

ASTRONOMY

Astronomy Highlights

Spiral arms of our galaxy were detected by two different techniques. Age of the expansion of the universe was increased to where it agrees better with age of earth's crust.

► **TEN TOP** astronomical highlights for the past year have just been picked by Dr. Harlow Shapley of the Harvard College Observatory. They are:

1. Tentative detection of what appear to be the spiral arms of our galaxy by tracing the distribution of shining nebulosity in Milky Way fields. This is the work of Dr. W. W. Morgan and his collaborators at the Yerkes Observatory, and for the southern sky by Dr. B. J. Bok and his collaborators of Harvard Observatory at Cambridge, Mass., and Bloemfontein, South Africa.

2. Even more spectacular, but still provisional, the detection of the spiral arms of our galaxy through use of radio astronomy's new tool for measuring neutral hydrogen in the space between the stars. This work was done by Drs. H. C. van de Hulst, C. A. Muller and J. H. Oort in Holland, following the pioneer work of Drs. H. I. Ewen and E. M. Purcell at Harvard.

3. General acceptance of the growing evidence, produced chiefly at the Mount Wilson-Palomar and Harvard Observatories, that the luminosities of classical Cepheid stars must be revised upwards, with the consequence that the distances of the Magellanic Clouds, the Andromeda Nebula and nearly all external galaxies must be appreciably increased. It is also now indicated that the speed at which the Metagalaxy is expanding at a given distance is much less than hitherto figured, and the age of the expansion of the universe is thus increased to where it agrees better with the radioactively determined age of the earth's crust.

4. Khartoum, Anglo-Egyptian Sudan, eclipse of the sun on Feb. 25, which may go down in history as the most copiously and successfully observed total solar eclipse.

5. Analysis at the National Bureau of Standards by Mrs. Charlotte M. Sitterly and associates of the spectrum of the radioactive element technetium, No. 43, first produced in the atomic pile. Spectral lines of this element have subsequently been discovered in stars of Class S by Drs. P. W. Merrill and I. S. Bowen at Mount Wilson and Palomar Observatories.

6. Optical design by Dr. J. G. Baker and first stages in the construction by Perkin-Elmer Corporation (optics) and J. W. Fecker, Inc., (mounting) of an important new type of telescope for the observatory of Vanderbilt University. The instrument can be used as a regular Newtonian reflector, as a broken Cassegrain reflector, and as a Schmidt-type instrument. It combines a 24-inch paraboloid mirror of fused quartz, a 24-inch correcting plate, an 11-inch two-

component lens in the converging beam, and a 24-inch six-degree objective prism.

7. Identification of two radio stars by Dr. W. Baade of Mount Wilson and Palomar Observatories with the collaboration of British astronomers and radio experts at Cambridge and Manchester. He found the "radio star" in Cygnus to be a pair of galaxies apparently in collision, and the one in Cassiopeia to be an expanding envelope of what may have been a supernova of the remote past.

8. Theory by Dr. E. E. Salpeter of Cornell that provides a method by which the heavier elements—carbon, oxygen, neon, silicon, etc.—can be built up in the hot stars out of helium atoms created from primordial hydrogen. A central temperature of more than a hundred million degrees is found necessary, and such exists, according to current theory of stellar interiors, in the massive stars of types O and B.

9. Discovery of the variability, in the shortest known period of 80 minutes, by Dr. O. J. Eggen of the Lick Observatory working at Canberra, Australia, of a low-luminosity seventh-magnitude nearby star,

H.D. 223065 in the constellation Phoenix. This may be a new type of variable star or a variant of the RR-Lyrae type.

10. Remarkable work on the color-magnitude arrays in some bright globular clusters by A. R. Sandage, H. C. Arp and Dr. C. C. Baum with the Hale telescope on Mt. Palomar.

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MEDICINE

Common Headache Linked to Migraine

► A **NEW** theory now links the cause of common migraine headaches with the cause of a rare migraine in which the periodic headaches are followed by paralysis of the eye muscles. The theory was presented by Drs. David O. Harrington and Milton Flocks of San Francisco at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago.

A relationship between these two migraines has been seriously questioned by eye specialists in the past. In five previous cases of the rare migraine, scientists have been able to examine the brain after death, but the findings "have only added to the confusion," the San Francisco doctors said.

They reported a typical case of migraine with eye muscle paralysis in which, after death, they found rupture of a curved structure in the brain. This was causing pressure on the nerve that controls motion of all but two of the eye muscles.

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FOREST FIRES RAGE—Drought conditions during early fall prolonged the forest fire season beyond its normal period over much of the country this year, resulting in dangerous fires such as the one shown here.