ASTRONOMY

From Now On: Galaxies

Gleaning of more knowledge about the Milky Way galaxy in which we live is slated for the future. The extent of space and planetary mysteries will also be probed.

By WATSON DAVIS

Twelfth in a series of glances forward in science.

➤ BILLIONS of galaxies of stars, each containing more than a billion stars like our sun, many so distant that it takes light a thousand million years to reach from them to us—that is what the universe is made of.

To see a sample of one such aggregation of blazing suns, look at the twinkling sweep of the sky on a clear, dark night. The Milky Way is our galaxy, our "universe," our stellar system. The Milky Way is a galaxy seen from the inside.

Astronomers build large and wide-sighted telescopes to explore the greatest expanses of space that the senses and minds of men can encompass. From the 200-inch Hale mirror on Palomar to the sprinkling of broad-seeing Schmidts, these are providing the clues to the most magnificent mystery of the universe—the nature of the universe itself.

This search for understanding our place in the nature of things is as old as the very early questioning of the meaning of the sun by day and the moon and the stars by night. We are not far removed—on the universe time scale—from Copernicus who deflated our egocentric confidence that the earth is the center of the solar system. Only a generation ago, some astronomers were hopefully confident that the sun was the center of the Milky Way and that the Milky Way was the whole of the universe.

Three decades ago, Dr. Harlow Shapley showed the center of our galaxy is about 30,000 years of light travel from us, and we are far off-center, in but one of the millions of "island universes."

If we were not so aware of the power of scientific method and fact, this idea would be humiliating to our human estate. It does do violence to any tendency toward master race complexes, and raises, inevitably, the suspicion that there exist other worlds than ours—although one must hasten to add there is no good evidence for such existence.

Such thoughts prove to be the fabric of philosophy and religion. But the astronomers are less concerned with the meaning of their discoveries than they are in discovering the universe. The big task is to photograph, explore and puzzle the physical relationships. Let the morals fall where they may.

Using the new improved telescopes—and the extraordinary improved photographic plates that have doubled telescopic efficiency in the past decade—is only part of the detective work of the astronomer. When the plates are ready, their meaning must be deciphered through the complex clues of modern astronomy.

Prisms are used on some telescopes to spread the star light into "rainbows" from which the nature of the star can be determined.

Two tiny black dots on photographs taken through a telescope may look exactly the same and the stars making them may be very different indeed. So the spectra of the stars made with the use of prisms are very revealing, and so are the photographic plates that are sensitive to different kinds of light, such as red light and blue light.

Once the astronomers have read the light of the stars they know a great deal about them. Some stars, by reason of the way they fluctuate in brightness in a definite rhythm or period, can have their actual candle-power determined, and by comparing their seeming brilliance with the actual brilliance, their distance away can be told. They can be used as yardsticks to tell the distance of th star clusters in which they are located.

Because of the great multitudes of stars and because new factors, like great clouds of interstellar dust that obscure parts of the sky are often discovered, the task of the astronomer is long-continued, tedious, and meticulous—although awe-inspiring and exciting. The past decades of this century have been an era of great discovery in the universe. But the future promises greater fruits in the exploration of space, time and matter.

In the years to come, as telescopes and astronomers continue their work, we can expect:

A. More knowledge about the Milky Way galaxy in which we live, determining the influence of dust clouds on our estimates of the size and the future history of the Milky Way.

B. Exploration of the extent of space, particularly the discovery as to whether the great galaxies are evenly distributed or whether they thin out or thicken up in some part of space—facts that are very vital to theories of the nature of the universe.

C. Knowledge of the planetary family, since even from distant stars we may glean some bit of knowledge about our own star, the sun, that may help us in understanding its many influences upon the earth.

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AERONAUTICS

Steam for Wind Tunnel

➤ DEVELOPMENT of a supersonic wind tunnel 10 times the size of tunnels now in use may be possible through the use of steam instead of compressed air. Such steam tunnels would be large enough to contain full scale models of pilotless planes and guided missiles.

A working model of such a supersonic tunnel has been developed at Pratt Institute in Brooklyn by senior mechanical engineering students under the direction of Maj. James R. Randolph of the engineering school faculty.

The largest compressed air supersonic tunnel now in use is at the Lewis Laboratories of the National Advisory Committee for Aeronautics at Cleveland. In that tunnel it is necessary to use small models of new weapons and planes to be tested.

Steam pressures which could be furnished by the average city steam power plant could be used in the new tunnel, according to Maj. Randolph. The small model at Pratt is connected to the Institute steam lines. A velocity of 1,360 miles per hour has been produced in this model.

Maximum velocities in supersonic steam tunnels would be produced by superheating the steam with electric heating coils, which would also produce the desired dry steam for the best experimental conditions, according to Maj. Randolph.

Although the use of steam for supersonic tunnels has been considered by other engineers, Maj. Randolph believes his is the first application of the steam principle.

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ANTHROPOLOGY

African Ape-Men Declared More Human than Ape

➤ THE South African fossil ape-men, who lived thousands of years ago and whose remains have been dug up, have a closer structural resemblance to primitive men than do any of the known anthropoid apes, Dr. W. E. Le Gros Clark of Oxford University Museum's Department of Human Anatomy, has declared.

He thus differs with Dr. S. Zuckerman, anatomist of the Birmingham University Medical School who had declared that the teeth of *Australopithecinae* showed that it resembled existing apes more closely than human types (See SNL, May 27, p. 329).

The Oxford anatomist pointed out in a report to the British scientific journal, NATURE, that many specimens of jaws and palates of *Australopithecinae* show the same human-like pattern consistently.

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