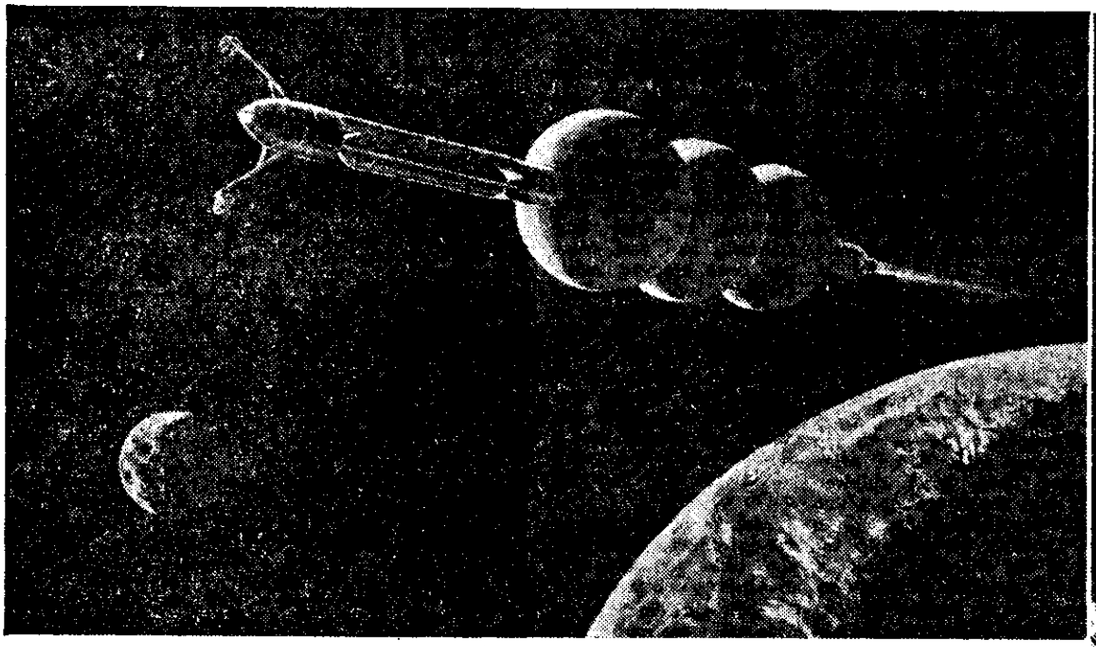


ADVENTURE IN SPACE

WHETHER a moth is used, as by Dr. Dolittle and his companions, Thomas Stubbins, Polynesia, and Chee-Chee, or a modified cannon ball, as by Jules Verne's heroes, men have been going to the moon, the planets and the stars—on paper at any rate — for some generations now. That the subject of space travel is rapidly developing into something more than a theory is evident in the attitude of many scientists in recent years, in the great development in rocket research, and in the status and number of members of the various astronautical and interplanetary societies.

In a BBC feature programme *Adventure in Space,* the first half of which will be heard from YA stations, 3YZ and 4YZ at 2.50 p.m. on Sunday, February 10, the Secretary of the British Interplanetary Society, Leonard Carter, and two other Fellows of the Society, Dennis Hurdon, a rocket engineer, and Derek Lawdon, a mathematician, answer questions on the how and when of space travel. Though these questions are asked by children, the traditional inheritors of wonder, the modern age has taught even the most sceptical adult to wait and see, and the threat that this world will be made uninhabitable leads many of us to conjure with the thought of a new one—which is one reason, no doubt, for the popularity of science fiction and mobile saucers.

The first manned voyage into space is likely to be to the Moon, contends a past chairman of the British Interplanetary Society, Eric Burgess, in a book* published recently. This is because the distance there is rather less than a quarter of a million miles, roughly equal to 10 trips around the Earth at the Equator. This is not considered an impossible distance, though most of it must be covered non-stop. The only stop or —more exactly — the starting point, would be a manned satellite space station circling the earth, 500 to 1000 miles or more out. The distance of a 1000-odd miles was an estimate made by Wernher von Braun, one of the members of the Peenemünde V2 team and now a key figure in rocket research in America. This matter of distance from the earth is critical, apparently, and a choice of a suitable orbit involves all sorts of calculations in mathematics to prevent the satellite moving into the atmosphere and burning up.

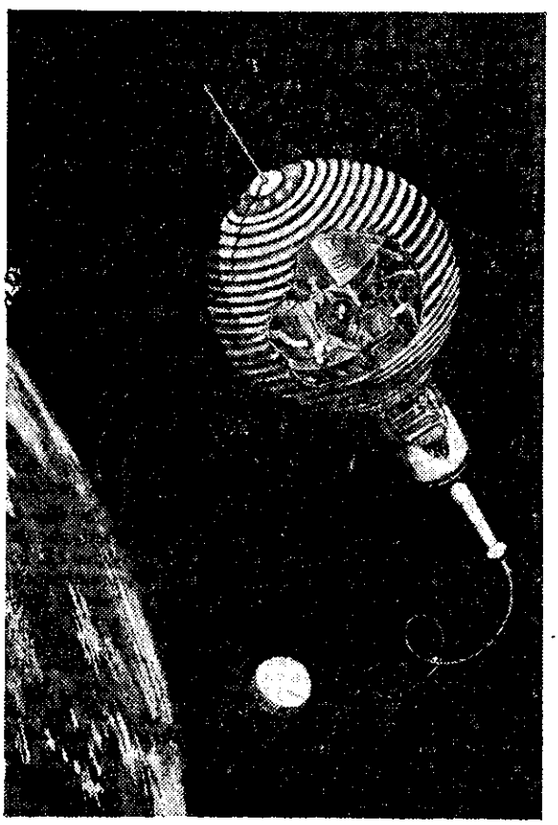
"Many scientists," writes Mr. Burgess, "will say that it should take about 20 to 30 years to develop the first Moon rocket. The beginnings will be made from the guided rockets which we have seen developed first as long range missiles and then for the instrumented satellite." The reference here is to the satellite that the United States intends to launch sometime during the present International Geophysical Year. Project Vanguard, as this operation is called, plans a three-stage rocket that will lift a magnesium sphere 20 inches in diameter weighing over 20 pounds into an orbit 800 to 1500 miles above the earth. Electronic equipment to relay various data to the earth will account for 80 per cent of the satellite's weight. The power to operate this equipment will be got from solar batteries that convert the sun's rays directly into electrical energy.

A space station, however, comments Mr. Burgess, cannot be established as easily as an instrumented satellite. The mass of many tons required for such a station requires a rocket so large as to be beyond engineering probability. But 20 or 30 rockets all launched at the correct time and controlled to enter the same orbit would over a period of weeks bring together enough material in space for men in special suits to assemble a station "on the spot." These special space suits already exist, for the high altitude pressure suits used for flights in the stratosphere are, if not quite perfect, a close prototype to that required in space —or for that matter on the Moon.

This raises the problem of human survival in space. "Will man," asks Mr. Burgess, "be the weak link in the chain of events leading to interplanetary flights?" He then tells us some of the nasty things that can happen to an unprotected person at a mere 63,000 feet, how his tears would boil on his eye-balls, his blood foam in his lungs and his body become one big blister. But, adds the author, after a brief survey of aero-medical developments, "to the best of our knowledge and experience, human survival beyond the protection of the Earth's atmosphere is assured."

One of the aspects of "space medicine" that has rapidly come from the realm of theory to demonstrable fact is whether the weightlessness of the body in "free fall" is physically dangerous. American experts in aviation medicine have conducted experiments in jets flying a parabolic path where centrifugal force balances gravitation. At the point of zero gravity a ball or pencil tossed in the air is suspended, and most men feel pleasantly relaxed. Altogether some hundreds of men have made such flights without alarming effects. Man then, it seems, could survive in space. "It but remains for the engineers to construct the machines which can carry us out into space."

In *Adventure in Space* the children asking the questions are Wendy Harfield, Roger Mander, Patrick Pritchard, Fiona Thorburn, and Dominic Wardell. The second half of this BBC feature will be heard from YAs, 3YZ and 4YZ at 2.50 p.m. on February 17.



TOP LEFT: An atomic-powered spaceship leaves the satellite orbit around the Earth on its way to Mars. Radar fixes obtained on the Moon and the Earth are used in conjunction with optical fixes on Mars and the Sun to check the ship's path. TOP RIGHT: Landing on the Moon—a spaceship sits down on its exhaust jet. LOWER RIGHT: A view of a small satellite in its orbit around the Earth during the International Geophysical Year. The surface of the sphere has been cut away to show instruments in the interior. (Pictures from "An Introduction to Rockets and Spaceflight")

*An Introduction to Rockets and Spaceflight, by Eric Burgess; Hodder and Stoughton, English price 12/6.