

Reflections on Mount Palomar

By KAREL HUJER

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Once again at the world's largest telescope, the Hale 200-inch reflector on Mount Palomar, one inevitably recalls Galileo's little 3-inch telescope, the first ever raised to the sky (in 1610). How insignificant seems that small pioneering instrument now preserved in the Florence History of Science Museum when compared with this modern telescopic giant. These 350-odd years since Galileo's "perspecillum" is a relatively short time, yet it is a period of fabulous progress superseded by a similar span of time at the foundation of Alexandria, in 332 B.C., when man's learning underwent stupendous advancement.

Contemplating the 500-ton Palomar optical giant, one starlit night in 1928 recurs to my mind, which fortunately I spent with Dr. Hubble at Mount Wilson's 100-inch Hooker reflector. For 30 years this had been the superlative among telescopes. In the silence of that night not only did we wonder over the majestic, boundless universe, but over man himself, whose genius constructed the tool that magnifies the power of his seeing. I recalled several telescopes in France and England which, too, for a time held a leading world position. Their history is closely linked with the growth of man's knowledge of the universe. The story of the telescope is a most fascinating chapter of man's unfolding universe and, conversely, the universe has unfolded man's horizon right along with a deeper understanding of the mysteries of life.

Today, during our public evenings at the observatory, the astronomer is frequently a target of many comments by the average visitor: "Astronomy is really flourishing now that astronauts are cruising through outer space." Also, such common questions of former years as "falling stars," "comets," and "canals on Mars"

are no longer asked. Instead, we hear: "When will we land on the Moon?"

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Palomar astronomers are apt to say that space probes, though significant in themselves, have relatively little to do with the type of research conducted by the Hale 200-inch reflector. Besides, when the Moon is conquered, in the not-too-distant future, the principal benefit for the Palomar astronomer will be to set an astrograph on its surface in order to accumulate photographic exposures of the lunar sky which has no encumbrance of atmosphere. Thus, man will penetrate ever deeper into cosmic space where no astronaut may ever hope to journey. The Moon's distance from earth is also utterly insignificant. When this distance is observed from the nearest star, for example, it is like the thickness of a hair six miles away.

Since its official dedication in 1948, the Palomar telescope has yielded astonishing results. Like other astronomical discoveries, these are not sensational nor as vivid as zooming rocket flights. Nevertheless, these Palomar studies will endure through the centuries because they silently represent a breakthrough into a new era of cosmology—into man's understanding of the structure of the universe. It was cosmology which, like the Copernican revolution, shaped man's philosophy of life.

The latest discoveries are the so-called quasi-stellar objects or simply quasars, which are powerful radio sources, and blue stellar objects, extremely hot stars. The study of these intriguing cosmic

objects goes on jointly with optical as well as radio telescopes, opening up vistas entirely beyond the imagination of only a few years ago. These strange objects indicate their distance up to eight billion light years, therefore even beyond the time of the supposed origin of the solar system. According to present hypothesis, we can now see half-way back to the creation of the universe. All this was made possible through the dual cooperation of optical waves and radio waves, both electromagnetic, yet differing only in the length of their waves.

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As we climbed above the smoke-infested California lowland onto the elevated regions, the difference in clarity and transparency was most striking. It is in such lofty heights that the starlit heavens are even more eloquent and world problems melt away in the face of infinity. How prophetic and enduringly valid were the words of Raymond B. Fosdick, president of the Rockefeller Foundation, in his dedicatory address June 3, 1948 at Mount Palomar, which I recall:

The towering enemy of man is not his science but his moral inadequacy. Around the world today, laboratories supported by almost limitless resources are feverishly pushing their research in the development of physical weapons which overnight could turn this planet into a gigantic slaughterhouse . . . It will not be this telescope and all it symbolizes that have led him to the doorstep of doom; it will be the immaturity and immaturity of his ethical codes.

At that time astronomers would say that the price of the 200-inch Palomar telescope, which the Rockefeller Foundation provided, represented the value of only two B-29 bombers. Today, with a sigh they would point out that five Palomars could be built for the cost of one Gemini shot.