

ASTRONAUTICS

# Space Scientists' Courses

► FUTURE SPACE SCIENTISTS should start their college-level preparation now, since outer space flights will begin much sooner than is expected.

Darrell C. Romick, on the missile project staff of Goodyear Aircraft Corporation, Akron, Ohio, told the International Astronautical Federation at their sixth worldwide meeting in Copenhagen that flight into outer space comprises an entirely new scientific field of study and learning.

Space flight will become a major activity within the next ten years, he suggested, and now is the time to provide text books and set up specific courses in astronautical subjects at the college level.

The subjects Mr. Romick outlined for study have opposite numbers in the field of aeronautical engineering. Space flight, he said, "is now at a point corresponding to that of aeronautical science in the opening years of the 20th century." It is "very likely" to proceed more rapidly because of present-day "accelerating technical capabilities."

The most significant new astronautical science suggested for study by Mr. Romick is called astrodynamics, dealing with "the

dynamic flight behavior of space vehicles." It would include the performance kinetics and dynamics, stability and control of spacecraft, similar to aerodynamics in aeronautics.

There would also be a science of spacecraft propulsion, control systems, guidance, instrumentation, structures and design. Each of these would use techniques similar to those for aircraft, but would be specific for space vehicles.

Among operational sciences and skills, Mr. Romick said, would be astro-navigation, astro-communications, cosmology and astro-biology, or space medicine. Other unique areas for study would include spacecraft maintenance and repair and spacecraft piloting.

In Mr. Romick's opinion, the demand for more highly and specifically trained specialists in the astronautical sciences is increasing steadily.

"A rapidly initiated proper plan of organization is required," Mr. Romick said. This would be highly preferable to "the much slower evolutionary process" that would otherwise occur.

Science News Letter, August 13, 1955

Altitudes from 200 to 300 miles, Mr. Petersen said, would be probable for refueling operations.

For a nearly permanent orbit, he estimated 500 miles as the lower limit. Large manned satellites would take positions about 1,075 miles in space, he calculated.

Science News Letter, August 13, 1955

TECHNOLOGY

## Earplug Made of Wax-Filled Plastic

► AN EARPLUG made of wax-filled soft plastic that conforms to the ear shape has been developed by Dr. J. Zwislowski of Harvard University.

People have found these earplugs sufficiently comfortable to sleep with, he says, and they cut down sound with an efficiency equal to or better than known earplugs.

When tested on 20 males and 25 females, the earplug fitted 90% of the persons. Although it has been made in only one size, its efficiency might be improved by a range of sizes, Dr. Zwislowski said in the *Journal of the Acoustical Society of America* (May).

Science News Letter, August 13, 1955

ASTRONAUTICS

# Orbit for Manned Moon

► A MANNED EARTH SATELLITE would have to be 1,075 miles out in space to serve as a stepping-off place for interplanetary space ships, Norman V. Petersen has concluded.

Mr. Petersen, president of the American Astronautical Society and a guided missiles engineer at Sperry Gyroscope Co., Lake Success, N. Y., calculated the behavior and lifetimes of earth satellites in orbits at various altitudes.

He told the Sixth International Congress of the International Astronautical Federation meeting in Copenhagen that low-altitude orbits are useful only for short-period research studies, or refueling and payload

transfers. These would be, he said, "perhaps from 100 to 200 miles, or approximately the 90-minute orbit (167 miles)."

More permanent orbits, required for extended research, astronomical observations, weather studies and space stations for departure points of distant expeditions, exist at altitudes of 500 to 1,000 miles—or near the two-hour orbit (1,075 miles).

Velocities of 17,000 miles per hour or more will be attained by even the closest satellites, Mr. Petersen pointed out. The man-made moonlets will circle the earth many times every day, appearing to rise in the west and set in the east, reversing other sky phenomena.

Earth satellites that might be used for relaying communications and perhaps even television programs would require "altitudes considerably in excess of 1,000 miles" for a nearly stable orbit.

A 167-mile altitude, he found, "represents the 90-minute orbit and is perhaps a probable minimum altitude for the first instrumented satellite probes having useful lifetimes of one to 20 days."

The unmanned earth satellite the United States plans to launch during the International Geophysical Year is expected to have an orbit from 200 to 300 miles above the earth's surface and to circle the world about once every 90 minutes. (See SNL, Aug. 6, p. 85.)

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