SOME PERSONAL REMINISCENCES

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The main facts about the life and work of Professor Barnard at the Yerkes Observatory have already been related in the various accounts of his life that have been written by Professor Frost and others, and most of you are already familiar with them.

The great attraction which the University of Chicago offered to Mr. Barnard in 1895 was the opportunity to use the new 40-inch refracting telescope, and his most important work during the twenty-seven years he was at the Yerkes Observatory was with this instrument. This work was very varied and included observations of many different kinds. He measured close double stars, and determined the positions of asteroids and comets. He was especially careful to get measures of faint comets that could not easily be observed with smaller instruments. He was greatly interested in the novæ, and not only made observations of the light changes in each new one that appeared, but carefully examined all of the earlier novæ he could identify for any peculiarity in its appearance. A number of faint variable stars were on his observing program. He made various observations of the planets, and of their satellites, particularly of those that are faint or difficult to see in smaller telescopes.

A huge piece of work which he undertook with the 40-inch telescope was the micrometric measurement of the relative positions of stars in some of the globular clusters. A few of the loose clusters were also measured. These measures were begun in the hope that an interval of a comparatively few years would show motion in these stars. He was disappointed to find that his measures, when repeated after ten years, and then after twenty years, showed no change in the relative positions of the stars in these clusters. But he did not consider that his work had been wasted. He said, "Well, it just shows that these clusters are vastly larger and at vastly greater distances than we have supposed. It may be we will have to wait one hundred or two hundred years before measures will show the motions that must be taking place in these groups of stars. At any rate, my measures are good, and they will be ready for astronomers to use one hundred or two hundred years hence, as the case may be. I wish there were measures as good as mine made one hundred years ago that I could compare mine with. As it is, there is nothing to do but to wait."

Observing was always a pleasure to him, and he looked forward to each night at the telescope with an eagerness that seemed never to be dulled. This work came ahead of everything else, and nothing was allowed to interfere with it. When his night at the telescope came he would have his early supper, be dressed for the night and at the observatory, often before the sun was down. There was no last-minute rush into the dome. And observing on a winter night,

with the temperature in the dome 10 or 15 degrees (Fahrenheit) below zero, is not all pleasure. When visitors to the Observatory would ask, "But how do you keep warm?" his reply would be, "We don't." One night when the temperature in the dome reached 26 degrees below zero, he stopped work and closed the dome, although the stars were still shining. He explained the next morning that he had begun to be worried lest, with everything in the dome and about the instrument so cold, something about the telescope might break or be injured. The Director of the Observatory agreed that there was wisdom in his caution, and it was understood thereafter that when the temperature in the dome dropped to 25 degrees below zero work should stop—for the sake of the telescope!

Mr. Barnard had not been at the Yerkes Observatory long before he began to look around for a lens with which he could photograph the Milky Way and comets, as he had done with the Willard lens at the Lick Observatory. Money for such an instrument was given to the University of Chicago by Miss Catherine Bruce, of New York. After much time spent in experimenting with different lenses in an endeavor to get the best kind for his purpose, the instrument was finished and first used in 1904.

Nothing else so aroused Mr. Barnard's enthusiasm or gave him more pleasure than the announcement of the discovery of a new comet. Each new comet that appeared was photographed with the Bruce telescope. If it was a bright one, or if it showed any interesting or unusual features, he would make a photograph of it every night. Some very active comets, such as Morehouse's of 1908, he photographed from hour to hour to try to get a record of the rapid changes that took place in them. The beautiful photographs he obtained of such comets as Halley's of 1910, Morehouse's of 1908, and of Brooks' of 1911 were a real delight to him. More than once, after minutely examining the plates he had taken the night before, he would lay them down with a deep sigh, exclaiming, "O dear, I wish I knew something about comets!"

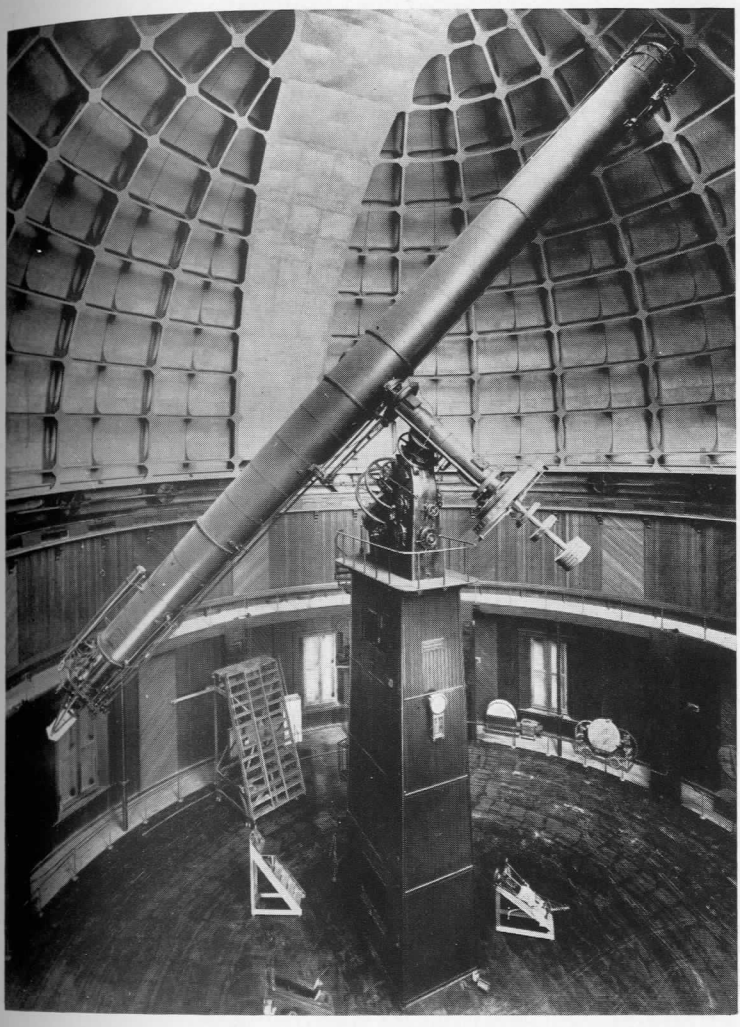
Mr. Barnard soon made some beautiful pictures of the Milky Way with the new Bruce telescope, both at the Yerkes Observatory and at the Mount Wilson Observatory, California, where the instrument was set up for about eight months in 1905. With the clear air of California's summer skies he obtained some remarkably fine photographs of regions of the Milky Way which are too far south to be reached from the Yerkes Observatory. In 1907 the Carnegie Institution of Washington granted money to have some of these pictures of the Milky Way reproduced and published in book form. After a number of experiments with photogravure and other processes of reproduction, it was decided to use photographic prints mounted on muslin. These prints cost considerably more than half-tones or photogravures, but Mr. Barnard was convinced that their greater accuracy in reproducing the delicate details shown on his photographs would more than compensate for the necessary reduction both in the number of plates that could be reproduced and in the size of the edition. He selected fifty of his best negatives, and set

for himself the exacting task of making a second negative from each. The prints necessary for the edition of 700 were made by a commercial photographer in Chicago, but Mr. Barnard personally inspected each one of the 35,700 to see that all came up to the standard of excellence he demanded for them. These photographic prints were finished several years before his death, but unfortunately he had not completed the text for the volume. He had written a brief description for each of the photographs, but for the introduction to the book there were only a few fragmentary notes. This was very unfortunate, for in his introduction Mr. Barnard had intended to sum up the results of his many years of study and photography of the Milky Way. In getting this work ready for publication, Professor Frost and the writer have tried to carry out Professor Barnard's plans for it as closely as possible. Now,* more than four years after his death, his "Photographic Atlas of Selected Regions of the Milky Way" is being published and is being distributed by the Carnegie Institution of Washington to the principal observatories and libraries of the world.

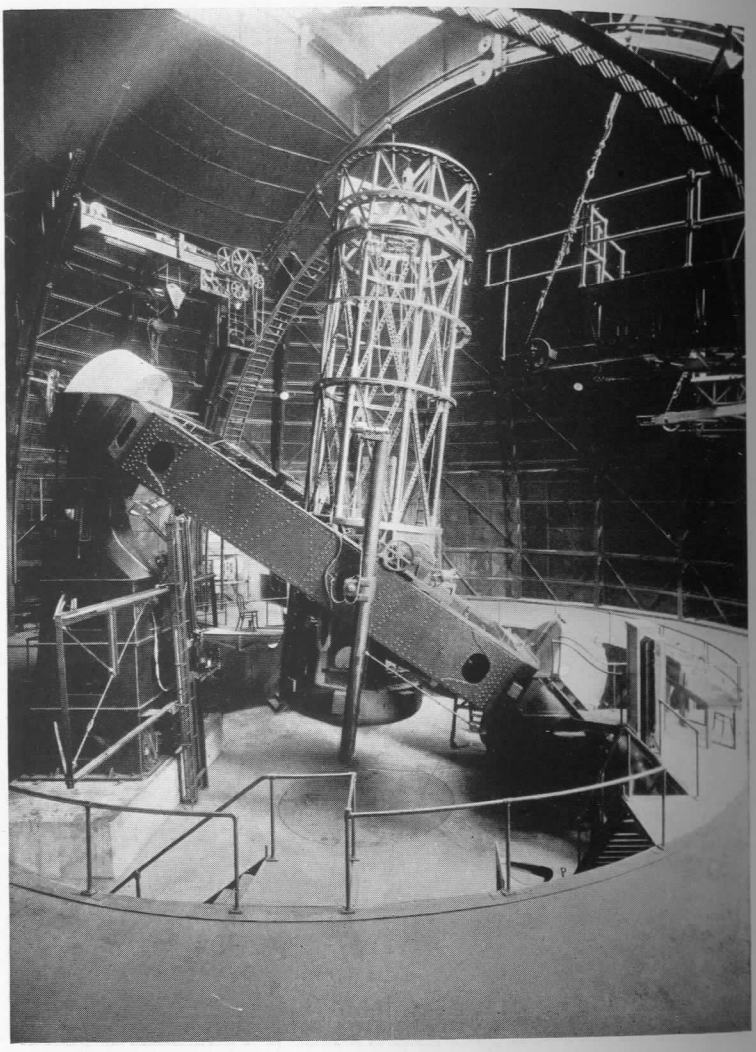
On three occasions during the years he was at the Yerkes Observatory Mr. Barnard journeyed to some distant place to observe a total eclipse of the sun. The first was in May of 1900, when he went with a party from the Yerkes Observatory to Wadesboro, North Carolina. There the sky was clear during the eclipse and he obtained some very beautiful photographs of the corona. The next year he was asked to join the expedition sent to Sumatra by the United States Naval Observatory. This trip gave the party an opportunity to see Honolulu and Manila, as well as various places in the island of Sumatra. Mr. Barnard was intensely interested in all he saw and took many photographs along the way. But on the day of the eclipse the sky was covered by clouds and the photographs for which the long journey had been undertaken could not be made.

On June 8, 1918, there was another total eclipse of the sun visible in the United States. The Yerkes Observatory sent a party of observers to Green River, Wyoming. Mr. Barnard went about six weeks before the date of the eclipse to superintend the laying out of the camp and setting up of the instruments. Those days of preparation at the eclipse station were anything but monotonous. It was soon seen that this spot in the desert could show a great variety of weather conditions in a short period of time—beautiful sunshine with a deep blue sky, rain, snow, high wind, sand storms (from which driving clocks and telescope gears and bearings had to be protected), and even a small tornado which threatened the camp, but passed a few yards to one side of it. At first, the dry air and alkali dust cracked the lips of all members of the party, and then the camp was visited by swarms of flies and of very large and persistent mosquitoes. These were minor troubles, but it was a matter of serious concern when it became apparent, day after day, that no matter how beautifully clear the sky was in the morning, the clouds

*December, 1927.



Lick Observatory, Mt. Hamilton, California. The interior of the dome, showing the 36-inch reflector with which Barnard discovered the Fifth Satellite of Jupiter, September 9, 1892.



Mt. Wilson Observatory, Pasadena, California. The interior of the Dome, showing the 100-inch Reflector, Cassegrain observing platform, etc., as seen from the West.

had a wicked way of gathering during the day—a few fleecy white ones at first, then in greater numbers, until in the afternoon about the time the eclipse was to occur, the sky would be more or less overcast. In spite of this warning, Mr. Barnard was greatly disappointed when the day of the eclipse came and, at the moment of totality, the sun was behind a thin cloud that partially obscured the corona.

There was one occurrence at Green River that, for some of us who were there, stands out as distinctly as the eclipse itself. This was Mr. Barnard's independent discovery of Nova Aquilæ. Returning to the town late that night, weary after the excitement and labors of the eventful day, and the evening spent in carefully packing the precious undeveloped eclipse plates ready for shipment to Williams Bay, Mr. Barnard noticed the brilliant new star. At once his weariness was all forgotten. On reaching his room he consulted a star map for a moment and then was off immediately to take the news to Professor Frost and the others; and back to the camp most of the party went to make what observations they could of the new star.

Mr. Barnard was interested in many things in nature not connected directly with astronomy. He made and published many notes on the aurora and on the gegenschein. He made many beautiful photographs of clouds. He would watch with much interest a lunar halo, a "sun-dog" or other such phenomena. The entries in his notebooks are sometimes surprising in their variety. On the same page, perhaps, with micrometer measures of stars in one of the globular clusters, or estimates of the magnitude of Nova Persei, there may be a note saying, "Autumn foliage very beautiful today," or "The lake froze over last night," or "Great numbers of wild geese on the lake making a great commotion," or "First thunderstorm of the season," etc., etc.

With Mr. Barnard punctuality was a fixed habit. He was always ready for any engagement he might have just on time or, more likely, a little ahead of time. He could never understand and was always irritated by a guest who, invited for a certain time, would come a little (or perhaps much) later than the time named. Probably his long work at the telescope was partly responsible for this habit of extreme punctuality. One cannot be late in making an observation of an eclipse or any such celestial phenomena.

When they came to Williams Bay, Mr. and Mrs. Barnard built a house on land adjoining the Observatory grounds. They were both very hospitable, and it was one of their greatest pleasures to have their friends visit them. Mr. Barnard took great pride in his young orchard and Mrs. Barnard in her flowers and garden. Many of the people who have stayed at the Yerkes Observatory have memories of very happy hours spent at the Barnard home.

Those who knew Mr. Barnard best and were closest to him perhaps knew best his bigness, his honesty and his ready sympathy.