

ASTRONOMY

Contents of "Empty Space" Revealed by Colors of Nebulae

Yerkes Studies Indicate That So-Called Void Contains Particles of All Sizes, Some as Large as Speck of Dust



WHITE, BLACK, YELLOW

peoples from the highest to the most primitive types, are the work of Malvina Hoffman. To seek living models who would represent little known tribes, Miss Hoffman traveled around the world.

The sculptor caught many of her subjects in lifelike poses. A bronze Hawaiian balances lightly on his surfboard. A native of the Australian bush stands poised to hurl his death-dealing spear. A lady of India shows the reserve of her class and culture. And farther on is an "untouchable" old woman of India, in sharp contrast. Some of the human types hunted out and modeled for this anthropological collection are said to be on the verge of extinction.

One monument, entitled "The Unity of Man," expresses the idea of man as a well-defined, fundamentally uniform species which has spread over the earth. It portrays in bronze three human types, white, yellow, and black, each man representing the highest physical development of his race. Each carries his weapons: the white man a sword, the yellow man bow and arrows, the black man a spear and shield. The pillar which the men encircle is topped by a globe.

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"AS EMPTY as interstellar space," is a comparison that needs revision as a result of recent researches made at Yerkes Observatory, Williams Bay, Wis. For the gigantic voids between the stars that shine in the night sky are not truly empty. They are filled with an extremely tenuous cloud of fog, which contains so close to nothing that it would be pronounced perfect as a vacuum by a physicist if it were here on earth.

Astronomers know that there is something in the space that seems to be empty because the light of distant stars is dimmed and reddened in its passage through space. This was shown by Dr. R. J. Trumpler of the Lick Observatory as well as by observations made with the Yerkes 40-inch telescope. Distant stars appear somewhat more ruddy than the ones nearer to us. This suggests to the astronomers that interstellar space has an effect like that of the atmosphere of the earth upon the sun's rays. When the sun is near the horizon its rays look red because they must travel through a thick layer of air.

But do not suppose for a moment that the light that is scattered by the air is lost, for it is not. The light subtracted to make the redness of the sunlight reappears as the blue of the sky. The compensation is so exact that it can be figured out theoretically.

Applying a like reasoning to interstellar space and its particles, Dr. Otto Struve, director of the Yerkes Observatory, considered what effect the space reddening of the starlight should have on the space surrounding the stars. It would cause a faint general illumination of space, a slightly radiant screen of the heavens upon which are projected the more luminous images themselves. Dr. Struve computed just how much this background illumination should be expected to contain. The result surprised him.

The total amount of light produced by space should be greater than that of all the stars combined and the color of

this general illumination should be as blue as the bluest daylight of the sky. That the night sky is actually bright and not dark can be easily proved by any observer situated far from city lights. When the eyes are sufficiently adjusted to the dark, the sky appears faintly luminous between the stars and the outlines of nearby objects, such as trees or houses, can be easily perceived.

In certain regions of space, near luminous stars, the interstellar fog may be illuminated so much that these regions appear even brighter than the rest of the sky. This would especially be true if a local condensation in the interstellar fog happens to be near a bright star. It can then be photographed with a telescope because of its great luminosity and it is seen projected as a bright spot upon the faint general sky illumination.

Such spots are called nebulae. The composition of these nebulae is not fully understood. Some of them scatter the light of the stars and their luminosity is therefore due to reflected or scattered star-light. (Turn to Page 364)

ARCHAEOLOGY

Exposition to Show Monte Alban Jewels

ONE OF Mexico's most treasured archaeological possessions, the famous collection of Indian jewels from the treasure tomb at Monte Alban, will arrive for exhibit at the Century of Progress fair, June 20.

The jewels, property of the Mexican government, will be displayed in a car of the Mexican Presidential train. There are more than 500 pieces of ancient Indian jewelry in the collection.

The tomb was discovered last year by Dr. Alfonso Caso, Mexican government archaeologist, in the mountains of the state of Oaxaca. Splendors of this prehistoric American tomb have been compared with the contents of Tutankhamen's tomb in Egypt.

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