

## TECHNOLOGY

**Pocket-Size Computers Foreseen by Inventors**

► A VEST-POCKET-SIZE computer that can be carried by an enterprising businessman may soon be a reality, according to Dr. John W. Mauchly, Mauchly Associates, Ft. Washington, Pa., co-inventor of Univac, the first commercial electronic computer.

The forerunner of the personal computer, a portable model which Dr. Mauchly calls SkeduFlo, was displayed at the Plant Maintenance and Engineering Show in Philadelphia. This revolutionary device is an important first step.

It is the size of a small suitcase, 18 by 12 by 20 inches, and can quickly yield results previously obtainable only by multiple runs on giant computers.

SkeduFlo's particular value is in minimum-cost expediting. It can plan and schedule such large jobs as the overhauling of oil refineries or chemical plants, in which more than 25 or 30 steps may be involved. The order in which these steps are programmed affects both cost and time.

No computer programming or cards to be punched are necessary with SkeduFlo.

The management expert at his office desk can determine in a matter of minutes the cost of meeting a number of different schedules just by turning knobs.

The computer then automatically selects the least expensive method, and also shows which jobs are critical for on-time completion of projects. It is accurate within one or two percent.

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## BIOCHEMISTRY

**Mystery of Life Nearly Solved**

► THE MYSTERY of life underlying human cell development on earth and whether similar intelligent life may exist on Mars are near solution, scientists from the National Science Foundation reported to the House Committee on Science and Astronautics.

Molecular cell research, supported by the NSF, has advanced so far that in the next year biologists may discover just what it is that "brings life into a given group of chemicals," Dr. Herve J. Carlson, assistant director, NSF division of biological and medical sciences, said at a Committee hearing.

Past and current research has shown that there must be a "master-plan" underlying the growth of a cell into the human organism, Dr. Alan T. Waterman, NSF Director, added. The arrangement of the molecules in a human cell is now known and scientists are now very close to finding out what triggers this arrangement, Dr. Waterman said.

Whether or not similar intelligent life exists on Mars may be finally determined in the near future following the completion of the second phase of Project Stratoscope, an NSF program to study the stars and

planets by unmanned telescopes hoisted by balloons 80,000 feet above the earth. At this altitude, scientists would see the planets and stars unobstructed by the dense layer of the earth's atmosphere.

The Project was launched by the U.S. Air Force five years ago and now is under development by NSF with the Office of Naval Research and the National Aeronautics and Space Administration.

Stratoscope I, a balloon carrying a 12-inch telescope, has already revealed important astronomical information about the sun and sunspots.

In the second phase, a 36-inch telescope with reflecting mirror and a television link to transmit pictures to earth will soon be launched by a 5,000,000-cubic-foot balloon taller than the Washington Monument. When aimed at Mars, it should provide a sufficiently clear view "to settle forevermore whether intelligent beings are on it," Dr. Geoffrey Keller, another NSF scientist, told the House Committee.

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## BIOPHYSICS

**Vision Created by Light Acting on Eye Pigment**

► HOW LIGHT acts on the molecules of pigments in the eye to excite the sensation of vision has been explained.

Dr. Ruth Hubbard of the Harvard University Biological Laboratories, who participated in a symposium on the excited state and photobiology at the annual meeting of the Biophysical Society in Washington, D. C., said that it is not understood in molecular terms how the stimulus of light brings about transmission of a message from the eye to the brain. Describing recent experiments, however, she said she now can offer the "closest approximation yet available" of how this is triggered.

Visual pigments are colored substances found in the rods and cones, small structures of the retina. Her experiments involved two of these, rhodopsin, a red pigment in the rods, and iodopsin, a violet pigment in the cones. They also concern rhodopsins isolated from the photoreceptor organs of a number of invertebrate animals.

All these visual pigments are composed of a colorless protein, opsin, combined with a bent and twisted isomer of retinene, a form of vitamin A. Dr. Hubbard found that the impact of light changes or straightens the bent retinene.

This change, in turn, triggers a number of chemical reactions, which expose new reactive groups on the opsin molecule. This produces a series of unstable, short-lived retinene-opsin chemical complexes in the organized structure of the rod and cone outer portions.

Within this framework, Dr. Hubbard said, one or more of the chemical reactions triggers the nervous impulse that is communicated to the brain. She observed that it must be one of the earliest reactions, since a nervous response is recorded a few thousandths of a second after a light is turned on.

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**IN SCIEN**

## PUBLIC HEALTH

**Dutch Guiana May Get Polio Epidemic**

► A SOUTH AMERICAN country that has not had a single case of polio in 20 years may be headed for a polio epidemic.

A study of the extent of natural polio resistance among 225,000 inhabitants of Dutch Guiana has shown that there are "pockets of susceptibles" where the risk of a polio outbreak currently exists. An immunization program should be given serious consideration, Dr. Joseph L. Melnick, Verle Rennick and Maria G. Molina Lozano of the Baylor University College of Medicine, Houston, Texas, reported in the American Journal of Diseases of Children (Feb.).

Blood analyses of a sampling of the population indicate that the level of immunity was comparable to that of Georgetown in neighboring British Guiana when its first epidemic occurred in 1957. The level was also comparable to that of sections of four U.S. cities where epidemics broke out—Detroit in 1958 and Des Moines, Kansas City and Houston in 1959.

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## HORTICULTURE

**Chemical Helps Fight Dutch Elm Disease**

► A POTENT new chemical for combating Dutch elm disease was described by Dale M. Norris, assistant professor of entomology at the University of Wisconsin, Madison, Wis.

Mr. Norris told a pesticide conference that a systemic chemical called Shell 3562 has emerged "as a highly effective control agent with commercial potential." The chemical is implanted in the vascular system of the elm, Mr. Norris said, and is carried through the branches and into the bark tissue. Bark beetles, which spread the disease-causing fungus, are killed by the chemical.

The entomologist noted that Shell 3562 cuts down the threat to bird life, endangered by the use of sprays containing DDT.

"With systemics, we can confine the chemical to the tree of concern, without contaminating the area," he said. "From the standpoint of bird life, this would be better, although there could be a hazard to the sapsuckers and possibly squirrels."

The new chemical will be tested this spring to determine the best method of use and the proper amount for each tree.

Mr. Norris warned that systemic chemicals such as Shell 3562 represent a preventive tool against Dutch elm disease, and that sanitation in the form of destruction of the dead wood is still most important.

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# CE FIELDS

## SPACE

### Preliminary Results From Explorer XII

► **SIGNIFICANT** scientific results on the nature of energetic particles and the earth's magnetic field have been gained from data transmitted back to earth by the Explorer XII satellite.

The spacecraft was launched Aug. 15, 1961, from Cape Canaveral, Fla., into an orbit ranging from a distance of 182 statute miles to 48,000 statute miles. In its 112 days of transmission life it orbited the earth each 26.5 hours.

More than 80% of its transmission data was stored on magnetic tape; it sent back to earth more data than all previously launched earth satellites. It ceased transmitting Dec. 6. Cause of the failure is still under investigation, the National Aeronautics and Space Administration reported.

NASA said study of the data has shown that all experiments worked as designed, and the spacecraft represents one of the most successful flown to date because it was able to measure simultaneously particle populations and their relations with the geomagnetic field.

The picture of the magnetosphere (Van Allen radiation belts), previously thought of as two distinct doughnut-belts surrounding the earth except at the poles, has changed. Explorer XII findings indicate there is not a distinct inner and outer belt but rather one big trapping region with particles having different characteristics.

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## ORNITHOLOGY

### Ducks Inherit Ability To Navigate by Starlight

► **THE ABILITY** of wildfowl to navigate by the sun and stars during migration is inherited, studies on wild ducklings strongly indicate.

This is a boost in favor of the long-debated celestial navigation theory, in contrast to the belief that the birds learn to navigate by following land formations.

Studies of three species of ducklings in experimental surroundings, made by Dr. William J. Hamilton III of the Museum of Vertebrate Zoology in Berkeley, Calif., and reported in *The Condor*, 64:19, 1962, point to the celestial navigation theory.

Three types of ducklings were placed in a cage when they were only 24 hours old. They were taught that water was behind only one of 12 doors, but always in a certain direction.

With only the sun or stars to guide them, the birds found the water consistently when the sky was clear, but were confused and lost when it was overcast.

"The findings presented here are in general accord with what we know of the natural migration of waterfowl and experimental work based on the release of free-flying birds," Dr. Hamilton says.

Two features seemed to confuse the ducklings when the sky was clear. The moon seemed to hinder their performance at night, and the sun, during the noon hours, was a problem to their navigational senses.

Dr. Hamilton points out that other studies on mature ducks and other birds have also led to the same conclusions about the celestial navigation theory. Work by Frank C. Bellrose of the Illinois Natural History Survey, who released ducks at night with lights attached, indicates clear weather navigation is based on stars also.

The factor of learning by adult birds was, however, shown to be unnecessary by the studies on young waterfowl by Dr. Hamilton.

"Juvenile blue-winged teal, detained beyond the period of natural migration for the species, nevertheless make appropriate species-specific migrations of hundreds of miles over unfamiliar terrain and open water without the company of experienced birds," he reports.

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## SPACE

### Hazard of Meteoroids On Moon Trip Evaluated

► **IF THE OPTIMIST** is right, a spaceship on a trip to the moon will be punctured by a meteoroid and seriously damaged only once every 57,000 days if properly shielded. The necessary shielding is a double hull of aluminum padded with glass wool.

However, if the pessimist turns out to be right, such a vehicle may be hit once every 11 days, an unfortunate possibility since the moon trip is expected to take 14 days.

Drs. C. Robert Nysmith and James L. Summers of Ames Research Center, Moffett Field, Calif., plotted the number of penetrations versus the vehicle flight duration. If the optimistic point of view holds, moon travelers on 14-day jaunts will get hit only once in every 4,070 missions.

The scientists reported to the National Aeronautics and Space Administration their results in trying to solve the problem of whether the meteoroid hazard is serious enough to be considered in the design of a spacecraft. This depends on the probability of the craft being struck by a meteoroid large enough to completely puncture the vehicle's wall.

They said this probability depends on such factors as meteoroid distribution, velocities and spacecraft structure, which were considered in the computation of the meteoroid hazard on the moon trip.

The scientists said that the double sheet design is not the last word in spacecraft hulls. Far more effective designs against penetration of meteoroids can be made, they believe.

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## MEDICINE

### Chemicals Effective Against Leukemia

► **NEW CHEMICAL AGENTS** that are extremely active against leukemia in animals are reported in the *Journal of Medicinal and Pharmaceutical Chemistry*.

The new substances, called nitrosoureas and nitrosoguanidines, were synthesized and found active against leukemia in mice by Stanford Research Institute chemists in Menlo Park, Calif.

Some of the new nitroso compounds pass from the blood into the brain tissue of the experimental animals, and destroy leukemic cells, according to Dr. Ronald B. Ross of the Cancer Chemotherapy National Service Center, U.S. Public Health Service, Bethesda, Md. The compounds are being tested at the Center.

Trials with human patients may be undertaken if the new materials continue to look promising after further testing.

More than 20 different nitrosoureas and nitrosoguanidines were prepared by SRI scientist Dr. Leon Goodman and his co-workers. The most active material in their study proved to be chloroethylnitrosourea.

Assisting Dr. Goodman were Karen A. Hyde, Drs. Edward Acton and W. A. Skinner, all at the Stanford Research Institute; Dr. Joseph Greenberg, now at the Palo Alto Medical Research Foundation; and Dr. B. R. Baker, now at the School of Pharmacy, University of Buffalo.

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## PUBLIC SAFETY

### Methane Gas, Oxygen Cause of Mine Explosion

► **A DANGEROUS MIXTURE** of oxygen and methane gas (caused by the decomposition of coal) was blamed for the recent disastrous explosion of the Luisenthal mine near Saarbruecken, Germany.

Saarland State Mine officials said the cause of the ignition of the mixture had not been determined, but combustion occurred and fire shot down the tunnels and shafts, snuffing the lives of approximately 300 of the 480 miners.

The deaths were attributed to poisonous carbon monoxide caused by the combustion.

Although extensive safety precautions and equipment are commonly used in mines throughout the world, explosions and mining deaths still occur.

U.S. Bureau of Mines research has helped cut the number of explosions and deaths in mining disasters in half in the last decade. Research on mine safety might again substantially reduce this figure in the next decade, a mining official said in Washington, D. C.

Methane in combination with coal dust is the number one cause of mine explosions and second in cause of mining deaths.

The worst mine disaster in U.S. history occurred at Monongah, W. Va., in December, 1907, claiming the lives of 361 miners.

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