

GENERAL SCIENCE

Science Forecast for 1962

Instruments on moon, measles protection, communication and weather satellites, and possible "breakthroughs" in cancer, thermonuclear power predicted by Watson Davis.

► THE YEAR 1962 will see instruments flung into space that reach the moon and the vicinity of the planet Venus, sending back information on their mysteries.

The menace of thermonuclear world war will hang like a sword of Damocles over both the Western and Soviet worlds. Clouds of radioactive debris from the hundreds of megatons of 1961 Russian testing will sift down in the rains of spring and summer, sowing the genetic seeds of damaged human beings for generations to come.

Production and use of one or more measles vaccines seems assured for the coming year, giving the means to control this disease, particularly in children, as effectively as other preventable diseases, such as polio, smallpox and diphtheria.

Among the less assured achievements of science that may come to fruition in 1962 are:

1. Success in harnessing the immense energy of the fusion reaction of the thermonuclear or hydrogen bomb to controlled useful power. Large resources have been directed to this end and results are overdue.

2. Discovery of a chemotherapeutic agent for treating and controlling some of the major forms of human cancer. The millions of dollars being spent and the research brains being used should bring results.

3. Accelerated efforts to develop practical artificial photosynthesis, capturing of the sun's energy. Growing knowledge of the manner in which the green leaf operates makes this the next logical step.

Space Events Foreseen

In man's rush into space, events can be foreseen.

The United States has scheduled orbital flights of astronauts, catching up with the Russians on their placing of men in space around the earth. An impact or hard landing of instruments upon the moon, Operation Ranger, is scheduled during the year. This first placing of instruments on the moon will be followed, probably in early 1963, by a softer and more gentle landing of instruments with more probability that they will send back from the moon information of scientific importance. Using giant booster rockets, such as the Saturn and Nova, space craft will be flung toward the planets Mars and Venus, not carrying men, but carrying instruments which, in all probability, will give us information about those planets that hide their many mysteries at the present time. Perhaps the Soviets will try to send a space ship carrying a man around the moon.

There will be satellites around the earth that will fulfill the promise of these man-made moons, which will be useful in pro-

viding communications throughout the world at all times. In the past two or three years, the usefulness of satellites for communication purposes has been demonstrated, but the ones that will enter space during 1962 will be more sophisticated and approach a stage that will be of practical world-wide use. There will be a launching of Relay, an active communications satellite. Telstar, the Bell System's active communications satellite, is also scheduled for launching in the spring, for experiments in long-distance telephone, TV and data transmission by satellite.

The success of the experimental Tiros satellites in spotting hurricanes and other weather in the earth's atmosphere will lead to a Nimbus operational weather satellite, the first of its kind. There will be more extensive and faster exchanges in weather information between various nations.

Two ion engines, one using mercury, the other cesium as fuels, will be flight-tested late in 1962 to find out how they function under actual space conditions. Such engines could be used for long space trips to other planets in the solar system.

The first global survey of the topside of the ionosphere by satellites carrying special ionospheric radars are scheduled. The topside sounder satellite is a joint U.S.-Canadian venture.

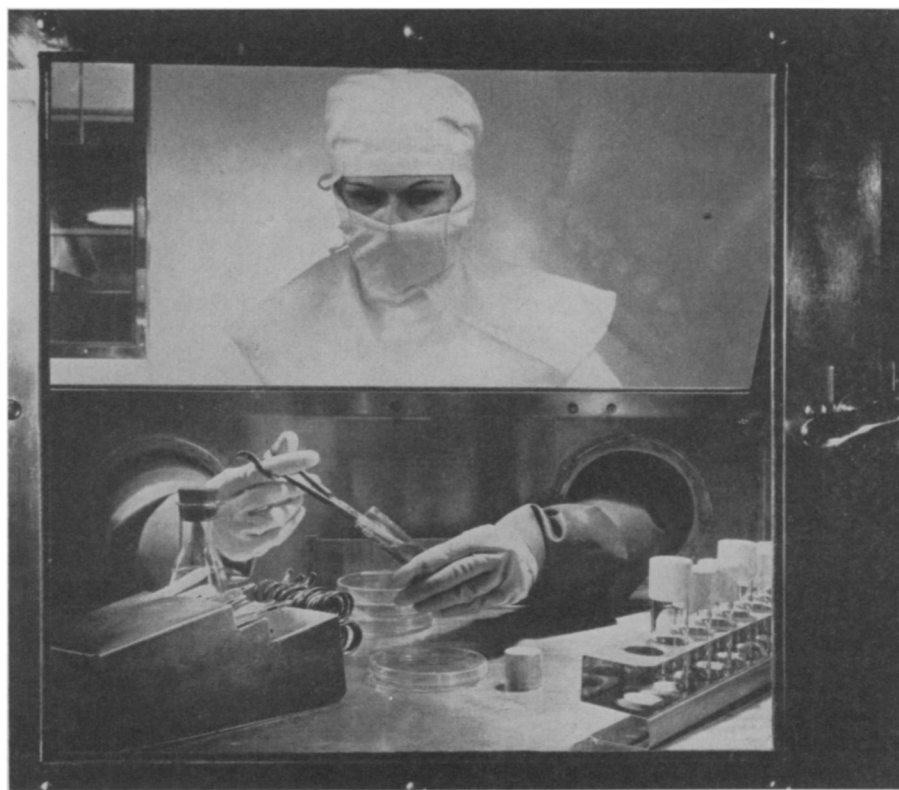
Changes in high atmospheric density, both with latitude and with time, will help explain major ionospheric variations, including the major storms which disrupt radio communications. Much progress may be made relating large-scale motions in the ionosphere with phenomena in the stratosphere and intervening atmospheric layers.

Special radars aimed at the sun will contribute to understanding of the corona and perhaps the gas clouds emitted by the sun toward the earth.

Rockets Probe Atmosphere

Meteorological rockets sampling temperatures and winds to 50-mile altitudes will be made much more often and from scores of places, marking the beginning of a global network taking "high meteorological" data.

There is growing concern about the accuracy of the intergalactic distance scale, which depends much upon a knowledge of the luminosity of cluster-type variable stars. It is hoped that within one or two years, much new information of a fundamental nature on the luminosity of these stars will be available.



DEVELOPING MEASLES VACCINE—Scientist from Pitman-Moore Co. minces tissue that may be used in the long-awaited measles vaccine.

Much progress has been made on the perfection of useful electronic cameras or image tubes. At present, only one such tube is in routine use in the U.S., the Lallemand Electronic Camera at the Lick Observatory. Within a year, several other image tubes of different types will probably go into service in other U.S. observatories.

Radio waves from Mars will be established, possibly a radar contact.

The 210-foot Parkes (Australia) radio telescope will contribute important results in "radio stars."

There will be better understanding of hurricane mechanisms, especially the way they are formed. Partly through new buoy stations, analysis of air-sea interaction processes will be advanced.

Studies will bring new understanding of the movements of fallout from stratosphere to lower levels.

Work on the small-scale structure in jet streams will show their relation to turbulence; possibly there will be better understanding of the whole mechanism of formation and maintenance of these streams.

An automatic seismograph station powered by a radioactive cesium-137 battery will be lowered to the floor of the Atlantic Ocean to report earth tremors. There will be distributed about the world 125 complete seismographs having uniform characteristics. While these are made possible by the necessity of having means to detect atomic test explosions, they will contribute in a major way to understanding the crust of the earth and its movements.

The study of primary electrons in the cosmic radiation, opened up anew in 1961, will be intensified. Attention will be focused on the question of whether an appreciable fraction of these electrons are positrons, since this would give information about the origin of the electrons.

Continued investigation of ultrahigh-energy interactions ("jets") of cosmic rays, exceeding a million million electron volts in energy, will reveal new information about nucleons, the building blocks of nuclei. The research on "jets" will be made possible by a second balloon-flight exposure, at 100,000-foot altitude, of a huge, 80-liter stack of special photographic emulsion.

One hundred kilogauss magnetic fields with superconducting magnetic coils will be produced. The operation of Cambridge, Mass., Electron Accelerator at 6,000 Mev should give a new energy record for electrons, and initiate new research in high energy particle physics.

Besides the measles vaccine expected, probably Type III of the Sabin live oral poliovirus vaccine will be licensed in addition to Types I and II now authorized.

A vaccine for infectious hepatitis is probably imminent now that the virus has been isolated. The search for cancer virus may be successful. Progress in the research now being done on leukemia is hoped for.

Research on cholesterol may show whether or not it is the culprit causing hardening of the arteries and consequent heart attacks.

The next few years should begin to see

some definitive work on the psychiatrically active drugs.

The next year will be an important one in determining the reaction that government, Federal and state, will take toward the report and recommendations of the Joint Commission on Mental Illness and Health.

Dating of the Chellean man from Olduvai by the potassium-argon method may be expected. There will be new information on Acheulean man of Europe and new discoveries of ancient man or fossil ape men in Africa.

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MEDICINE

Spinal Cord Tumor Danger

► THE GENERAL PHYSICIAN confronted with patients suffering low-back pain should be on the lookout for spinal cord tumor, according to a study at the Mayo Clinic, Rochester, Minn.

Wrong diagnoses of "slipped disks" had been made in some of the 100 spinal tumor cases at the Mayo Clinic followed up by Drs. Craig W. Norstrom, James W. Kernohan and J. Grafton Love. The findings were reported in the Journal of the American Medical Association, 178:1071, 1961.

Spinal fluid analysis and follow-up examinations should be done to be sure the diagnosis of patients' low-back pain is correct, the investigators report.

Physicians also read a report in their official magazine by Johns Hopkins University surgeons on 118 patients treated by external heart massage (p. 1063).

An accompanying editorial emphasizes that this method could be used by rescue and first aid squads to save the lives of persons who otherwise would die of electrocution, suffocation, drowning, heart attacks and reaction to drugs (p. 1102).

Dr. James R. Jude, Dr. William B. Kouwenhoven and G. Guy Knickerbocker reported the Johns Hopkins study.

Germfree techniques in animal research can also be used on humans, three researchers at the Germfree Laboratory, University of Arkansas, Little Rock, report. Burn patients, for example, could be protected from "staph" germs, *Staphylococcus aureus*, by placing them or the burned part of the body in an isolator (p. 1084).

Drs. Jerome J. Landy, James H. Growdon and Russell L. Sandberg reported the study.

A study of 617 patients with high blood pressure showed kidney artery obstructions in 173 at the Cleveland Clinic Foundation, according to Dr. Eugene F. Poutasse. Of these, 126 were treated surgically (p. 1078).

Winter as well as summer air conditioning can affect the nose and throat, Dr. S. A. Friedberg, nose and throat specialist, Chicago, says in reply to a query from a Texas doctor.

"In large buildings the accomplishment of adequate humidification is expensive and difficult," Dr. Friedberg states. "A person may obtain relief for dry nasal membranes with one percent or two percent ephedrine

MEDICINE

Germfree Research Mice Now Priced at \$5

► GERMFREE rats and mice useful in making studies of various disease conditions will shortly be available at relatively low production costs. Dr. P. C. Trexler of Loblund Laboratories at the University of Notre Dame told the Animal Care Panel in Boston that production costs for gnotobiotic (germ-free) animals is now \$5 for a mouse and \$20 for a rat.

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sulfate in isotonic sodium chloride solution used three or four times daily by medicine dropper" (p. 1123).

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EDUCATION

Women Spark Gain In Science, Math Degrees

► THE NUMBER of college graduates getting bachelor's degrees in science and mathematics during the 1960-61 academic year is expected to show an increase of about 2.7% over the previous year, the U.S. Department of Health, Education and Welfare reports.

The overall increase, HEW notes, is "due very largely to the increasing numbers of women" taking up science and mathematics. The expected increase is 11.5% for women graduates, compared with only four-tenths of one percent for men graduates.

The HEW figures are based on an Office of Education survey of junior year enrollments in the fall of 1959. After the 1958-59 academic year, actual figures on the number of graduating seniors are not available.

Canvassing 1,132 institutions, researchers found 57,265 juniors majoring in science and mathematics in 1959. Of these, 78%, or a total of about 44,600, were expected to be graduated the following academic year.

The juniors in science and mathematics made up 13.8% of the 414,000 total junior enrollment. In the previous year, the 55,777 science and mathematics majors out of a 405,000 total also comprised 13.8%.

The expected annual increase in graduates totals only 2% among the 30,551 enrolled in publicly controlled schools, but 3.4% among the 26,714 in privately controlled schools.

Despite the upward trend in women enrollees, the untapped reservoir of scientific and mathematical talent is still far greater among women than among men. Only 8.7% of women juniors, compared with 16.6% of men juniors, were science and mathematics majors in the fall of 1959.

The one year changes also are expected to reflect heightened interest in mathematical subjects via a 17.6% increase.

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