MEDICINE

Aeromedical Research

REVOLUTIONARY IMPROVEMENTS in future hospital and home patient care will be one of the many down-to-earth benefits resulting from aerospace medical research by the Air Force.

Instruments designed for recording environmental factors in space can be adapted for better patient care and study, Maj. Gen. O. K. Niess, Air Force Surgeon General, told the 24th Annual Educational Conference National Association of Sanitarians meeting in San Francisco.

In the future "patients could be electronically monitored, so to speak, with miniaturized instruments and be watched from a central recording station," he said.

Electrodes could be painlessly implanted on the patient to record all physiological processes. These would then be centrally recorded and reduced mechanically by special medical computers, thus providing the doctor a complete picture of the patient for diagnosis, study and treatment.

The ability to effect such constant and detailed observation would permit more home care for patients ordinarily requiring hospitalization. This in turn would relieve the need for more hospital beds, a major factor in the failure to provide adequate medical care for the very sick.

Studies of physical and psychological stresses in space have yielded new and important knowledge and understanding of the factors affecting human behavior, which should enable man to better face the stresses and strains of daily living on earth.

Gen. Niess reported that physiological studies on centrifuges and rocket-powered sleds "have been of great value in the analysis of mechanical injuries and protection in traffic accidents here on the earth's surface."

Public health problems concerned with fuels, oxidizers and other toxic materials used in space research, as well as safety practices and noise hazards associated with space vehicle operation, are also under investigation by the Air Force.

Noting the high cost of establishing space travel, the Air Force Surgeon General predicted that the rewards in research, advancement in medicine and public health will be "amazing" and will enable man to "influence the development of new methods and instrumentation in these fields."

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GENERAL SCIENCE

Space Program Results

BILLIONS OF DOLLARS already have been poured into space research and burned up in rocket launches, and in the next decade the United States will spend another 30 to 50 billion dollars on its space program.

The financial investment is staggering; but, happily, so are the benefits already received as well as the promise of future dividends.

Our efforts in space have greatly advanced medical research. Hydrazine, a liquid missile propellant, has proved useful in treating certain mental illnesses and tuberculosis. Space-designed electronic equipment is being adapted to measure body temperature and blood flow. Film resistance thermometers, highly useful in medical research, are another development from the space program.

The unexpected and important breakthrough from the one discovery of the medical value of hydrazine alone cannot be calculated in dollars and cents.

Pyroceram, developed for missile radomes (housing for radar antennas), has made possible better and more attractive pots and pans for the modern kitchen. Satellite scan devices are being used in such domestic infrared appliances as lamps, roasters and ovens. Better portable radio and television sets are available now because of miniature electronics and bearings used in and designed originally for satellites.

There are new materials, fabrics, alloys and compounds that are being adapted for consumer commercial markets.

Silicones used for motor insulation and subzero lubricants required for space are being used in new glass-making techniques for countless products for both home and industry.

Engines, automatic pilots, radar systems and flight equipment, developed for space, already have been used to improve conventional aircraft.

Missiles have been used to help build the St. Lawrence Seaway and are bringing down the high costs of quarrying, thus making economically available new sources of ore and hydrocarbons.

In the future, mail may become almost as swift as telephone when guidance devices, now being developed, make possible soft landings necessary for commercial rocket cargo and passenger transport.

A new welding process using a high-powered electron beam will mean stronger and more fire-resistant buildings and homes in the future at more economical cost.

Space research has provided new tools for food and agriculture. Infrared blanching is a new and effective technique in preparing foods for canning and freezing. A new forage harvester based on principles of aerodynamics developed by missile engineers is a space-age contribution to the age-old profession of farming.

The development of new foods for growth in the confines of a space cabin may prove to be a valuable food source as the world population climbs and our conventional food sources decline.

Weather modification is another promise of the space age further in the future. But better understanding of weather processes soon may make accurate, long-range weather prediction possible, which would mean millions of dollars saved by being able to know when to plant crops as well as being able to avoid crop damage.

The Army's work on an anti-radiation drug not only would be invaluable in civil defense in the event of atomic war, but would be a great protection for atomic workers in peaceful pursuits.

The axiom that you have to spend money to make money is amply demonstrated in the space program, which has opened vast new industries, thus increasing the demand for workers, specialists, scientists and technicians to an all-time high, and increasing employment and national income.

These are some of the valuable rewards reaped from efforts in space, as reported by the House Committee on Science and Astronautics in The Practical Values of Space Explorations. But probably the greatest benefit may come in that, as nations strive to conquer space, the high cost of space exploration may force nations attempting to conquer that area to give up conquering each other.

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SEISMOLOGY

Undersea Seismograph To Record Shock Waves

A ROCKET-SHAPED DEVICE is being dropped to the ocean floor about 150 miles west of Bermuda, to fish for profiles of the ocean bottom.

The device is a new underwater seismograph for recording shock waves. It was built at Columbia University's Lamont Geological Observatory in Palisades, N. Y.

It may tell scientists new things about underwater sound transmission and may indicate a fairly good sound channel or wave guide in the upper part of the ocean-bottom sediment. These sound studies could have application in military communications and submarine detection systems.

John Ewing, the Lamont geophysicist who is directing the six-week test of the new device, believes the device will be "as valuable to us as a telescope on a high mountain is to an astronomer."

The new 14-foot device has a nose cone with a spike on one end and tail fins on the other. The scientists are dropping the device nose first into sediment 18,000 feet below the ocean's surface. It will stand upright on its spike.

Columbia's converted mine sweeper, *Sir Horace Lamb,* will drop depth charges and the seismograph will record the shocks.

As the seismograph responds to motions of the earth, its signals will be amplified and transmitted through the water acoustically to Columbia's schooner *Grace.*

The seismograph may also be useful in recording natural earthquakes that often occur under the ocean, and in studying ocean-bottom sediment.

The transistorized device has batteries that will keep it functioning for four and a half to five days.

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