

SPACE

Gemini Program Gets '65 Astronaut Line-Up

► EIGHT U. S. astronauts for the 1965 Gemini program have been named.

Two U.S. Air Force captains, James A. McDivitt and Edward H. White, are scheduled to make four orbits in late June or July on GT-4.

Air Force Capt. L. Gordon Cooper Jr. and Navy Lt. Charles Conrad Jr. will make the GT-5 flight in September or October.

The crew for GT-6 which may be the first attempt to rendezvous two objects in orbit and planned to last two days, has not yet been officially announced, but informed sources believe that Navy Lt. Cmdr. Walter M. Schirra and Air Force Capt. Thomas P. Stafford will be named for the flight.

Air Force Capt. Virgil I. Grissom and Navy Lt. Cmdr. John W. Young had already been announced for the GT-3 flight to take place this spring.

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ZOOLOGY

Plastics and Steel Wire To Modernize Zoos

► THE PROUD high-soaring eagles should not be put in a chicken coop—and it is a great waste of space to put a chicken in a large cage, believes Dr. Theodore Reed, director of the National Zoological Park in Washington, D. C.

Letting the birds and animals move, eat and sleep in the natural way they are accustomed to is one of the goals of alert zoo officials working to present nature's beautiful wild creatures to men, women and children in a safe and convenient manner, Dr. Reed told the members of the Cosmos Club, Washington, D. C.

Plastics and high-tensile steel are some of the materials being used to modernize zoos throughout the world and give an appearance of watching animals in their natural surroundings.

"The old traditional cell block theory is out," he said. Zoo specialists are trying to get away from masses of concrete and the dingy small square cells that for years have housed many a bored and frustrated animal.

Almost all zoos are taking advantage of translucent, lightweight and flexible plastics for use as skylights or walls, he said. Attractive and well-made plastic plants are also set by themselves or in combinations with natural plants to give an atmosphere of reality wherever possible to zoo cages.

Today zoo designers are interested in construction that eliminates heavy bars or appearances of cages. In Switzerland, for instance, high tensile strength steel mesh holds lions and gorillas confined and yet gives the illusion of freedom.

The construction of moats, either dry or filled with water, has been used successfully to keep the animals in their places and yet allow the visitors a clear view. The choice of a dry moat, such as used in Gelsenkirchen, Germany, or of a wet moat, such as those of Paris and Munich, depends on

local conditions of climate, appearance and cost. Wet moats are not advisable for northern climates, for instance, because they can freeze in the winter.

Another trend of modern zoo face-lifting is to enclose a family group of animals in natural surroundings so that the complete life cycle can be seen. This includes a breeding unit where the mother and her young can be observed eating, nursing and carrying on their normal life activities.

Many zoo officials are first concentrating on housing and preserving those precious creatures now being threatened with extinction by expanding civilization.

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TECHNOLOGY

Straighten Pisa's Tilt, Russians Suggest

► THE RUSSIANS ARE promising the world they can straighten the leaning tower of Pisa.

The Soviet Information Service in London issued a bulletin pointing out that a country which thinks nothing of straightening a minaret, tower, or wall after an earthquake can be relied on to solve Italy's problem.

Prof. Mikhail Tupolyev has been appointed chairman of a commission to save Pisa's tower and he plans to use the "daring technical solutions" perfected by the engineer Vladimir Shukhov which involves chiseling a wedge under the part of a building that has not subsided. The foundations are then lowered until the tilt has been corrected and the remaining space is filled with cement.

The method of lowering the foundations is a Russian secret which they have chosen not to disclose. Nor have they told the Italian Government that they propose to deprive the country of one of its principal tourist attractions.

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AERONAUTICS

Airplanes Are Leaving Their Pilots Behind

► MANY PLANES today are so advanced that their pilots limit their performance.

This is the opinion of the director of the National Aeronautics and Space Administration's aeronautics division, Charles W. Harper.

Planes can now do more than their pilots are capable of letting them do, believes Mr. Harper. Too much of a pilot's time is spent in acting as a mere servo-mechanism, he said, and a limited one at that.

"We don't want to demand so much activity as a servo-mechanism that we interfere with the pilot's use of his intelligence," said Mr. Harper at a luncheon of the Aviation and Space Writers Association in Washington, D.C.

One step toward eliminating the mechanical tasks is the "approach-coupler." Many airlines have accepted the device for use in landing jet transports, said Mr. Harper.

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IN SCIEN

ASTRONOMY

Uranus, Neptune, Pluto Formed by Snow Storm

► THE THREE most distant planets in the solar system—Uranus, Neptune and Pluto—as well as hundreds of comets, formed from a giant snow storm 50 to 60 times as wide as the distance from the earth to the sun.

This is the theory of Dr. Fred L. Whipple, director of the Smithsonian Astrophysical Observatory, Cambridge, Mass.

As the huge hot cloud of gas surrounding the already-formed inner planets condensed, it began to cool, freezing first one element and then another into solids. Iron and similar elements formed dust, after which hydrogen and other gases turned into frozen vapors or snow.

The resulting snow storm, 200 times the mass of the earth, may have measured more than 5.5 billion miles across.

The snow and dust condensed into solid lumps of "dirty ice," the three largest becoming planets and the other comets.

Dr. Whipple described his theory at a symposium in Denver on unmanned exploration of the solar system, sponsored by the American Astronautical Society.

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PUBLIC HEALTH

Children Mainly Hit By U.S. Flu Outbreak

► CHILDREN rather than adults have been reported getting influenza in the United States this winter, but the U. S. Public Health Service says there is no sign of an epidemic.

The only identified A-2, or Asian flu, virus has been found in Allegheny County, Pa., Morbidity and Mortality Weekly Report, Feb. 5, 1965, of the Communicable Disease Center, Atlanta, Ga., stated.

Influenza cases have been mainly confined to New Jersey, Connecticut, Massachusetts and Pennsylvania, with flu-like illness reported in northern Maine. The latest outbreak has been in Missouri, with preliminary studies pointing to possible Asian flu.

So far, no marked changes in the flu virus have been noted, and it is believed that the flu vaccine now in use will be effective next year.

The first definite influenza was confirmed at a state school for boys aged 9 to 16, near Jamesburg, in Middlesex County, N. J. Older boys returning from the Christmas vacation in the Newark, New Brunswick and Paterson areas developed acute fever with respiratory illnesses. Some of them had fever up to 104 degrees Fahrenheit. Attempts to isolate the specific virus are under way.

Among the 700 pupils enrolled in the school, 22% got flu.

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CE FIELDS

SPACE

Glass From Outer Space Has Ripples Like Water

► **TEKTITES**, the strange droplet-sized glassy lumps that some believe have fallen to earth from space, ripple like water as they hurtle through the air.

All attempts to learn what causes tektites or where they come from have failed so far. However, one of the mysteries of the obsidian-like particles appears finally to have been unraveled.

The tektites are not just shapeless masses. On one side most of them have a series of concentric circular ridges, like the waves caused by throwing a stone into a pond. Using laboratory models, two scientists have shown that the ridges could be "petrified ripples," originally created by the friction of the atmosphere.

Two-inch spheres made of tar-coated wood were mounted in a wind tunnel, which was placed vertically so that the effects of gravity and the deceleration of the atmosphere could be reproduced.

A few seconds after the air stream was turned on, small bits of melted tar built up on the spot of each sphere pointing directly into the wind. Under the pressure of the air, the spot turned into an expanding ring, or wavelet, moving along the sphere away from the air stream. As the wavelet moved "rearward," another spot formed.

Although this theory may explain one phase in the life of tektites, their origin is still unknown. The study was performed by Simon Ostrach of Case Institute of Technology, Cleveland, Ohio, and Dudley G. McConnell, of NASA's Lewis Research Center, Cleveland. Their findings were reported at an aerospace sciences meeting of the American Institute of Aeronautics and Astronautics in New York.

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METEOROLOGY

White House Located in Washington Heat Island

► **THE WHITE HOUSE** is a hot spot in Washington, meteorologically as well as politically.

The President lives within Washington's heat island, which is made warmer than surrounding areas because of heat from buildings, automobiles and paved roads.

In the spring, a popular time for tourists to visit the capital, the latest date for a temperature of freezing is March 29 at the White House. In the suburbs less than 15 miles away, freezing temperatures are recorded as late as April 20.

For the year as a whole, temperatures at the White House average three degrees higher than those only ten miles away.

The charts and figures showing how

weather factors vary in the immediate Washington area were compiled by Clarence A. Woollum of the U.S. Weather Bureau, Washington National Airport. In *Weatherwise*, 17:262, 1965, American Meteorological Society, Mr. Woollum credited the volunteer observers of the Washington metropolitan area who helped to gather the information during the past 15 years.

Washington is not alone in having a heat island. Each city and town has its own particular area where temperatures are higher than around it. The location of such an area depends on the general climate, topography and the heat produced from buildings, factories and other heat sources.

Most of these heat sources spew particles into the air, contributing to air pollution. These particles appear to move about over the city within the central area of the heat island.

Precipitation also varies in the Washington area, with the highest rates being recorded to the north and west of the city at the higher elevations. The least amounts of precipitation are at the lower elevations in the valleys of the Potomac and Anacostia Rivers.

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PUBLIC HEALTH

Fats, Smoking Attacked In War on Heart Disease

► **TAKE EXCESS** fat out of the U. S. diet and reduce the danger of heart trouble, advises the American Heart Association.

Animal fat on the dinner table and cigarette smoking are both spotted in this organization's 40th annual report as dangers to be avoided, not only by persons overweight or with high blood pressure, but by everyone.

The 1964 report suggests that Americans eat less animal fat and substitute vegetable oils or other polyunsaturated fats in their diets. Even though "final proof is not yet in hand that dietary changes will prevent heart attacks or strokes," the report says it is time to apply lessons from worldwide research indicating a relationship between the amount and type of fat consumed, the average cholesterol levels found in a population and the reported incidence of coronary disease.

Cigarette smoking is another important risk factor in "coronary proneness," the report says, pointing out that it has been conservatively estimated that at least 100,000 premature deaths occur in the United States each year from heart disease associated with this cause.

Prevention of stroke, second to coronary disease as the most important complication of atherosclerosis, should be aggressively undertaken, the Association's report emphasizes. Although an estimated two million Americans are now alive who have survived stroke, their survival has created problems of rehabilitation and care that are often more difficult to solve than those arising from coronary heart disease. There was a 26% drop in the death rate from stroke among men 45 to 64 years of age between 1950 and 1962.

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RADIOLOGY

X-Ray Exposure Causes Hereditary Rat Cataracts

► **FURTHER STUDY** into the effect of X-ray irradiation of the entire body, in this case using rats, shows that hereditary cataracts have been caused in the third generation of the exposed animals' offspring.

Two scientists in the Center of Nuclear Energy Study, Mol, Belgium, report in *Nature*, 205:615, 1965, that their radiation experiments with young rats had previously caused some dwarfed animals in the first generation of offspring. These animals continued to produce about five percent dwarfs, and in addition, some of the third generation offspring had cataracts.

Drs. A. Leonard and J. R. Maisin of the center's department of radiobiology found in breeding tests that 100% of the offspring had cataracts when both male and female rats with cataracts were mated. When a normal animal was mated with an animal with cataracts, their offspring were normal but the next generation showed an occurrence of cataracts in a ratio of one to four.

The researchers give an example of a 17-day-old female irradiated with 150 roentgens of total-body X-ray radiation.

At the age of 70 days, this female was mated with a control, or normal male, and produced two generations of offspring with normal eyes. In the third generation about 25% had cataracts, although all animals were not affected at the same time.

At weaning, about 75% of the mutant offspring showed bilateral cataracts, while 25% had one or both lenses that appeared to be normal. At 70 days of age, however, bilateral cataracts were present in all mutants.

The researchers say their breeding tests have established that this mutation is inherited as a "simple recessive factor." In genetics, this means a factor that in the presence of a dominant factor is not expressed.

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PHYSICS

Interlocked Laser Beams From Interference Rays

See Front Cover

► **Two beams** from a laser, which gives an extremely intense light, for the first time have been locked to each other in phase, or in step. The beams combine and interfere with each other, resulting in alternating light and dark rings.

To obtain such interference rings, the two beams must be at the same frequency and their phase difference must be within a third of a degree of each other. The experimental locking was achieved by Drs. Louis H. Enloe and John L. Rodda of Bell Telephone Laboratories, using a feedback loop. Seen on the front cover is Dr. Enloe observing the laser pattern.

In experimental light communications systems, a transmitting laser would be tracked by a receiving laser and phase-locked onto it some distance away.

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