

ASTRONOMY

120" Telescope Ready

After ten years and 300 hours of grinding, which removed some 900 pounds of glass from its mirror, the 120-inch Lick Observatory telescope is almost completed.

► THE GREAT 120-inch telescope at the University of California's Lick Observatory, Mt. Hamilton, ten years in the making, may join the 200-inch Palomar sky-searcher before the end of this year.

Dr. C. D. Shane, director of Lick Observatory, said the mirror is now undergoing its final, delicate stages of polishing and figuring, which may be completed soon.

Then, after the mirror is aluminized, auxiliary control equipment installed and tests made, the world's second biggest "eye" will be ready to photograph stellar objects more than a billion light years in space.

The telescope's mirror is now undergoing the same painstaking treatment as the 200-inch Palomar telescope in its final stages—and under the direction of the same expert, Donald O. Hendrix, head of the optical shop at the Mt. Wilson and Palomar Observatories.

The four-ton Pyrex disc has already had about 900 pounds of glass removed, giving

it the parabolic curve it must have. To the naked eye, the mirror already appears perfect. However, on the scale the astronomers worry about, there are still humps and depressions that can be eliminated only through tedious tests and a light touch with polishing instruments.

The object of the final polishing operation is to give the mirror an optical surface accurate to two one-millionths of an inch. Now there are still some slight imperfections, the largest of which is about eight one-millionths of an inch. So near perfect is the mirror that only a few thousandths of an ounce of glass, the minute humps on the surface, remain to be removed.

Tests to locate the imperfections are the same ones Mr. Hendrix used at Palomar. Associated with him in the tests are Dr. Nicholas U. Mayall, astronomer, and Dr. Stanislaus Vasilevskis, assistant astronomer.

Assisting in the optical work is Howard Cowan.

The two tests are called the Hartmann test and the knife-edge test. In both, the mirror, in place in the telescope, is focused on a bright star and photographs taken.

In the Hartmann test, an opaque screen with regularly spaced holes is placed a few feet below the observers' cage, and an out-of-focus photograph taken of the points of light coming through the holes. Careful measurement shows if a hole is out of position, which means there is a distortion in the slope of the mirror, and where and how much. The distortion is marked on a mirror map, for later polishing.

In the knife-edge test, half the image of the star is obscured by an instrument similar to a knife, which casts a portion of the mirror into a kind of half shadow. Dark and light portions in the photograph of the mirror indicate high and low places in the mirror's surface, which are also marked on a map.

Mr. Hendrix uses small hand tools, made with backings of pressed wood and facings of pitch. An optical abrasive, called "rouge" because it resembles the woman's cosmetic, is used with light polishing movements.

After a hump is removed, further tests show whether enough was removed or whether more work on the spot is needed. About 300 hours have been spent on grinding the mirror since 1953, and another 10 hours will be needed.

One problem to be tackled by Lick astronomers with the 120-inch telescope will be the distribution of extra-galactic nebulae. Studies with a smaller telescope indicate these galaxies occur in great clusters in space, rather than at random, suggesting a greater order to the universe than has been believed. Samplings of more distant nebulae may determine whether these galaxies thin out or become more concentrated.

Science News Letter, September 21, 1957

GENERAL SCIENCE

Flint Prepares For Young Scientists

► FLINT, Mich., will be host to the Ninth National Science Fair in May, 1958, when about 300 high school scientists, together with their prize-winning scientific exhibits, arrive to compete for national honors.

With the same know-how used to plan a future automobile, the entire Flint community is busy planning this national event. Both the universities and most industries in the area are readying their scientific marvels to display to the youngsters from throughout the United States.

At the same time, the senior scientists will see on display during the Fair, which runs from May 7 through 10, the scientific projects created by these teen-agers.

The Fair is conducted each year by SCIENCE SERVICE'S Science Clubs of America for students who have been chosen as finalists representing science fairs. The local committee administering the Fair for Flint is headed by Richard Harbeck.

Science News Letter, September 21, 1957



MOSASAUR BONES—Huge lizards, whose general appearance is indicated by mosasaur bones obtained by a Michigan State University museum expedition, inhabited the earth some 60,000,000 years ago. Victor H. Hogg, right, discovered the fossil bones while inspecting a sea-deposited chalk cliff in western Kansas. Dr. Rollin H. Baker, museum director, helped with the reconstruction of the mosasaur, which, the scientists estimate, probably measured 16 feet long in life.