

people and wiped out 29 villages in the Erzurum region of Turkey.

**A National Earthquake Information Center** was established to disperse information on earthquakes occurring around the world.

**A new scientific base**, called Plateau Station, was set up on a 13,000-foot ridge on Queen Maud's Land in Antarctica, as part of the program sponsored by National Science Foundation and the U.S. Navy.

**Rocks are cracked** and broken by complex behavior of water molecules within the rocks, not by freezing and thawing processes, a new theory suggested.

**The size and shape** of the earth are being measured with the help of the Passive Geodetic Explorer Satellite.

**A 10-year project** to represent precisely the earth's geometric figure and gravitational potential was completed. The new "Standard Earth," based on 40,000 observations of artificial satellites, estimates intercontinental distances to an accuracy of less than 50 feet.

**The largest diamond** ever found in a meteorite was discovered in a fragment from the Arizona Meteorite Crater.

**A 100,000-year-old glacier**, on the October Revolution Island, part of the Arctic islands, was reported retreating in northwestern North America by Soviet scientists and U.S. geologists reported several spectacular forward surges of glaciers.

**The world** may contain 900 trillion

tons of organic matter rich in oil, with an energy potential about 18,000 times the amount the world consumes each year, according to calculations.

**During a period** of 25 million years, about 270 million years ago, the continents may have "sprinted," not drifted, at a rate of about one-half to three-fourths of a foot per year.

**A volcanic eruption** may have sent a raging river of melted glacier ice over a valley near Ross Island in Antarctica several centuries ago, cutting deep channels in bedrock, geologists reported.

**An 80,000-year-old** piece of coral from the Bahamas indicates that a huge thaw may have occurred during the last Ice Age.

**Evidence of lead pollution** of the atmosphere is being found in ice layers of the North and South Poles.

**Geologists** concluded that the pumping of waste fluids into a deep disposal cell at the Rocky Mountain Arsenal near Denver, Colo., appears to be a significant cause of a series of minor earthquakes that have occurred in that area since 1962.

**Drastic shrinkage** and disappearance of some permanent lakes on Long Island, N.Y., are definitely related to the five-year Northeastern drought, which was relieved, if not broken, by autumn rains.

### Archaeology and Paleontology

**With an ingenious method** of using cosmic ray detectors, archaeologists

hope to discover whether or not any unfound burial chambers exist in the ancient pyramids of the Pharaohs, now that an agreement has been signed by the Governments of the United States and the United Arab Republic condoning use of the method. The group will go into the Great Pyramid at Giza first.

**Fragments of pottery** dating back to 3000 B.C. with specialized decorations were unearthed on the coast of Ecuador, indicating that the Japanese landed in America thousands of years before any European.

**The oldest village** in the world with mud walls still standing was unearthed in southern Kurdistan in Iran, judged to have been built by people of the New Stone Age nearly 10,500 years ago.

**Huts of a village** estimated to be about 9,500 years old were unearthed at Tell Mureybat, a large mound on the Euphrates River, 200 miles from Damascus, Syria.

**The largest** single piece of carved jade ever found in Middle America, shaped in the form of a jaguar's head, was unearthed in an ancient Mayan tomb at Tikal, Guatemala.

**A dinosaur skeleton** 25 feet long, found in the Big Horn Basin of Wyoming and Montana, is about 11 million years old and considered one of the "missing links" in dinosaur evolution.

**The largest camping site** yet known of 10,000-year-old Ice Age hunters has been found on the outskirts of Albuquerque, N. Mex., including two lodge type houses.

## CONSERVATION

# Resources Becoming Critical

In today's world where increasing numbers of people are overflowing their cities, crowding into newly developed lands and facing a growing threat of famine, man is becoming forcefully aware of the importance of conserving the world's natural resources. Consolidated efforts, perhaps even too late, are being planned to save our water—save our land—save our air—save our wildlife and in essence, save our earth.

Of these vital resources now being polluted, used up or killed, water is probably of prime importance. Federal, state, city governments and private industries are making sharper attempts to clean lakes, rivers and other water courses; to determine methods of reusing these waters; and to locate new sources of fresh water. Efforts are also being made to protect the oceans from

becoming polluted or misused, and to investigate methods for extracting fresh water, minerals and protein food. The growing problem of food supply is forcing more careful use of arable land and greater strides in creating useful crops and forests that resist ravages of insects, drought and air pollution. The realization that polluted air can cause disease, death and accidents is tightening controls over automotive exhausts, industrial smokestacks and building incinerators. Along with the need to conserve the essential resources rides an awareness that wildlife and forests, beaches and rivers of natural beauty should also be conserved in order to nurture the spiritual needs of mankind.

During the year:

**One of the hottest** controversies of conservation raged over the proposed plan to build one or more power dams

over the Grand Canyon, thus destroying much of its scenic beauty and historical value. The plan died in Congress, but increasing demands for water in that area will create new proposals.

**Water shortages** and growing pollution problems became more critical in many regions of the United States, causing the Committee on Water, sponsored by the National Academy of Sciences-National Research Council, to call for new methods of water planning with long-range projects.

**The President** transmitted to Congress legislation which would authorize federal participation in the development of the world's largest water desalting plant. The plant would produce 1,800 megawatts of power and 150 million gallons a day of water.

**A scientist** of the Lamont Geophysical Observatory proposed damming off

both ends of Long Island Sound, creating the largest fresh water reservoir in the nation.

A **three-ship Canadian "navy"** is fighting water pollution in the Great Lakes by checking the industrial, domestic and surface pollution from Ontario and their effects on the Lakes.

**New kinds** of spectrographic analysis and other advanced methods for quickly detecting polluting chemicals and bacteria were reported.

**The oceans** can no longer take all man-made wastes such as crude oil, radioactive elements, heavy metals and chlorinated hydrocarbons, warned a 54-nation Intergovernmental Oceanographic Commission sponsored by UNESCO.

A **500-foot deep well**, first of a series, is being installed to pump about 400 gallons of fresh water per minute into sands near the southern coast of Long

Island to keep salty ocean water from moving in.

**Cessation of plans** for the immense, expensive Rampart Dam proposed for the Yukon River in central Alaska, was urged after 16 months of study by a six-man team commissioned by the Natural Resources of America.

**Scientists continued** to make strides in combatting insect pests with biological factors instead of harmful chemicals, including use of natural enemies of insects such as bacteria, viruses and protozoa; use of high-energy gamma rays, infrared and other powerful radiating waves; and energy waves such as sound, light and heat.

**Plants** such as grapes, beans and spinach are being cultivated to be less sensitive to air pollution.

**Forest genetics** experts are breeding pine seedlings that grow faster, resist

disease, and produce more and better pulpwood.

**The Sequoia redwoods**, *Sequoia sempervirens*, some of the world's oldest trees, were centers of bitter fights between conservationists and lumber and highway interested people.

**Yielding under pressure** from President Johnson and an aroused public, California lumber companies agreed to stop cutting "park quality" redwood trees within the confines of a proposed Redwood National Park.

**The bald eagle**, symbol of America, was given better protection in federal refuges, where one square mile around each nesting tree is now closed off.

A **mother Southern Right whale** and her calf were sighted and driven out of Sydney Harbor, on the New South Wales coast. The two are perhaps the last survivors of a species.

SPACE

# On the Way to the Moon

by Jonathan Eberhart

The space story in a nutshell was: U.S. astronauts did, Soviet cosmonauts didn't, and the moon had more oglers than Sophia Loren.



Eberhart

The next chapter of the space story in a nutshell will be: What next?

Though a manned moon landing is still some two years off, most of the work has been done already. The

huge space companies, many of which have grown almost from nothing solely because of an address by President Kennedy declaring the moon to be a national goal, are turning to other things, diverting their vast engineering and scientific teams to more earthly problems such as pollution and medicine.

It is taking man a decade to tool up for going to the moon. If he is going to Mars, those preparations may take even longer. While trying to make such a monumental decision so far in advance, NASA is finding itself stuck for ways to sustain its more than \$5 billion budget.

Though the Space Age is moving so fast that a lot of hardware is far behind the state of the art by the time it is built, NASA's biggest hope to

plug the economic dike is the Apollo extension system, a plan to use Apollo-style hardware for a range of projects including space stations, moon flights and other missions.

A series of mishaps during the past year, mostly involving Apollo testing, have caused considerable delays and shufflings in the early flight schedule, but NASA doggedly maintains that the manned lunar landing will take place on time. It can still happen, but the program is now so tight that there's barely enough "padding time" left to bite your nails.

During the year:

**The only men** in space were Americans, riding five Gemini spacecraft. Each flight had its spacewalk, some finally got some docking practice, and the net result was that although a lot was gained toward the Apollo flight to the moon, working in space turned out to be a lot harder than previously imagined.

**The moon** was scouted like never before in 1966, especially by two spacecraft that first settled gently down in a blast of retrofire, then sent back to earth the first pictures ever taken from the lunar surface. The Russians were first with Luna 9, the Americans followed four months later with Surveyor 1, which amazed even its inventors by surviving for months instead of for only a single two-week lunar "day."

**Luna 10** was launched in April into orbit around the moon, equipped not with cameras but with a gamma ray spectrometer to analyze the lunar rocks. Next was the U.S. Lunar Orbiter 1, which took the first U.S. pictures of the far side of the moon, followed by Luna 11 from the Soviet Union, weighing more than four times as much as the U.S. spacecraft, then Luna 12, and Lunar Orbiter 2, which obtained the high resolution photos its predecessor missed.

**Three satellites** were launched for the Environmental Science Services Administration, the first two forming a global storm patrol, and the third being the first Tiro-type satellite to carry two advanced vidicon camera systems, each capable of complete daily coverage of the world's weather.

**The years-behind-schedule** Orbiting Astronomical Observatory finally got off the ground, only to have its battery fail after two days in orbit. Two months later, however, the Orbiting Geophysical Observatory, OGO-3, did everything just right and set to work with all 21 of its experiments going.

**The second Nimbus** weather satellite, largest meteorological satellite ever launched, was lofted perfectly, photographing everything from tropical storms to nighttime clouds.

**At least 27** of the Soviet Cosmos catch-all satellite series were launched this year, notably including No. 110,