ASTRONOMY

Galaxies Group Enlarged

Discovery of two new universes outside our own may bring us closer to solving the riddle of how our world came into existence.

➤ DISCOVERY of two new members of our local group of galaxies, vast number of stars whirling through space together, may bring us closer to solving the riddle of how our world came into existence. This brings to 13 the number of galaxies, close neighbors to our own galaxy or Milky Way, with which we are familiar.

The two faint nebulae, representing previously unobserved stages through which a stellar system passes in changing from a nebula which is either round or elongated in shape into a globular group of stars, are reported by Dr. Walter Baade of the Carnegie Institution's Mt. Wilson Observatory, Pasadena, Calif., (*Astrophysical Journal,* Sept.). Known to astronomers by the New General Catalogue numbers of 147 and 185, the nebulae in structure differ considerably from typical elliptical nebulae which become continually brighter toward the center and gradually get fainter toward the edge.

The pair, Dr. Baade reports, seem to be intermediate in form between systems like NGC 205, in which it is just apparent that the usual distribution of stars in elliptical nebulae is no longer being followed, and the Sculptor and Fornax systems, globular systems where so few stars seem to be grouped together that observers hesitate to claim that they belong to the group of elliptical nebulae.

"It seems that a marked change in the internal structure of the elliptical-type nebulae takes place as we reach the systems of lowest luminosity," Dr. Baade states. The strong concentration of stars toward the center and the central nucleus gradually disappear. In one nebula investigated the central nucleus was faint, in the other it was entirely missing.

For years elliptical nebulae have puzzled astronomers anxious to delve deeper into the secret of their creation. It seemed impossible, even by the most powerful instruments, to photograph the individual stars. It has recently been discovered, however, that when red-sensitive plates were substituted for the blue used hitherto, stars just beyond the reach of the blue-sensitive plates could be photographed.

By means of red-sensitive plates nebulae can now be resolved with the 100-inch telescope if their distance is not greater than 300,000 parsecs or about 980,000 light years. Since this distance coincides with the distance adopted for the outer limit of the local group of galaxies, ability to resolve the nebula into stars provides a convenient criterion by which nebulae within the "family circle" can be distinguished from those outside of it.

The pair of elliptical nebulae chosen by Dr. Baade are about the same distance from us as the great Andromeda spiral, now visible high in the evening sky, near which they are located.

Both systems were easily resolved into stars on the red-sensitive plates, the brightest stars in the groups appearing to be about as brilliant as those in Messier 32, NGC 205 and the inner part of the Andromeda nebula, recently investigated by Dr. Baade.

Showing only an ill-defined elongated patch of faint nebulosity by ordinary plates, under red exposure NGC 147 appears as a large star cloud. Although its shape could only be guessed at before, it now seems to be definitely ellipsoidal in structure. Its absolute magnitude is about the faintest thus far observed in a galaxy, but it is clearly visible because of its nearness to us.

Long known to have two dark clouds near the center, on red-sensitive plates the individual stars of NGC 185 can easily be distinguished. Considerably brighter than its companion, the nebula may well be described as a slightly elongated, giant globular cluster of stars.

Science News Letter, November 4, 1944

ORDNANCE

One-Piece Tops for Tanks Have Turtle-Back Contours

➤ ONE-PIECE tops for war tanks are the subject of patent 2,361,129, granted to W. M. Sheehan of Philadelphia and S. T. Wharton, Jr., of Ridley Park, Pa., and assigned to General Steel Castings Corporation of Granite City, Ill. In this design, the armor shell is also the supporting frame for the turrets and other structures. A turtle-back contour, very desirable for defensive purposes, is achieved.

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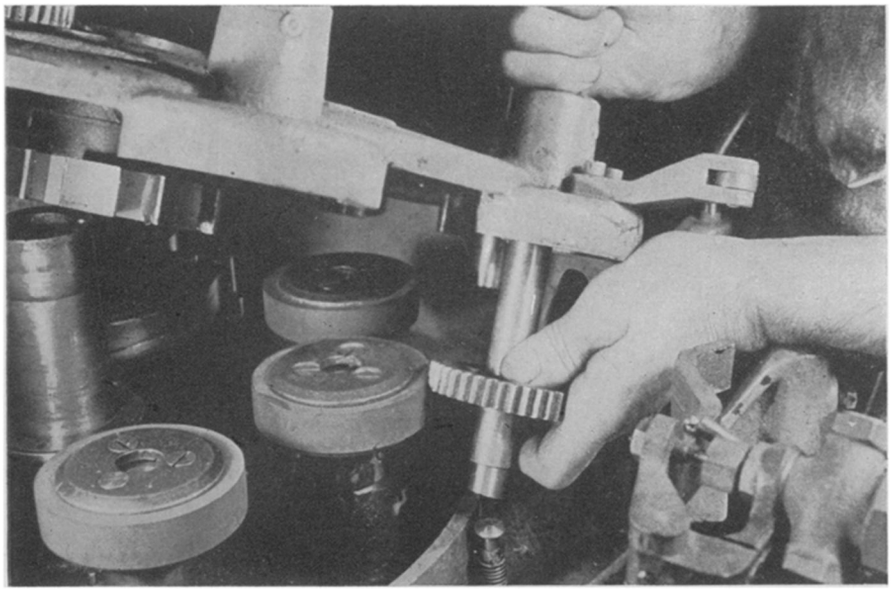

OUTWEARS RUBBER—Originally developed to prevent gear breakage in the event of jamming, a unique type of power transmission involving rubber rings that mesh with metal gears on revolving turret machinery was in use in the plant of a large radio manufacturer, before the rubber shortage. In the course of the rubber conservation program, it was found that when the rings were made of compar, a vinyl resin derivative compounded by Resistoflex Corporation, their service-life was increased five times.