

## GENERAL SCIENCE

# Science Forecast of 1960

**New probings of atom, new nuclear power production, first man in space foreseen for coming year. Space probes will go to vicinities of moon, Mars and Venus.**

## See Front Cover

## By WATSON DAVIS

THE YEAR 1960 will see significant events in atomic power, probings of the atom and spectacular adventures into space. It will be a year of fulfillment in major efforts that began several years ago.

In less physical research, continued efforts will be fruitful. Discoveries relating to human origins and ancient man promise to bring revisions in our detailed ideas about evolution, while from China, the Mediterranean region and Africa there will probably be new finds of significance. The relationship of the East African ancient man-like creature, *Zinjanthropus*, discovered in 1959, to another possible human progenitor, *Australopithecus*, will be determined.

Medically, the big hope will be to turn up among the thousands of drugs being tested on animals a chemotherapeutic agent of promise in controlling cancer. We may hear something of attempts to immunize against some diseases now checked by antibiotics or chemicals.

## Mice For Research

The photograph on the cover of this week's SCIENCE NEWS LETTER shows one of the 100,000 mice which Lederle Laboratories uses annually in its cancer research program. The mice are "grown" at a special farm in Wyckoff, N. J.

In the promising studies of complex chemicals in growing cells and the mechanisms of reproduction, biochemists may come closer to delineating the organization of the life processes, so basic to understanding healthy growth and disease processes.

These are some of the broad fields in which 1960 progress seems to be likely. There are always unpredictable breakthroughs that may occur on the far-flung and augmented scientific effort in other parts of the world, notably Russia, as well as the United States.

The time has not yet arrived when atomic power from fission of elements, principally uranium, will furnish a major part of our power, but more giant reactors will begin work here and abroad and the intensive program of nuclear-powered submarines continues under full fission. The Dresden reactor at Morris, Ill., will join the two-year-old Shippingport, Pa., atomic power station in full power operation, while two other power reactors, the Enrico Fermi plant at Lagoona Beach, Mich., and the Yankee Atomic Electric Co. installations at Rowe, Mass., will both go critical. This

will bring 440,000 electric kilowatts of power into actual production or on the verge of it. The nuclear ship Savannah will start up its reactors during the year. A couple of dozen U. S. nuclear submarines are being constructed. Britain and Russia, too, are having atomic power plants come into production and the first U. S.-built (Westinghouse) power reactor in a foreign country will go critical in 1960 at Mol, Belgium.

There will continue to be apprehension as to the safe disposal of the radioactive wastes of such power plants, and this problem, like atomic test explosions with their fallout danger, will have international attention.

The ban on atomic explosions will probably continue during the year although there may be an internationally conducted test to demonstrate that a small underground blast can be detected by the proposed monitoring system.

The progress in 1959 toward a controlled hydrogen bomb reaction for power purposes does not give promise that this will be achieved in 1960, although the extensive research in progress may prove productive.

Gigantic atomic accelerations for research on the fundamental atomic particles are being built and these may discover facts

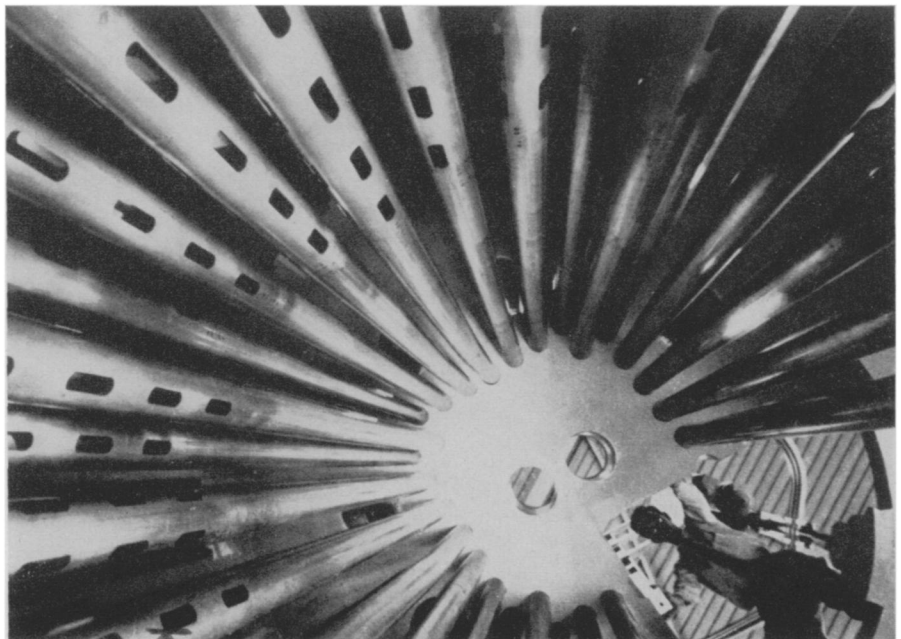
about the constitution of matter that will give new clues to tapping matter for practical power just as uranium fission ushered in the atomic age. Super accelerators in the range of billions of electron-volts are being constructed at Brookhaven on Long Island, N. Y. (30 bev protons), CERN at Geneva (30 bev protons), Argonne, Ill. (12.5 bev protons), U.S.S.R. (7 bev protons), Cambridge, Mass. (6 bev electrons) and Princeton (2 bev protons). Two or three of these machines will be completed in 1960 and scientists will start the search for new information about the basic forces and particles of matter. Some of these should create researchable quantities of anti-matter, particles that differ so in nature from the ordinary matter we know that they annihilate it in a gigantic flash of energy.

## Hop Into Orbit

Man's penetration into space will continue. It is possible that a man will make the first short hop into an orbit around the earth in 1960. He may be an American or a Russian.

Rockets to the vicinity of the planets, Mars and Venus, will carry observing instruments, and there will continue to be probes toward the moon. Better pictures of the hidden side should be obtained.

Among some two dozen space shots scheduled by the United States, one will launch a hundred-foot balloon satellite that



**INSIDE REACTOR TO BEGIN POWER PRODUCTION IN 1960—A view of the interior of the pressurized water atomic power plant that will go critical in 1960. Producing 110,000 kilowatts of electricity, it is being designed by Westinghouse at Rowe, Mass., for the Yankee Atomic Electric Co.**

will be used as a relay point for TV. It will shine like a bright star.

More image converters, electronic TV-like devices, will be attached to more big telescopes to improve man's observing power for viewing the distant universe. These will be applied to infrared spectroscopy and to the photographic measurement of very close double stars.

For more information about the universe as signaled by radio waves originating in various parts of the universe, two new 85-foot antennae of radio telescopes will go into service.

From a satellite there will be observations of X-ray-like cosmic radiations from space that outline structures of the universe different from those shown by light and radio.

With detectors of streams of particles from the sun installed in the polar regions, there will be better forecasts of interruptions of long distance radio communications, based on the concept that the fast solar particles from flares on the sun get to the earth near the poles, while the slow ones cause the world-wide auroral and communication disturbances.

The radiation belts discovered high above the earth will be further observed to find out whether there are several bands or just one with varying zones of intensity. The suspected connection between radiation belts and magnetic disturbances will be explored.

Weather maps will be extended still higher by mapping the ionosphere at fixed heights. There will be continued improvement of the long-range 30-day forecasts through use of progressing numerical computing techniques.

From the discovery of the triple chromosome pattern there promises to come explanations of some abnormalities like mongoloidism and possibly the origin of stillbirths, some miscarriages and some mental retardation.

Some psychiatrists are still searching for a safe and nontoxic energizing drug that speeds up human activity just as tranquilizers slow it down. This "anti-lethargy pill" would be a running mate to the psychiatric use of the drugs that have helped the management of the mentally ill. There is still need in the case of institutionalized mental patients for further development of "halfway houses," sheltered workshops and nursing homes to supplement the usual mental hospitals.

The attempt will continue to increase the effectiveness of science education at all levels to produce more scientists and technologists needed by the world, but it may become evident in the coming year that there is some fear that undue attention is given to the small fraction that is judged mentally superior.

The science forecast for 1959 made by Watson Davis, director of SCIENCE SERVICE, and issued a year ago was fulfilled in many respects.

There were rocket probes carrying instruments that reached beyond the moon, as predicted. Two of these space shots, one U. S. and other U. S. S. R., reached

the vicinity of the sun and became artificial planets.

The moon, as foreseen, was the prime space target. Accomplishment in lunar rocketry exceeded the expected as a result of Soviet rockets hitting the moon and getting an electronic view of its hidden side.

Not only was there exploration of the radiation belt around the earth that was discovered in 1958, but another one was found and U. S. A. space probes brought back information about these possible barriers to space travel by men.

Enhanced effectiveness of the world's second largest telescope, the 120-inch on Mt. Hamilton, Calif., was obtained by use of an electronic image tube, as predicted, when this new telescope went into service.

While a gigantic program of cancer research, seeking a chemotherapeutic agent effective against malignancies, continued, there was no breakthrough as had been earlier considered a possibility, not a probability.

The experimental plane X-15 did make its first test flights as foreseen.

Science News Letter, January 2, 1960

#### PUBLIC SAFETY

### FAA Retires Pilots 60 Years or Older in March

AIR-LINE pilots aged 60 or more must retire beginning March 15, 1960, according to a new Federal Government law.

There are now approximately 40 pilots of this age or older, Federal Aviation Agency Administrator, E. R. Quesada, has reported.

Mr. Quesada pointed out that in the absence of any regulation to the contrary, the growing number of pilots aged 60 and over would substantially increase during the next five years with some reaching the 65 to 70 category. In the next eight years approximately 250 air-line pilots will have reached the age of 60.

The FAA regulation is based on medical facts that clearly establish that sudden incapacitation, due primarily to heart attack and strokes resulting from deterioration of physiological and psychological functions, becomes significantly more frequent in any group reaching age 60, and such attacks cannot be predicted on an individual basis by prior medical examinations, an official statement read.

The Agency stated that because of deterioration of these functions, which normally occur with age, allowing pilots in this age group to fly airplanes that carry up to 165 passengers at speeds of 550 miles per hour would be hazardous.

Older pilots now fly the largest, highest-performance aircraft, carrying the greatest number of passengers over the longest non-stop distances, operating into and out of the most congested airports near the largest cities, and traveling in flight in and through traffic lanes with the highest density of air traffic.

Science News Letter, January 2, 1960

#### ENGINEERING

### USSR Engineers Try Tuned Transmission Lines

RUSSIAN electrical engineers are experimenting with "tuned" power lines for carrying large blocks of power 1,500 to 1,900 miles from Siberia to the Ural Mountain area.

By loading a long transmission line much as radio engineers load transmitting antennas, the Russians hope to achieve better efficiency in transmitting electricity from an area having good power generation resources to a power-deficient area.

Tuned transmission lines are not used in the United States. Most U. S. transmission lines are relatively short and voltage on the line end is regulated easily by applying condensers or inductances as needed.

Electricity experts in Washington, however, believe that the tuning of a transmission line would be similar to techniques used in the U. S. for adjusting voltage at the end of the line.

The tuned transmission-line experiments are being carried out at the Siberian Branch of the USSR Academy of Sciences' Electric Power Systems Laboratory under direction of Prof. Shcherbakov. But S. P. Khatskevich of the Novosibirsk Electrical Engineering Institute reported that the problem of tapping a long line at points along its length, without disturbing the whole line, has not been fully solved. Intermediate line taps cause large voltage fluctuations in the whole line.

News of the experiments was revealed in *Scientific Information Report* (Oct., 1959) prepared by the Central Intelligence Agency and circulated by the Department of Commerce.

Science News Letter, January 2, 1960

#### CHEMISTRY

### Scientists Stress Use of Computers in Chemistry

COMPUTERS are among the most effective classroom and laboratory demonstration aids, scientists at the San Francisco meeting of the American Institute of Chemical Engineers learned.

"The analogue computer has shown itself to be an excellent teaching aid in presenting the dynamic behavior of physical and chemical systems," said Theodore J. Williams and Verlin A. Lauher of the Monsanto Chemical Company, St. Louis. They went on to explain how it can be wired to simulate, or become electronic models of, many physical and physical-chemical systems, so that the model is more vivid than the experiment itself.

J. W. Tierney of Remington Rand Univac, St. Paul, Minn., said the digital computer "has become an important aid in chemical engineering calculation." He stressed that students of engineering should be taught the proper use of computers along with the other calculation tools available.

Science News Letter, January 2, 1960