

TECHNOLOGY

Galloping Automation

The workhorse of the new technological and scientific age is the electronic computer, which seems to have limitless fields in which to roam—By Walter Wingo

(Third in a series of five)

► FIFTEEN YEARS AGO computer-makers were in the same position as Samuel F. B. Morse, who, upon inventing the telegraph, sent out the message, "What hath God wrought?"

Not knowing exactly what they had, computer men talked more confidently about the physical qualities of their new, big electronic toys—their uncanny ability to retain information, the amazing number of computations each second, their electronic pulse rates.

Today, with automation already part of the daily routine of most Americans, the field in which the computer can be applied appears limitless. The computer is the workhorse of the new technological and scientific age.

Archaeologists are using computers in attempts to reconstruct ancient civilizations; biochemists use them to determine the structures of protein molecules; aeronautical engineers use them to "test fly" experimental airplanes that never need be built.

A Stanford University professor, studying how people learn, has "taught" a computer to balance an upright broomstick in the palm of a mechanical hand.

A computer has designed an entire chemical plant on the West Coast, taking into account thousands of factors, including costs

of materials, the best use of space and details of local zoning laws.

Another computer can "read" a blueprint and order another machine to produce the item on it.

Many computers have the capacity to store within their memory cores the contents of all the books in the Library of Congress.

Library of the Future

The future reference library may not have a single book in it. The information-seeker will merely drop a card containing questions into a computer and out will come his answers.

Such a library, while not so charming to those of us who like to browse, is an example of what computer men proudly refer to as a "total system." You tell a machine what you want, and out it comes.

The total system idea already is the heart of four large "continuous-process" industries; that is, industries that turn out vast quantities of similar products. The four are chemical-making, power generation, steel processing and oil refining.

Computers are calculating payrolls, billing insurance holders, tracking satellites, guiding delicate cutting, drilling and welding operations, processing census figures and even composing music.

With varying success they have been used to predict the weather, presidential elections, the course of the nation's economy, football and track results, and the consequences of proposed business ventures and marriages.

To aid in one of the biggest guessing games of all, a computer with a human-sounding voice will be installed late next year in the New York Stock Exchange. If you dial a certain number, the computer will tell you current quotations. The voice is controlled by sending electrical pulses through an artificial larynx.

Tests are being made in Michigan on a highway for driverless autos. They will respond to signals sent through the pavement by a computerized guidance system.

Mechanical brains already are used extensively to prevent collisions of planes and trains. Automation in those fields is not a matter of economics, but of necessity.

The same is true in the military. The typical soldier, sailor or airman today is more a technician than a fighting man.

Foreseeable is the day when high-speed computers will mastermind the proofreading, printing and bundling of a daily newspaper. Now the American Newspaper Guild wonders whether automation will make even newsmen expendable. On this question it concludes: "It might be a good idea to keep a few human beings around."

Robot Answers Questions

The Labor Department, however, employs a robot to answer newsmen's inquiries about routine news releases.

A tremendous impact on education is expected from increased use of teaching machines, now being made by some 50 companies.

Doctors are using a growing number of computers and other electronic devices. Envisioned is a machine containing all the medical knowledge of the day. Doctors would feed the computer facts about a patient and it would diagnose the illness.

While one group tries to build a machine less fallible than a team of the greatest human minds, another, studying human behavior, tries to build one capable of making silly mistakes—as most of us do.

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SPACE

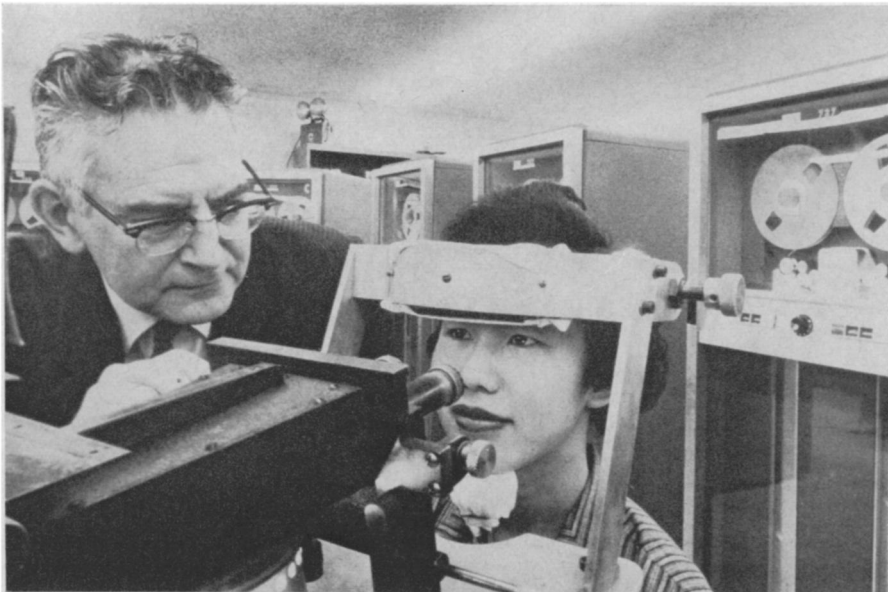
2,000 Hours in Space To Precede Moon Shot

► THE UNITED STATES will have chalked up about 2,000 hours of flight in manned space satellites by the time the three-man Project Apollo team takes off for the moon.

This pre-Apollo experience will include rendezvous of spacecraft in orbit, transfer of men and materials from one spacecraft to another and space maneuvers.

Addison M. Rothrock, associate director of plans and progress evaluation for the National Aeronautics and Space Administration, reported in Des Moines, Iowa, that it will amount to about 1,300 orbits of the earth by Americans in Gemini and Apollo spacecraft.

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University of California

SPOTTING THE EYES—Dr. Jack Holmes, professor of education, is using the University of California's computer in an attempt to get at some of the underlying factors to general reading ability. Here, Dr. Holmes' apparatus records on film the eye movements of a student in the process of reading. This and other data are then processed by the giant "brain."