

A decorative horizontal banner with a patterned border. Inside the banner, on the left, is an illustration of a telescope on a tripod. In the center, the text "THE REALM OF SCIENCE" is written in a bold, serif font. On the right, there is an illustration of a microscope and a balance scale.

THE REALM OF SCIENCE

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THE Lick Observatory on Mount Hamilton, in California, fills a glorious chapter in the history of astronomy. Thoroughly familiar as the writer was with its inception, growth, outfit, personnel, and work, its glory took on a still more golden hue when on last August 6th he entered its walls for the first time, and inspected its equipment with his own eyes.

The Lick Observatory opened up to the centuries-old science of astronomy a new and brighter phase of existence. For the first time in the history of the world, as far as we know, astronomers were presented with a handsome fortune, amounting in this case to seven hundred thousand dollars, with which they were bid to erect a telescope larger than any hitherto erected, shape it and equip it in any way they liked, put it wherever they pleased, with only the one practically nominal restriction, that it should be placed within the borders of the large state of California.

I say the occasion was unique and unheard of, because all the observatories hitherto built were located in or near large cities. They were the property of universities or of special donors, so that they were readily accessible to students and friends, or even to the general public. Special technical work with the telescope was secondary to the curiosity of amateurs, and the unpropitious skies of the large cities levied a heavy toll on the little time the observers in charge could snatch from the nights.

Now, all this was to be changed. There was to be absolute liberty in every detail except the trifling one we have mentioned,

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and even the architect of the structure was to be under the orders of the astronomer.

And the astronomers were equal to the occasion. Consultation, testing of sites, visits to the largest and best existing observatories and instrument shops, had their fitting culmination in the observatory that now exists on Mount Hamilton. The telescope, although since surpassed, was the largest and best ever erected; the site was unequalled for the number and purity of its skies throughout the year; the observing staff was of the best, and the work done since its official inception on June 1, 1888, surpassed the expectations of even the most sanguine.

James Lick, the doner, died on October 1, 1876, just a month after appointing his third and final board of trustees. Of the seven hundred thousand dollars bequeathed for the purpose, six hundred and ten thousand were spent upon the instruments and the buildings, and the remaining ninety thousand became the nucleus of an endowment fund. Congress granted 1,946 acres, the state of California 511, R. F. Morrow 40, while 405 were purchased, giving a total of 2,902 acres, on which camping and hunting are forbidden.

The principal equipment provided by the Lick trustees consisted of the 36-inch refractor (the lens alone costing fifty thousand dollars) with a 33-inch additional photographic lens, a 12-inch refractor, six and one-half-inch meridian circle, and minor apparatus. In 1895 Edward Crossley of England presented his 36-inch reflecting telescope, and prominent citizens of California paid for its transportation and housing. In 1900 D. A. Mills, after having presented a 3-prism spectrograph for the large telescope and having seen the excellent work it had done on the stars visible in California, provided funds for an observatory near Santiago, Chile, South America, for the observation of southern stars. This subsidiary observatory has a 37 $\frac{1}{4}$ inch reflecting telescope with one-, two-, and three-prism spectrographs and accessories. Since his death in 1910 his son, Ogden Mills, has supported this southern observatory.

The county of Santa Clara, at its own expense of seventy-eight thousand dollars, built a splendid road twenty-six miles long from San Jose to the observatory on Mount Hamilton. Visitors are always welcome, but are permitted to look through the 36-inch and 12-inch telescopes only on Saturday nights from seven till nine o'clock. They number about five thousand in a year. While there are no hotel accommodations at the summit, there are one large building and several private smaller ones in which the astronomers reside, singly or with their families as the case may be; a school, barn, pumping station, reservoir, and other necessary structures, accommodating sixty people.

The greatest glory of an observatory is the work it has done, and the condensed list giving twenty-four headings in the booklet that is presented to visitors, reads almost like romance. We must still further condense that list.

1. To the four satellites of the planet Jupiter, which Galileo was the first to see, the Lick Observatory has added four more, and they are all that are known at present. They are extremely faint, the brightest requiring an 18-inch telescope at least, and the two faintest being known only from their photographic images.

2. The Crossley reflector was the first to show the enormous superiority of photographic over visual telescopes, so much so, that now every large instrument must be photographic.

3. The first great success in photographing comets and the Milky Way was made on Mount Hamilton.

4. About 4,400 double stars, innumerable nebulae, and twenty-nine comets have been discovered.

5. The sun's motion in space has been measured, nine expeditions have been sent out to observe total solar eclipses in various parts of the world, an atlas of the moon has been made, and any amount of special and technical data collected concerning the stars.

6. The crowning glory of the Lick Observatory is the discovery by the present director, W. W. Campbell, who went

into office January 1, 1901, that there is a relation between a star's velocity in space and the character of its spectrum, or in more popular terms, that a star's speed increases with its age. The further discovery that certain so-called planetary nebulae exceed the swiftest stars in speed, gives rise to the surmise that these nebulae may be the results of the collisions of the oldest and dead stars, thereby controverting the old and familiar nebular hypothesis of Laplace.

With such a brilliant record for the first twenty-five years of its existence, what may we not expect in the future from the Lick Observatory?

