

## ASTRONAUTICS

## Food in Space Flights

► THE WEIGHT of food man needs may limit the time he can spend in space, Miss Beatrice Finkelstein, space nutritionist for the Air Force and the National Aeronautics and Space Administration's Project Mercury, reported.

Storage and weight, rather than nutritional content, are the major limiting factors involved in space feeding, she said. Each pound of dry weight placed in an earth orbit requires ten pounds of propellant.

An adequate supply of ready-to-eat, pre-packaged foods could be stored without a significant weight penalty for the several days required for a man to get to the moon and back. But food for a trip to Venus or Mars, almost a year away from earth, would impose too great a weight penalty, Miss Finkelstein said.

"If such packaged foods are to go with men on a planetary flight, the ship will have to carry about 1,300 pounds of food per man per year of flight. This is not eco-

nomical with present launching requirements," the space food expert said.

The weight problem is only one of the many involved in feeding man in space with which Miss Finkelstein is concerned.

There is also the problem of feeding a man adequately and safely in a weightless environment. This requires special packaging so that food is accessible in easy-to-eat bite sizes to minimize the "danger" of crumbs. In a weightless environment, crumbs floating inside a space helmet and perhaps blocking the air tubes present a real danger, Miss Finkelstein said.

If she has her way, men in space will receive a diet as close to that normally enjoyed on earth as possible.

For her contributions to this vital area of space research, Miss Finkelstein has been selected as the recipient of the McLester Award in the field of nutrition and dietetics by the Association of Military Surgeons of the United States, at their annual meeting in Washington, D. C.

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## ASTRONAUTICS

## Man's Space Performance

► HOW EFFECTIVELY man performs in space may be told by a little black box no bigger than a bedside radio.

The box can be used to pick up and amplify the tiny electric signals from the brain's center of consciousness when animals or man are in space. This information could then be telemetered to earth.

The instrument, a transistorized brain wave machine, was developed by Dr. Ross Adey of the University of California, Los Angeles, Medical School. It was designed by Raymond Kadio, electronics engineer, under a project supported by the U. S. Air Force's Air Research and Development Command.

Weightlessness in space may basically alter the process of consciousness, Dr. Adey said. The brain is normally subject to an unceasing barrage of impulses arising in muscles, tendons and other deep body regions. In the weightless state these impulses are reduced to a very low level. Thus man's level of awareness may be affected.

There may also be a problem of "space insomnia," Dr. Adey said. The porpoise which exists in a relatively weightless state in its watery world, does not display the sleep-wakefulness cycles common to land-living mammals. This sleepless behavior may be related to prolonged weightlessness.

Characteristic patterns of alertness and sleep are signaled by impulses from the brain's center of consciousness. Tiny electrodes planted in these centers in space animals would carry these signals to the black box and to earth via telemetry.

Dr. Adey believes this might give a more reliable measure of performance capability than having the animal press a lever. The animal may stop pressing a lever from boredom or just plain balkiness, he points out.

The system has been tested on animals in a human centrifuge and in vibration experiments simulating acceleration loads of rockets. It has passed with flying colors.

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## TECHNOLOGY

## Plastic Braille Books

► MORE BOOKS for the blind, cheaper to produce, easier to read, and less cumbersome than before, will become available in the near future. They will result from a new process of printing braille, invented by Edward Pyke, the technical officer of the Royal National Institute for the Blind.

Mr. Pyke's invention is the first real

change in the method of printing braille since the process was started about 100 years ago. It consists of baking plastic dots on to paper instead of embossing them in the paper itself.

The new technique, strangely enough, is a reversion to Louis Braille's original method—round-headed nails, driven into a

plank, by which he was taught to "feel" the letters of the alphabet.

The braille alphabet consists of permutations of six dots within the shape of a domino six. The dots, until now, have been embossed on special Manila paper by distorting the fibers, a not-altogether satisfactory method since the dots wear down with the friction of moving fingers. The new method briefly consists of baking solid plastic dots on to the surface of a thin strong paper.

Several leading British industrial companies combined to help make the new invention possible. Imperial Chemical Industries found the right plastic paste for the work, Spicers found the paper that could go through the General Electric Company's infrared curing ovens without taking fire, and Mono Pumps designed the pumps that lift the plastic.

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## TECHNOLOGY

## Turn Stove On and Off By Dial Telephone

► A HOUSEWIFE can turn her stove on or off by dial telephone with an experimental control system developed by engineers of the Westinghouse Electric Corporation, Pittsburgh, Pa. The phone system is part of an exhibit of future products for the home. If made available commercially, the system would permit a housewife to dial her home, dial the appliance she wants to control and then dial one more digit to turn the appliance on or off.

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## PHYSICS

## Improvements Planned For Berkeley Bevatron

► AN EXTENSIVE program of improvements to the 6.2 billion-electron-volt bevatron are planned by the University of California's Lawrence Radiation Laboratory.

The scheduled modifications will permit a greater number and wider range of high-energy experiments with the giant proton accelerator. They will improve the machine's efficiency and usefulness in nuclear research.

The improvements, expected to begin shortly and to be essentially complete by the spring of 1964, will cost about \$9.6 million. Funds are being provided by the U. S. Atomic Energy Commission.

The bevatron has pioneered a new phase of nuclear research, making possible the discovery of the antiproton, the antineutron and other particles.

The changes will not increase the energy of the proton accelerator, but more protons will be accelerated. Ten bursts of protons are now fired each minute by the pulsed machine, with about 100 billion protons in each burst. After the modifications, it is hoped that some 10,000 billion protons will emerge in each burst.

The new program calls for a completely new injection system, consisting of a new ion gun and a new linear accelerator.

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