

GENERAL SCIENCE

Science Forecast for 1963

Longer cosmonaut flights, added probes to the moon and planets and underground nuclear explosions to explore peaceful aims are predicted by Watson Davis.

► THE MOST SPECTACULAR science achievements of 1963 will continue to be upon the space frontier. There will be a Soviet space vehicle in orbit carrying two and possibly more men for more than a week. This will be a long stride toward the construction of a space station which will be placed in orbit in later years.

The United States space effort will not equal the Russian achievements during the coming year and possibly not for several years in the future.

Cooperation between the U.S. and the Soviet Union will be extended to more competitive fields if there is success in the limited joint efforts concerned with weather satellites, communications satellites and satellites to map the earth's magnetic field.

Joint exploration of the moon and other planets is not unthinkable if the dangerous competition in intercontinental missiles and space armaments can be diverted to peaceful uses. Whether this will happen depends not upon scientific progress but upon political and military considerations. Several communications satellites like Telstar will go into orbit and be used to transmit information of various sorts including TV programs throughout the world. Echo II, a passive vehicle like the first Echo still in orbit, will be launched. The Russians will probably use our communications satellites for their transmissions as well.

Both Russians and Americans will continue to put into orbit secret satellites which will photograph all areas of the earth for military activities which are considered dangerous to them.

Worldwide Weather Forecast

The weather satellites, particularly those of the United States, will be used routinely to observe clouds and storms as an aid to worldwide weather predictions. Succeeding the Tiros vehicles, there will be a Nimbus meteorological satellite in a near circular orbit 500 miles above the earth. The computers installed to analyze atmospheric circulation as an aid to long-range weather forecasting will get into their stride during the year and prove more useful.

Preparations for the conquest of the moon will continue in both rival space nations but the amount of money and resources the U.S. is spending on this feat is far in excess of what the Soviets have budgeted to this task so far removed from the sociological trouble spots on earth. The date for an effective landing by men upon the moon is still several years hence and probably close to the end of this decade. Due to the head start the Soviets have upon the development of large rocket engines, the prospects are that the first men on the moon will be

Russians unless the hope of a joint U.S.-USSR expedition is realized. Possibly a Russian will orbit the moon and return to earth in 1963.

Rockets will carry instruments to the vicinity of the planets such as Venus and Mars and possibly also there will be new U.S. attempts to land instruments on the moon to send back information.

Balloons will carry cleverly devised telescopes and other instruments to the top of the atmosphere in order to observe the planets. It is possible that this method of observation will yield quite as much information as the more expensive and hazardous space probes which are a by-product of our national space program.

A space event that human effort cannot control but can only observe will be the total eclipse of the sun on July 20. The sun's shadow will cross Canada and a small area of northeast United States. This will be widely observed although solar eclipses are not as highly prized by astronomers as they once were, since things that happen on the sun can be observed with instruments devised in the last couple of decades.

There will be no spectacular aeronautical

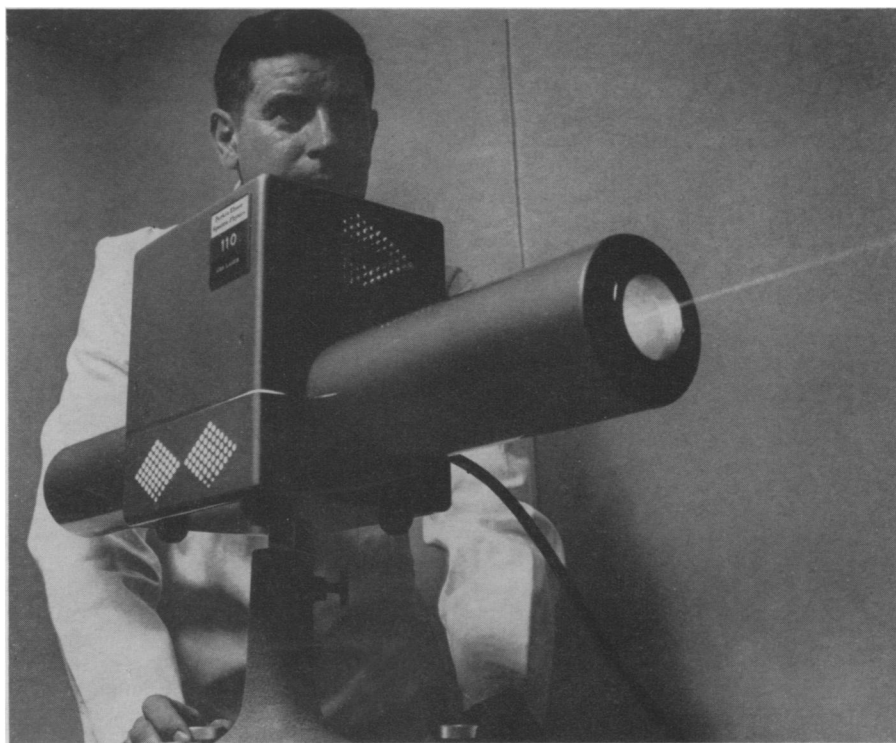
developments in the coming year although several military planes are on the drawing board and in pilot production. Not for at least five years will there be a jet transport plane to challenge the present jets. Missiles have largely taken over the military functions of bombers and the missile program, much of it under security wraps, will continue both in development and installation for use in case of a war.

Nuclear Energy for Peace

The application of nuclear energy for peaceful uses will receive a demonstration through visits of the nuclear cargo ship, N. S. Savannah, to various ports of the world, including Europe, during 1963.

Whether atomic testing in the atmosphere continues depends in large measure upon agreement between the U.S. and the Soviets but there will be major tests of nuclear explosions underground for a dual purpose. Operation Plowshare which was begun in 1960 is intended to test the use of nuclear explosions for industrial purposes such as moving earth, carrying out chemical reactions and other useful purposes. These nuclear explosions are scheduled to continue in the salt beds of Mississippi and New Mexico and granite flats in central Nevada.

The secondary purpose will be to detect these explosions with seismographs stationed all over the world, with the purpose of determining whether such artificial earthquake



Perkin-Elmer

LASERS, BEAMS OF CONCENTRATED LIGHT—Device for concentrating light will be used industrially as well as scientifically in 1963. This is the first visible-light continuous wave laser for the commercial market.

recorders can police atomic explosions successfully. There are over a hundred standard seismograph stations together with many non-standard or temporary stations involved in this program around the world including Antarctica.

This seismological record will give scientists a better understanding of the earth's interior. This is one objective of the renewed interest in the crust of the earth which resulted from the International Geophysical Year.

Laser Research Advances

The devices called lasers and masers for concentrating light and electromagnetic spectrum energy will have further development during the year and find additional uses. Some of them will be used in industry and others will join the instrumentation that scientists use in various areas including space.

Oceanography has been given increased attention and an international survey of the Indian Ocean will be underway during the coming year.

There probably will be some progress on Mohole Project in drilling a deep hole in the floor of the ocean reaching down to the inside of the earth.

While Mt. Everest, the highest mountain on earth, has been conquered, a new expedition will ascend it during the year in the interest of more scientific information and to demonstrate that what once has been accomplished can be done again.

There will be additions to the more than 500 nuclear reactors that have been built in the first two decades since the first atomic chain reaction. The number of large reactors producing commercial power is not expected to increase rapidly, because atomic power is still not competitive commercially with conventional power production except in a few isolated spots.

It is predicted that by 1970 only about two per cent of all electric power will be

produced by atomic reactors, but within the decade following all the new electric generating capacity built will be nuclear. Giant accelerators, the size of which could hardly be imagined as recently as a decade ago, will approach completion and the ones already in operation will dig deeper into the secrets of the atom with unpredictable results for theory and practical utilization.

A measles vaccine will become available during the year. Progress in making available this immunization has been slower than was expected a year ago. The new chemical preventive of malaria should be extended during the year to the areas of the world where this is a major disease causing much illness and death.

Study of mental retardation as well as the major psychiatric diseases will receive new emphasis and an expanded program of community mental health will receive national impetus.

The research on cancer, heart disease, and some of the other major unconquered diseases will continue energetically but what will develop is difficult to predict.

Peaceful Power Research

The harnessing of the atomic fusion reaction of the hydrogen bomb to give useful power may occur but again this progress has been slower than had been hoped. Developing more knowledge about the mechanism of capturing the sun's energy through photosynthesis will probably result from research underway.

Man is always curious about his evolutionary rise and new studies are in progress on the way that modern races originated. New pre-human remains should be unearthed in various parts of the world. Some anthropologists expect that there will be a reconsideration of the common assumption that the modern races are no more than about 20,000 years old.

• Science News Letter, 82:411 December 29, 1962

PSYCHOLOGY

Action Indicates Tension

► SAYING the wrong word or acting in an unusual manner may indicate that you are under tension.

Research by University of California, Los Angeles, psychologists Dr. William E. Broen Jr., Lowell H. Storms and Herbert U. Schenck Jr. indicates that normal stress or drive to achieve a goal produces almost random responses to particular situations.

For example, in a word association test one may respond to the word, "table," with "chair" 60 per cent of the time, with "cloth" 30 per cent of the time, and with "dinner" 10 per cent of the time.

Thus an order, or hierarchy, of responses is established with "chair" the dominant response, "cloth" somewhat down the ladder and "dinner" still further down.

The research has indicated that stress facilitates all responses. But there is a ceiling on the strength of the responses, and under high stress the hierarchy of responses tends to be telescoped upward so that all are grouped near the ceiling. Thus the chances

that one may respond with any one of the three words are almost equal.

These observations may account for inappropriate behavior by both normal persons and emotionally disturbed individuals.

An example of normal behavior might be the verbal "flubs" by radio and television announcers and by politicians in the heat of a campaign.

An example of response to extreme stress might be the bizarre behavior of some men in combat. Such behavior has led to a temporary diagnosis of schizophrenia. But symptoms suggesting the diagnosis frequently disappeared once the stress of combat was removed.

Dr. Broen believes this phenomenon may explain the unpredictable behavior of schizophrenics under the constant stress of their emotional illness.

• Science News Letter, 82:412 December 29, 1962

Studies show that two-thirds of all persons over 50 years have weakened *capillaries*.

Questions

ASTRONOMY—What month brings the year's best display of evening stars? p. 420.

ASTROPHYSICS—Where is the graphite formed that peppers space in minute flakes? p. 410.

BIOCHEMISTRY—From what animals is the present insulin supply obtained? p. 414.

MEDICINE—Which are more numerous, typhus or typhoid carriers? p. 413.

PSYCHOLOGY—What are common word associations with the word "table"? p. 412.

ZOOLOGY—How are restless mink calmed? p. 428.

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