

ASTRONOMY

# Only 11 Billion Galaxies

**New 200-inch telescope, when completed, expected to furnish data for test of new theory of relativity which reduces population of the universe.**

► THE 200-INCH telescope is expected to furnish observing data for a critical test of a new theory of relativity which cuts down the population of the universe to only about 11 billion galaxies. This theory, proposed by the late Dr. George D. Birkhoff, of Harvard University, has been applied to the dynamics of the universe by Sr. Luis Enrique Erro, director, and Dr. Carlos Graef, assistant director, of the Mexican Astrophysical Observatory at Tonantzintla, in the State of Puebla, Mexico.

In three papers given at the meeting of the American Astronomical Society in New York, they present the results of their computations and point out that counts of remote star systems, so faint as to be seen only by the Mount Palomar telescope, are needed to give observational proof of the correctness of the Birkhoff theory.

The new theory predicts, according to Sr. Erro and Dr. Graef, a uniformly expanding universe, which began this expansion about 2,000 million years ago, in agreement with the "short time-scale" of the universe. The analysis satisfactorily accounts for observations of the red shifts in the spectra of galaxies and for their distribution in space as determined with the 100-inch telescope at Mount Wilson and by researches at Harvard College Observatory. The limit of the 100-inch instrument is the 21st magnitude (photographic), whereas Sr. Erro has been able to predict the distribution of galaxies as faint as magnitude 23.5, the probable limit of the 200-inch telescope. It is for these very remote galaxies, whose light spends up to 1,000 million years reaching us, that the predicted counts on the basis of the Birkhoff theory differ notably from the predictions of other theories, notably those developed by Dr. Edwin P. Hubble, of Mount Wilson Observatory.

Dr. Hubble's studies have led to two rather puzzling dilemmas. If the assumption is made that the universe is in expansion in the sense predicted by Einstein-Lemaître relativity, the red shifts seem to vary as if the universe were slowing its rate of expansion. Its age

then seems to be only about 1,000 million years, only half the short time-scale and probably only half the age of the earth. The Birkhoff theory predicts uniform expansion and twice the age.

The second Hubble dilemma concerns the numbers of galaxies actually observed, and indicates a very small, crowded universe with positive space curvature. Birkhoff's theory leads to a less crowded universe, with a set of corrections to be applied to the magnitudes of the most distant galaxies different from those required by Einstein-Lemaître theory.

"The all-important point in Birkhoff's theory is his central postulate of four-dimensional flat space as the geometric frame of cosmic events," Sr. Erro said. "To my way of thinking, it is a return to Newtonian dynamics, although the Birkhoff theory retains all the assumptions of special relativity proposed by Einstein in 1905. Einstein's general theory is an attempt to substitute geometry for dynamics. Instead of gravitational 'forces' acting upon mass points, the concept of space curvature is introduced. Birkhoff returns to the concept of 'force' and to the implicit Newtonian postulate of flat space."

*Science News Letter, February 9, 1946*

BIOCHEMISTRY

## Rutin To Go Into Full Scale Production This Year

► RUTIN, a drug effective in reducing the increased fragility of small blood vessels which may lead to blinding or fatal hemorrhages in cases of high blood pressure, will go into full scale commercial production this year, the U. S. Department of Agriculture has announced.

Discovery by the department's scientists that the green buckwheat plant is an economical source of the drug, following a two-year search for such a plant, makes possible the commercial manufacture of rutin which is described as a bright yellow, non-toxic powder.

The marked similarity of rutin's chemical structure to that of vitamin P, known for its effect on the fragility of

small blood vessels, intrigued the interest of Dr. James F. Couch of the Department's Eastern Regional Research Laboratory. Following his suggestion, medical studies of rutin were made by Dr. J. Q. Griffith, Jr., of the University of Pennsylvania.

Results of his studies and those of about 100 other physicians gave further evidence, the department states, "of the value of rutin for reducing increased capillary fragility and showed that thio-cyanates and other drugs for reducing high blood pressure can be used safely after treating with rutin."

*Science News Letter, February 9, 1946*

Approximately one-fourth of the deaf have deaf relatives.

## SCIENCE NEWS LETTER

Vol. 49 FEBRUARY 9, 1946 No. 6

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St. N. W., Washington 6, D. C. NORTH 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

Copyright, 1945, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAt 4439.

### SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

**Board of Trustees—Nominated by the American Association for the Advancement of Science:** Edwin G. Conklin, American Philosophical Society; Otis W. Caldwell, Boyce Thompson Institute for Plant Research. **Nominated by the National Academy of Sciences:** Harlow Shapley, Harvard College Observatory; Warren H. Lewis, Wistar Institute; R. A. Millikan, California Institute of Technology. **Nominated by the National Research Council:** C. G. Abbot, Smithsonian Institution; Hugh S. Taylor, Princeton University. **Ross G. Harrison, Yale University. Nominated by the Journalistic Profession:** A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Executive Editor, Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. **Nominated by the E. W. Scripps Estate:** Max B. Cook, Scripps Howard Newspapers; H. L. Smithton, Executive Agent of E. W. Scripps Trust; Frank R. Ford, Evansville Press.

**Officers—President:** Harlow Shapley. **Vice President and Chairman of Executive Committee:** C. G. Abbot. **Treasurer:** Frank R. Ford. **Secretary:** Watson Davis.

**Staff—Director:** Watson Davis. **Writers:** Frank Thone, Jane Stafford, Marjorie Van de Water, A. C. Monahan, Martha G. Morrow. **Science Clubs of America:** Joseph H. Kraus, Margaret E. Patterson. **Photography:** Fremont Davis. **Sales and Advertising:** Hallie Jenkins. **Production:** Dorothy Reynolds.