The Immensity of Space

(Continued from p. 119)

NASA estimated that the reentry velocity would be 37,256 feet per second (roughly 25,401 mph), but their guess was off—by 24 fps. Though it made no difference for FIRE II, this tiny error, less than 0.065%, could make the difference between success and failure for a long-term mission, during which the great distances between earth and the other planets could magnify a small discrepancy into a major catastrophe. If your watch loses or gains one minute a day, it is still almost as accurate as was FIRE II. (Your timepiece's error is still less than 0.07%.)

Herculean Effort

To build the ever-growing hardware of this country's ever-expanding space program is a Herculean effort. Getting three astronauts to the moon will have directly involved the services of a third of a million people—a brain-and-labor force equal to the population of Omaha, Nebr. For every company assigned by NASA to build a booster stage or a space vehicle there are hundreds of subcontractors with the task of supplying everything from magnesium panels to dehydrated food. Dr. Hugh L. Dryden, deputy administrator of NASA, has estimated that 20,000 companies are or will be connected with the program.

And when Apollo is finally launched, it will be a remarkable sight indeed, seated atop the huge Saturn V booster that will make a Gemini-Titan package seem like a child's toy. Three times as big as a Gemini-Titan, each Saturn-Apollo will tower as high as—well, just try to imagine a 30-story building blasting its way into space.

Once on their way, the Apollo astronauts will be busy with an incredible list of tasks filling some 12,000 pages of instructions. This is almost 10 times as many pages as there are in the inch-and-a-half-thick Washington classified telephone directory. In order to save weight, and to make all the information as readily accessible as possible, a souped-up variation of microfilm will be used to compress 12,000 pages into one two-foot strip of eight-millimeter film. This super-reduction could be used to reprint the entire Bible on a postage stamp. The Library of Congress, containing 270 *miles* of bookshelves, could be stored in half a dozen ordinary filing cabinets.

The biggest, the smallest, the highest, the fastest—these are the dimensions and quantities in the conquest of space. But all the spectacle, the glamor, and the plain old Buck-Rogers-ism is lacking without an understanding of just how extreme these numbers are.

How far is 325 million miles? Not just "pretty darn far," but a particular distance. Some day another spacecraft, perhaps with men aboard, will go even farther. The point is that to regard all these statistics as nothing but big numbers—collections of zeros that boggle the mind and leave no clear impression of size—is to confine man to counting on his fingers, with no mental picture to cope with any number beyond 10.

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Nature Note

SEA NETTLE

The beautiful fragile sea nettle Dactylometra is a menace in warm summer waters.

Pulsing through brackish waters of estuaries and bays, with a motion like opening and closing an umbrella, the nettle has a disk-shaped translucent body, with golden tentacles hanging down from the edges and pink mouth lobes underneath.

On the slightest contact, a painful poison is ejected from trigger hairs coiled like a spring in the stinging cells located along the jelly-like body and long thread-like tentacles.

This poison, used by the nettle to paralyze and capture small fish as food, can cause human beings to have painful red welts, muscular cramps and other serious symptoms.

The beautiful, dangerous creature, also called the stinging jellyfish, can grow up to eight inches across, some with tentacles 120 feet long.

Millions of these stinging beauties drift leisurely in the summer waters along the East Coast from New England all the way to Florida.

They also inhabit the sea along West Africa, India, the Malay Archipelago, Philippines and Japan.

Jellyfish reproduce in quite a complex manner.

Sperm cells from a male jellyfish fertilize the female's eggs, which develop into tiny hollow spherical bodies that move through the water by whipping hairs back and forth.

After a few days, the young jellyfish fastens itself to some object, develops a mouth and tentacles and becomes what is called a polyp.

Shaped like a bowling pin, the tiny polyp is about a quarter of an inch high and a sixteenth of an inch across.

This polyp produces baby jellyfish in two ways—tiny round disks peel off in layers from the top of the polyp and swim away, or else the polyp simply moves away from its base, leaving a series of circular "footprints" which grow up into mature jellyfish.

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