

way, if it were introduced, would necessitate all the cars using it to be equipped with an automatic pilot. The experts feel that this will come first on special truck highways between points of great population density and business.

One approach to automation is a system which has been worked out by Delco Radio for broadcasting messages to ordinary car radios from transmitters along the road. Traffic information is provided in this way when it is needed. This has been tried out on test stretches on the Kentucky Turnpike just south of Louisville through the cooperation of U.S. Bureau of Public Roads, the Georgia Institute of Technology and the Kentucky Highway Department.

### Mechanisms on Moon

For travel in space, whether the rockets and satellites and other space vehicles carry people or scientific apparatus, automatic controls are widely used. The moon will be conquered from the standpoint of scientific knowledge, first by an inanimate visitor from the earth; even if and when men land,

much of their operation will be directed from a planned and programmed procedure, perhaps directed from the earth in the event that an emergency arises.

A great variety of mechanisms and devices, both electronic and mechanical, are utilized in applying automation. Extremely precise gyroscopes, compact and miniaturized transistors and other electronic control apparatus play a large role in some of the automation. Other devices rely largely upon mechanical as well as electronic methods of operation.

Behind some of the more elaborate automatic devices there are computers, large and small, that do almost everything but think. The human brain is still supreme even though in many cases the work of human muscles and reflexes is supplanted by the automatic devices. People have to think through and create automation, both in the design of the instruments and in planning. Human beings must determine what is to be done and when the devices shall operate. Mechanisms labor under man's control.

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### SPACE

## Sick Astronauts Doctored

► WHAT WOULD space doctors do if an astronaut came down with measles during a long space flight?

Or how could a moon explorer who fell and broke his leg 239,000 miles from earth be treated?

Dr. Charles A. Berry of the National Aeronautics and Space Administration's Manned Spacecraft Center, Houston, Texas, told SCIENCE SERVICE that such occurrences are possible but not expected during future space missions.

It is impossible to keep astronauts in complete isolation before a flight, Dr. Berry said. A technician coughing on the launch pad, for instance, might pass on a germ which could result in a space explorer coming down with a cold a week later.

NASA is therefore planning ways of meeting such contingencies. These plans include turning the spacecraft around and returning to earth in severe cases. Future vehicles also may be equipped with emergency medical equipment. It is also possible that doctors may be trained as astronauts for 30- to 60-day lunar missions, Dr. Berry added.

Communicable disease is not a serious problem since people close to astronauts before flights will be checked closely, he said. However, "as we look at mission durations of up to 14 days, it is obvious that some communicable diseases could develop in flight if the astronauts were exposed during the preflight preparation period."

NASA may equip lunar landing vehicles with such provisions as splints, Dr. Berry said, but first they want to know more about the lunar surface and what type of gait a man in a spacesuit would have.

During a lunar mission, the blood pressure, respiration, body temperature and heart beat of each astronaut will be sent

back to earth, where the information will go through a computer in the mission control center before going to Dr. Berry.

"What we are really interested in is how much function does the brain have in space?" Dr. Berry commented. "All we monitor is a means of getting at that."

Dr. Berry, who is chief of medical programs at the Manned Spacecraft Center, was interviewed at a meeting of the American Astronautical Society in New York. He also revealed that NASA hopes to get a good system of receiving electroencephalogram data showing the electrical activity of the brain during space flight.

Methods of taking EEG traces may be tried during two-man Gemini flights "but we don't have a good system yet. . . . The real problem is that you cannot burden an astronaut by tying electrodes on all over the place."

The NASA scientist also stated:

While pills for motion sickness and fatigue have been the only medication used so far in flight, "drugs do have an emergency role in the space flight environment." Injectors containing stimulants and anti-shock medication were carried on some flights but not used.

The question of what causes post-flight orthostatic hypotension, or reduction of blood pressure after emerging from spacecraft, remains unanswered. Both Astronauts Walter Schirra and L. Gordon Cooper Jr. experienced changes in blood pressure and heart rate after standing up, Dr. Berry said, and these persisted for some 7 to 19 hours after landing.

In case one member of a three-man Apollo crew is incapacitated before a mission, NASA plans to replace the entire crew in order to maintain "crew integrity."

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### TECHNOLOGY

## Computer Simulates People With Problems

► AN ELECTRONIC COMPUTER has been designed that can simulate the actions of a small group of people as well as their feelings.

Called Homunculus, the system was designed by John T. and Jeanne E. Gullahorn of the computer institute for social science research of Michigan State University, East Lansing. It will be used to provide concrete bases for psychological theories.

The system is programmed to deal with a number of "persons," Mr. Gullahorn told the Spring Joint Computer Conference in Washington, D. C. Each "person" is provided with various personality and ability traits.

In addition to a history of past action, the "personality" includes job proficiency, skill in social situations, and positions in various groups, such as clubs, the family and the office staff.

The computer also provides each "person" with a set of needs and values, including personal status symbols.

Each person has a memory of past experiences involving the other group members, as well as the ability to tell good from bad and to associate given action with certain responses.

In one example, the computer simulated the staff of a civil service office. A number of workers were engaged in the same job, but some were better at it than others. As the workers became more proficient, they received more requests from co-workers for assistance.

Each participant in a request-relationship had to consider both benefits and losses. The worker asking for help would gain the assistance but would lose by admitting his inferiority. The other person would gain from being asked and from the resulting gratitude, but would lose time from his own job.

The next task in line for Homunculus, Mr. Gullahorn told SCIENCE SERVICE, is to consider the interaction of two computer personalities that disagree on whether or not novelist Herman Melville's character Billy Budd should have been hanged.

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### TECHNOLOGY

## Computer 'Caveman' Has Compressed Air Muscles

► A "CAVEMAN" is on exhibit at the New York World's Fair, but he is more modern than anyone living today.

Created by Walt Disney for the Ford Motor Company display, his body is honeycombed with plastic tubes instead of muscles. An electronic computer, programmed with all the motions of his lips, tongue, jaw, brow and hands, triggers blasts of compressed air through the tubes, operating his "muscles."

In this newly developed technique, called Audio-Animatronics, the computer also controls a tape-recorded voice, synchronized with mouth movements.

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