 whose spiograms were divided into groups according to sex, age and smoking habits.

Marked differences in lung function were noted between smokers and nonsmokers, particularly beyond the age of 29. Dr. Larson found the spiograms of smokers equivalent to those of nonsmokers 20 years older.

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## GENERAL SCIENCE

**Library of Congress To Tell Who Knows What**

► THE GREAT WORLD depository of books and knowledge, the Library of Congress, is about to expand its services to the nation's scientists.

The National Referral Center for Science and Technology is being established with the support of the National Science Foundation. Its first step as a clearing house will be to publish directories and listings, and catalogue data centers, specialized libraries, abstracting and indexing services, scientific journals and other sources of published and unpublished information.

The center will tell scientists and engineers where they may turn to for advice on where they can find the material they need.

Eventually the center expects to keep current records on tens of thousands of information resources in this country and abroad.

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**IN SCIEN**

## ANTHROPOLOGY

**New Type of Family Needed Today**

► THE MODERN American family is not doing its job very well.

The time has come to design "a new type of family life," Dr. Margaret Mead of the American Museum of Natural History said.

The small isolated family of the U.S. is not the best unit to handle the confusing conditions of modern life.

The U.S. is moving toward "a new family form," Dr. Mead told the 39th annual conference of the Child Study Association of America in New York.

Grandparents were once considered relics of the past, valuable mainly for their knowledge of the past. However, in today's world of rapid changes, grandparents know more about adjusting themselves to new ways than anybody else. Instead of reminiscing about the past, they can help those younger meet the future.

Children are more at home in the space age than their parents, Dr. Mead said, and the family should be reorganized so parents can learn from their children's experiences with new things and ideas.

The mass media have taken over the moral training of children, Dr. Mead believes. Young parents, off on their own, have a hard time bringing up their children.

These are conditions that "have never existed on this planet before," Dr. Mead said, and a new kind of family will grow from them.

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## TECHNOLOGY

**Corrugated Boxes Strong After Two Decades**

► AGE has little effect on the tensile strength of paperboard or on the top-to-bottom strength of empty corrugated boxes, tests at the United States Forest Products Laboratory in Madison, Wis., have indicated.

The studies were made with a variety of paperboards kept in storage at the laboratory for 24 years, and showed no significant difference in the physical properties of the paperboards through the years.

Some hardening or stiffening effect was indicated in the tests, when compared with results of tests 24 years ago. However, the basic weights of the paperboard sheets remained about the same, and the tensile strength values, or stress at maximum loads, were only slightly lower for the aged materials.

No rough handling tests were made, but laboratory researchers thought it possible that very old paperboard boxes would not take rough handling quite as well as new ones.

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# CE FIELDS

## ORNITHOLOGY

### Birds Freeze or Starve In March and April

► DO NOT STOP feeding those feathered friends, even though spring is almost here by the calendar.

The most serious bird losses due to freezing and starvation usually occur in March or April, the National Audubon Society said in New York.

This is the season when late winter storms strike and natural foods are still frozen and difficult to find. Wild birds grown accustomed to finding food in bird houses, window sills or other feeding stations often cannot fend for themselves during late-season freezing.

Winter bird feeding should be continued until spring really arrives with enough insects, worms and seeds to satisfy the birds. This usually happens about April 1 in states along the Mason-Dixon Line and about April 15 or May 1 in the more northern states.

Many persons find enjoyment in feeding birds regularly all year long, and it is helpful to birds to be fed during nesting time.

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## BIOLOGY

### Space Food Harvest May Be Speeded Up

► ONE-CELLED algae are scheduled for use in space as food and oxygen restorers. Now crops of algae can be multiplied millions of times by speeding up their day and night cycle.

These minuscule plants are each only two ten-thousandths of an inch in diameter, yet they are being investigated for practical use in space exploration because they would replenish the oxygen supply in the spaceship, as well as provide food for the men.

In the life process, algae convert carbon dioxide exhaled by people to oxygen—the reverse of the human respirational system. The tiny plant also converts light energy into protein, a highly desirable kind of food. This plant factory operates with a minimum of cell structure.

Research to reap a large harvest of this vital plant by speeding up the life cycle is underway, directed by Prof. William E. Fontaine, head of the Ray W. Herrick Laboratories at Purdue University, Lafayette, Ind.

The optimum day and night sequence for algae may be as short as thousandths of a second, although there is not complete agreement on research results at this time. Purdue researchers are speeding up the light and dark sequence of the algae by constructing a kind of tubular factory that

would be lighted from outside at various points. In this container, algae would be suspended in water with a controlled flow so that the plants would be exposed to light and dark sequences at intervals found most efficient, measured in millionths of a second.

Animals on the earth will be better fed with a large crop of these tiny one-cell plants, as well as men in space.

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## ORNITHOLOGY

### Wild Birds Migrate From British Winter

► WAVES of wild birds migrating from Britain to Ireland and the continent of Europe to escape the prolonged cold and a shortage of food are reported by naturalists in the south and southwest of Britain.

F. Clifton of the Portland bird reserve, Dorset, said: "Birds have been passing London, heading south, in successive waves. We have found many completely exhausted and have picked up about 80 already dead. First there were the plovers, then thrushes and pigeons."

Some 500,000 starlings have flown off from Berriew, Montgomeryshire, in the direction of Ireland. Other migrating birds include fieldfares, redwing and lapwing.

Other species that have suffered are the blue tit, gold crest and tree creeper. All are small birds that have difficulty to keep up their body heat when temperatures are low and food scarce.

The great problem of wildlife is not so much the cold as the difficulty of finding food when the ground is covered by snow, and streams and lakes are frozen over.

Flocks of pigeons have stripped fields of vegetables in Yorkshire. In Dorset, magpies have been seen perching on the backs of cattle and pecking at their flesh.

Many species are undoubtedly saving themselves by forsaking the open countryside and clustering round houses and villages where householders have put out breadcrumbs and scraps. Even such shy birds as linnets and larks have been seen in back gardens.

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## PUBLIC SAFETY

### More Flying in U.S. With Greater Safety

► AMERICANS are not only flying more on scheduled airlines each year but more safely, despite the occasional headline about an airline tragedy.

In 1962, a record travel year for the 61 million passengers carried, the fatality rate per 100 million passenger-miles was down to 0.27, a low for the last six years. The figure was 0.29 for 1961, 0.75 for 1960, 0.70 for 1959 and 0.38 for 1958.

Fatal accidents were at a record low, five, for both 1962 and 1961. The number of passenger fatalities was up to 158 for 1962, after having been down to 124 in 1961, according to the Civil Aeronautics Board.

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## METEOROLOGY

### Press Kiosk Button in Kiev for Weather

► AT KIOSKS in Kiev, the Russian man in the street has only to press a button to have a beautiful girl tell him personally, by closed circuit television, what the weather will be.

This unique method of weather reporting is supplemented by methods familiar in the U. S.—telephone service, newspaper weather forecasts, and radio and TV forecasts every hour on the hour.

A delegation of Soviet meteorologists visited U. S. Weather Bureau installations, the first of such exchanges of scientists under the new cultural program between the two nations. A reciprocal visit of American weathermen to Russia is being arranged.

Dr. Konstantin T. Logvinov, deputy director of Russia's Hydrometeorological Service, headed the delegation which was received in Washington, D. C., by Dr. F. W. Reichelderfer, chief of the U. S. Weather Bureau. Other Russian scientists were V. D. Karmanov, M. G. Prikhodko, V. P. Sadokov and V. Y. Fedosenko.

They visited Asheville, N. C., also, where the Weather Bureau has a National Records Center that keeps track of world data.

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## TECHNOLOGY

### Coastguard Surfboat Has Glass Fiber Hull

► THE U. S. Coast Guard has adopted a new type of rescue surfboat.

Its new 26-foot craft is using glass fiber for its hull for the first time, rather than wood. Another first is use of a small gas turbine for power, rather than a diesel engine.

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## ZOOLOGY

### Sea Lions Use Sonar Signals as Do Porpoises

► TAPE RECORDINGS of the underwater noises of captive California sea lions show that the animals are guided largely by the same pulse-type sonar signal systems that guide bats and porpoises.

Dr. Thomas C. Poulter of Stanford Research Institute, Menlo Park, Calif., analyzed the noises he heard and concluded that the sea lions show "an amazing sophistication so far as echo ranging is concerned."

He found that they picked up fish thrown into their pools just as easily in darkness as in the daytime. Upon analyzing the sea lions' method of retrieving fish at night, the researcher found a double pulse, the first containing three to nine waves, with an average of about five.

Additional records made of the underwater noises of the Stellar sea lion, the elephant seal, the harbor seal and fur seals strongly indicate that they, too, make use of pulse-type sonar signals. Dr. Poulter reported in Science, 139:753, 1963.

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