ASTRONOMY

Stellar System of Stars Likened to Swarm of Bees

THE MAN who has probably seen and probed more of the universe than any other person, Dr. Edwin Hubble of the Carnegie Institution's Mt. Wilson Observatory, presented the following word-picture of the universe to the National Academy of Sciences:

On the grand scale, we may picture the stellar system, the system to which our sun belongs, drifting through the universe like a swarm of bees drifting through the air. From our position somewhere within the system, we look out through the swarm of stars, past the borders, into the universe beyond.

It is empty for the most part—vast stretches of empty space. But here and there, at immense intervals, we find other stellar systems, comparable with our own. They are so distant that in general we do not see the individual stars. They appear as faint patches of light and hence are called nebulae.

The nebulae are great beacons scattered through the depths of space. We see a few that appear large and bright. These are the nearer nebulae. Then we find them smaller and fainter in constantly increasing numbers and we know we are reaching out into space farther and even farther until, with the faintest nebulae that can be detected with the greatest existing telescope, we have reached the frontiers of the known universe.

This last horizon defines the Observable Region—the region of space that can be explored with existing telescopes. It is a vast sphere, some 600,000,000 light years in diameter, throughout which are scattered 100,000,000 nebulae.

Further radical advances in cosmology will probably await the accumulation of more observational data—the elimination of more types of possible worlds. The data will come either from detailed investigations of the present Observable Region or from a significant enlargement of the region itself.

The latter alternative will be achieved with the 200-inch reflector in course of construction for the California Institute of Technology with the assistance and cooperation of the Carnegie Institution of Washington. This great telescope, in the hands of experienced research men in the two institutions, is expected to enlarge the available sample of the universe some ten times in a single step and will increase in a corresponding measure the chances that our sample is fair and significant.

Our present information concerning the universe is necessarily vague. It is new and raw and will mature only with time and continued study. The great significant feature is that the first steps have actually been achieved—that in our generation, for the first time, the structure of the universe is being investigated by direct observations.

Science News Letter, May 26, 1934

GENERAL SCIENCE

Astronomer and Chemist Receive Franklin Medals

PROFESSOR Henry Norris Russell, Princeton astronomer, and Dr. Irving Langmuir, General Electric Co. chemist and recent Nobelist, were awarded the Franklin Institute's Franklin Medal at its annual meeting.

Among the other awards were Wetherill medals given to Dr. Johann B. Ostermeier of Augsburg, Germany, and to Prof. E. Newton Harvey, of Princeton, and Alfred L. Loomis, banker-scientist of Tuxedo Park, N. Y. The latter two were honored for their joint invention of the centrifuge microscope, one of the most powerful of the newer tools for scientific research.

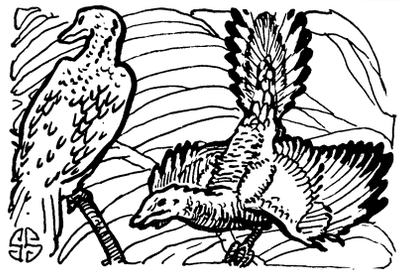
The centrifuge microscope is an instrument in which the specimen to be examined is whirled on the end of a high-speed rotor, which imitates the effect of a greatly increased force of gravity. A light is arranged so as to illuminate it with a brief flash at one point of each rotation, and during these succeeding flashes it can be looked at with a microscope, so that events may be watched while they happen. The centrifuge microscope was developed by the two men in Mr. Loomis' private laboratory.

Science News Letter, May 26, 1934

Government scientists are trying out a new poisoned bait on the grasshoppers that infest Midwestern fields this year.

PALEONTOLOGY

NATURE RAMBLINGS by Frank Thone



Writ In Clay

HOW MUCH of our knowledge of the past we owe to mud!

One of the two oldest known civilizations, that of Mesopotamia, left us practically all of its records imprinted on clay tablets in the curious "hen-track" script we know as cuneiform, or wedge-writing. And from the clay-made pottery of early peoples in all parts of the earth, ranging from the crude jars of Mound-builder Indians to the painted vases of the Greeks and the exquisite porcelains of the old Chinese dynasties, we gain light on the culture and attainments of the peoples who made them.

But older than these, older than anything human, old as any life on the earth, are other records writ in clay. Dinosaurs stamped their huge feet into moist mud, dragged their trailing tails across it. The clay dried out in the sun, hardened, was buried under fresh layers brought by the next flood, and after long ages turned to stone. Now we can split off slabs of it and see where these lumbering reptiles walked. Lesser footprints, of salamanders, insects, scorpions, snails even, are similarly preserved for us from remotest ages.

Not only are the writings of hands (and feet, and tails) preserved in hardened clay, but sometimes the images of the writers themselves. A common type, perhaps the commonest type, of fossil is what paleontologists call a "cast." In such a fossil, no trace of the internal structure of the bone or other hard part of the dead animal remains. All it left, as it decayed rather rapidly, was a hollow in the mud that covered it, and into this hollow slowly filtered fine-grained silt that filled it up, marking itself off from the surrounding "matrix" stone by differences in fine-

ness, in color or in material. Such casts give us images of the external shape of bone, scale, horn—sometimes even skin and feather.

The finer the clay the finer the detail in the cast. Probably the most perfect fossil cast, certainly the best known one, is the famous cast of *Archaeopteryx,* the toothed, long-tailed primitive bird found, complete even to prints of its feathers, in a slab of lithographic stone from Central Europe.

The ooze into which that dying bird fell, millions of years ago, was so fine-grained that the stone into which it has hardened will register and reproduce the thinnest of lines that can be drawn upon it with a lithographer's pen. This extreme fineness of grain has made it possible for scientists to study the skeleton and feathers of this long-gone bird species almost as though they had before them the bones and feathers of a crow killed a few days ago.

Good enough for the dinosaurs were the coarse shales and sandstones of our rude west, of the wild plains of Mongolia. *Archaeopteryx,* writing his own epitaph with his own plumes, demanded—and received—a much daintier entombment.

Science News Letter, May 26, 1934

AGRICULTURE

United States Need Not Fear Famine Even With Drought

DROUGHT or no drought, Americans will not have to face famine this winter. The "carry-over" of wheat, corn and other basic foodstuffs, added to even a short crop, insures ample supplies. And should the worst imaginable befall, and no food whatever be raised in this country this year—something quite impossible, short of a veritable Devil's miracle—there is already sufficient in the pantry to live on.

A survey of the situation, based on latest data available at the U. S. Department of Agriculture, piles up some impressive figures.

The quarterly report of stocks of wheat on farms, together with private figures, leads to an estimate of 386,000,000 bushels for total wheat stocks as of April 1 this year, compared to 528,000,000 bushels last year and 521,000,000 bushels average for the past three years.

Estimating and deducting the amount to be used at home and set aside for export until July 1 suggests that the carry-over at that time will be 250,000,000 to 275,000,000 bushels. This compares with 397,000,000 bushels a year ago and a five-year average of 285,000,000 bushels.

The new winter wheat crop is estimated at May 1 at 461,000,000 bushels. No estimate can be made as yet for spring wheat, because it is not all planted. Last year the spring wheat crop was 176,000,000 bushels. Assuming that the crop is the same size this year (which is doubtful if the present drought continues) that would give a total supply for next year as follows: Carry-over 266,000,000 bushels, winter 461,000,000 bushels, spring 176,000,000 bushels, or a total of 903,000,000 bushels.

The total disappearance of wheat for food, feed, etc., was estimated at 620,000,000 bushels last year, 666,000,000 bushels in 1932, and 684,000,000 bushels in 1931, assuming 625,000,000 bushels for next year would leave 278,000,000 bushels for export and carry-over. The total exports during the years 1929-32 averaged less than 150,000,000 bushels per year, in 1933 they were 44,000,000 bushels and declined still more in 1933-34.

This would leave us with a carry-over next year about as large as this year.

The stocks of corn on farms on April 1 amounted to 834,000,000 bushels, compared with 1,123,000,000 bushels in 1933 and 913,000,000 bushels in 1932.

Stocks of oats on farms on April 1 were 271,000,000 bushels, compared to 468,000,000 in 1933 and 365,000,000 in 1932. Oats are, therefore, relatively considerably below recent years.

Science News Letter, May 26, 1934

ENGINEERING

Hair Not Good Material For Test of Razor Blades

THE TIME-honored morning rite of plucking out a hair and testing a razor blade on it has been investigated by science, and found wanting.

Hair is too irregular to be good test material. So T. S. Fuller and Dr. W. R. Whitney of the General Electric Company's Research Laboratory discovered, in seeking a thread or fiber for razor blade tests.

An eight-inch hair varies as much as 340 per cent. in its cross-sectional area. While even poets rarely wear hair this long, the figure gives an idea of how inexact the hair test is.

The laboratory investigators made a standard fiber of raw silk strands twisted in a certain way, for their tests. The "sharpness tester" apparatus which they have devised is described as purely a developmental and not a commercial device, to check up on the performance of blades.

Science News Letter, May 26, 1934