

ASTRONOMY

Aura of Escaping Stars Surrounds Our Galaxy

New Dimensions of Milky Way Stellar System Given as 80,000 Light Years by Prof. Shapley; Limits Not Sharp

A GIGANTIC aura of escaping, super-speedy stars has been discovered enveloping our own universe of stars, the Milky Way, through the researches of Dr. Harlow Shapley, director of the Harvard Observatory, and his colleagues. This increases the dimensions of our nebula or galaxy to the vast extent of an approximate sphere nearly half a quintillion miles in diameter. That is a chunk of space so large that it takes light some 80,000 years to cross it. Dr. Shapley announced the discovery at McDonald Observatory dedication.

The great aggregation of stars in which our sun is located is seen as the Milky Way in the night sky. Great telescopes, such as the new one going into service on a Texas mountain top, show thousands upon thousands more stars than the eye can see. Most of the stars are located in a relatively thin disc 6,000 light years thick and some ten times as much in diameter. Ninety-nine out of a hundred stars of our galaxy are in this most densely star-populated part of the galaxy.

What is newly discovered is that stars unquestionably belonging to the Milky Way are found far beyond its old limits. These are faint and of high velocity, speeding some 120 miles per second. Dr. Shapley believes that they are the lighter stars that have in effect been thrown out from the main body by gravitational effects. Mathematical physical theory agrees with the actual astronomical finding that this envelope or shell forming this greater galaxy should be a sphere in shape and not a disc like the main mass of the Milky Way.

When inquiring telescopes and photographic plates are pointed at other nebulae or galaxies, such as that in Andromeda, similar star-halo envelopes or shells are found. In some cases the shells of galaxies overlap with those of other, nearby galaxies. The limits of the shell are very indefinite, just as it is difficult to say just where the earth's atmosphere definitely ends.

The two most recently discovered near neighbors in space to our Milky Way,

unusual star aggregations in the constellations of Sculptor and Fornax, have had their distances from us determined by use of famous Cepheid variable stars, whose waxing and waning of light measure the universe for astronomers. They are about 300,000 light years away. Dr. Shapley explained that they are part of our super-galaxy, which roughly includes the volume of space within a million light years of us.

Science News Letter, May 13, 1939

MEDICINE—PHYSICS

Reddened Faces Mark Step in Medical History

THE world's history is not all being made around European council tables and it is not all being recorded in

state department and foreign office files. Colored pictures of patients with square, reddened areas on their faces, shown at the recent meeting of the American College of Physicians, are records of medical history in the making which may have more far-reaching importance for humanity than the almost daily re-drawings of the map of Europe.

These colored pictures of patients with a square patch of reddened skin are pictures of the first patients treated with science's latest weapon against cancer—neutron rays produced by the atom-smashing cyclotron of the University of California. The pictures were shown to physicians by Prof. E. O. Lawrence, inventor of the cyclotron and director of the radiation laboratory at the University of California where a small group of patients with advanced cancers are now being treated.

It is too early to say whether the treatments are proving cures for cancer, but Prof. Lawrence and the physicians associated with him are hopeful. One reason they are hopeful is connected with those square, reddened patches of skin on the patients' faces. The patches are square merely because the opening from the cyclotron through which come the neutron rays is square. The redness, medically termed erythema, is the skin



NOT GULLIVER IN LILLIPUT

Only a skilled craftsman putting the finishing touches on the model of a farm barnyard (date circa 1900) which is part of a farm electrification exhibit at the New York World's Fair.

reaction to the rays as they pass through to the cancer in the patient's throat.

This same redness is produced by X-rays and, as you know, by the ultra-violet rays of the sun. An important and hopeful difference between X-rays and neutron rays for cancer treatment is in their quality. As an example, Prof. Lawrence explained that physicians cannot safely give much more of an X-ray dosage than will just produce this skin reddening, but considerably more than the skin reddening dosage of neutron rays can be safely given. Perhaps this difference will make all the difference needed for cure of cancer.

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CHEMISTRY

Plasticized Sulfur Now Serving as Road-Binder

PLASTICIZED sulfur, first cousin to the elemental material from which potent industrial chemicals such as sulfuric acid is made, is finding its way into industry as a binder for brick roads, glass skylights and parts of washing machine tubs, as well as in wood to prevent swelling from water, and in other fields.

These new uses are the result of laboratory research conducted at the Mellon Institute in Pittsburgh, the institute, one of the largest industrial research foundations in the world, announced in its annual report, published in *Industrial and Engineering Chemistry*.

The institute spent \$1,104,405 during the year ended last March 1 in furthering research carried out through 86 fellowships, according to the report.

An improved raw material for ceramic products; a superior and safer dry cleaning solvent to replace dangerous explosive "Stoddard solvent"; cheap paper X-ray plates, useful for sorting out tuberculars from healthy people in early diagnosis; and synthetic oils for lubricating watches are among the new products now announced in the report. Discoveries previously reported—such as the promising quinine-derivative treatment for pneumonia and a special treatment for rapid tenderization of meat—are also set forth among the Mellon foundation's accomplishments.

The institute has generally broadened out its work recently, the report points out. "Especially prominent among the institute's recent undertakings has been the inception of researches along a broader front for greater service to science, industry and humanity."

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AERONAUTICS

New Wing Design Promises 500-Mile-an-Hour Speeds

Product of National Advisory Council for Aeronautics Laboratory at Langley Field Hailed as Major Contribution

A NEW TYPE of wing, which makes possible a considerable increase in airplane speeds was announced as the outstanding contribution of the National Advisory Committee for Aeronautics to aviation this year. With other developments, it brings the 500-mile-an-hour airplane within range of the next year or two.

It was developed by a team of half-a-dozen or more staff members of the N.A.C.A. at its Langley Memorial Aeronautical Laboratory during the past year. Worth untold millions to national defense, commercial aviation and private flying, it means not only that high speeds can be gained with the same size of engine, but also that equal speeds are attainable with smaller engines and less fuel—in other words, less money.

Control of the boundary layer of air closest to the skin of the wing, one of the most baffling problems hitherto faced by the science of aerodynamics, has been achieved in the new wing, whose speed-killing and power-consuming drag is thus reduced, Dr. George W. Lewis, the Committee's research director explained.

In conventional wings, the boundary layer close to the leading edge soon becomes turbulent and as a result slows the wing and the entire plane. The transition point between smooth and turbulent air has been moved back on the new wing to a point nearly two-thirds the distance from leading to trailing edge. This is gained by altering the shape of the conventional type of wing, Dr. Lewis said.

No gadgets of any kind are used. At the same time, Venetian blind flaps and some other high lift devices can be adapted for use with it.

No further information concerning the wing, either descriptive or concerning its performance, is available, for it will remain for the time being a closely guarded military secret.

In importance, the conservatively inclined Dr. Lewis rated it with the N.A.C.A. cowling which, ten years ago, added 20 or 25 miles an hour to the speed of every airplane using a radial engine by reducing the drag of the motors' projecting air-cooled cylinders.

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PSYCHOLOGY

Father's Favorite Child Finds Life Worth Living

THE CHILD who is Father's favorite, whether boy or girl, faces a life worth living, Dr. Ross Stagner, of the University of Akron, told the meeting of the Eastern Psychological Association in Bryn Mawr. But being Mother's favorite does not insure such a happy lot.

Intimate revelations from more than 150 boys and girls aged 18 to 25, collected for Dr. Stagner by Dr. Maurice Krout, of Chicago City Junior Colleges, showed how parents mold the personality of youth.

Girls who are Father's favorite day-dream often. Boys who are Mother's favorite are forgetful.

When Father prefers a son, the sister is likely to have feelings of suffocation. When Mother prefers a son, however, sister is suspicious of others.

Boys whose fathers prefer a daughter believe they have enemies. Boys, so rejected by their mothers, may report an unreasoning impulsion to take things.

Boys whose fathers are distant toward them may have thoughts of suicide; if their mothers are distant, they are more likely to develop neurotic pains and dizzy spells.

Girls kept distant by their fathers often report feelings of suffocation, dizzy spells and headaches. Kept distant by