GENERAL SCIENCE

Earth Is in Suburbs, Not the Downtown Section, of Galaxy

Reports from Many Fields Are Presented to National Academy of Sciences at the Annual Spring Meeting

THE SUN, together with the earth and other members of the solar system, is in the suburbs of our vast celestial city, or galaxy—not part way down town, as astronomers have supposed.

Observations which seem to remove us from a more central location were announced by Dr. Arthur B. Wyse and Dr. Nicholas U. Mayall, of the Lick Observatory of the University of California. Their data were presented to the National Academy of Sciences meeting in Washington.

All the stars that can be observed, even with most telescopes, and the sun as well, are members of the galaxy, a swarm of stars in the shape of a huge disk. Looking in the plane of the disk, we see many more stars than when we look to the sides. So concentrated are they in the disk's plane that the naked eye cannot detect them individually, and the effect is the Milky Way.

Outside this galaxy are millions of other galaxies, formerly called spiral nebulae. Only one of these, in the constellation of Andromeda, directly overhead on autumn evenings, is visible, as a faint patch of light, without a telescope. This is Messier 31, its number in the catalog of nebulae prepared in 1781 by Charles Messier, a French astronomer. Drs. Wyse and Mayall have studied this galaxy, as well as Messier 33, which is in the same part of the sky, in the constellation of Triangulum.

Up to now, it has been assumed that there was a great concentration of the mass of these galaxies toward their centers. Consequently, the stars in each system, revolving around the center in merry-go-round fashion, would be subject to the same sort of motion as in the solar system. In the latter case, the sun contains most of the mass, and the innermost planet, Mercury, travels fastest. Farther out, speeds are progressively slower, because these planets are not pulled as much by the sun's gravitation. Mercury, for example, moves around the sun at about 30 miles per second, the earth at 18.5 miles per second, Jupiter at 8 miles per second, and Pluto, most distant, only 3 miles per second.

Using the spectroscope to analyze the light of the two galaxies, and to measure the speed of various sections, the California astronomers find that a short distance from the center of Messier 31 the speed is not fastest, but slowest. "The velocities in both cases," they report, "increase outwards to unexpectedly large distances from the center." This is similar to movement of parts of a solid wheel, rather than a group of separate stars. By a mathematical study, they found a distribution of the stars in such a system that would account for this.

"The results for both spirals," they announced, "indicate only a very slight tendency for the mass to be concentrated toward the center."

Then they checked over measurements of the rotation of stars in our galaxy, and found that these did not necessarily indicate a high concentration of the galactic mass to the center, which is in the direction of the constellation of Sagittarius.

"Comparison of the densities and the rotational velocities in the two spirals with those in the solar neighborhood, suggests that the sun may be situated in the outermost parts of the galaxy, well beyond the main body of the system," they declared.

Many observations have indicated that the stars that are nearer the center of the galaxy are going faster than the sun, and those farther out are going more slowly. But if we are in the galactic suburbs, it may be that we are so far out from the center that there is a falling off of speed.

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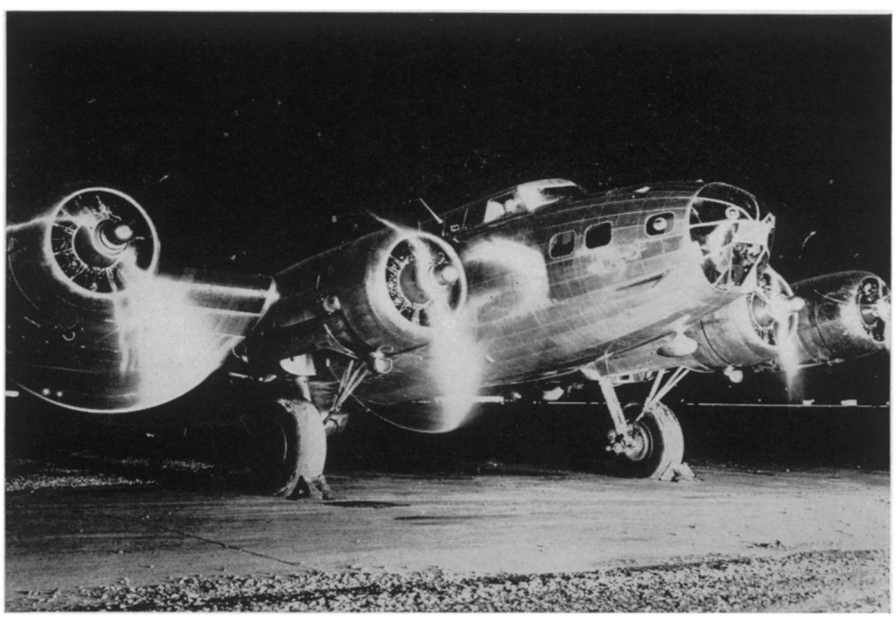
Spirals "Trail Their Arms"

FIRST unambiguous determination of the direction in which one of these spiral galaxies rotates was announced by Dr. Edwin P. Hubble, of the Mt. Wilson Observatory, in paper prepared jointly with Dr. Mayall. Since it cannot always be determined which edge of the disk is nearer, spectroscopic measures, while they reveal speeds, do not necessarily show the direction.

Of 1000 of the brightest galaxies in the northern sky, only one, NCG 3190, in the constellation of Leo, permits both a spectroscopic measure of the movement along the spiral arms, and a definite



NIGHT FLIGHT

In the glare of floodlights is visible the 4-engine Flying Fortress built by Boeing in Seattle for the U. S. Army Air Corps and Britain's R. A. F.