

**THE LICK OBSERVATORY-CROCKER ECLIPSE EXPEDITION TO SUMATRA.**

It gives me great pleasure to announce that the expedition sent to Sumatra from the Lick Observatory through the generosity of Mr. William H. Crocker, to observe the total solar eclipse of May 18, was very successful. This announcement has been unduly delayed from the fact that the scientific apparatus and the astronomical photographs containing the results were sidetracked at an Asiatic port for three months, and have but recently arrived at Mount Hamilton. The expedition was in charge of Acting Astronomer C. D. Perrine. He was assisted by Mr. Ralph H. Curtiss, Fellow in Astronomy at the Lick Observatory.

A site for the observing station was selected on the race-course in the edge of the city of Padang, the capital of Sumatra, located at about the middle of the west coast of the island. The accompanying illustration will give an idea of the immediate surroundings of the camp. The great thatched tower supports and incloses the camera of 40 feet focal length for recording details of the solar corona on a large scale. This instrument was designed and first used by Prof. Schaeberle in the Chile expedition of 1893, and was the original of the long-focus instrument now so largely adopted by nearly all eclipse parties. The lens is at the top of the tower, and the plate holder, moving by clockwork, is at the bottom. The lens is supported by an inner tower, and the outer tower, completely isolated from the inner, serves both to prevent the wind from shaking the lens and to keep out the tropical rains.

The nine other instruments are located in the smaller thatched huts.

The ten instruments were mounted and in perfect adjustment a week before the day of the eclipse. The remaining days were utilized by Prof. Perrine in training his sixteen assistants, secured in Padang, so that they could take the photographs in strict accordance with the signals previously arranged, and in attending to the multitude of final details.

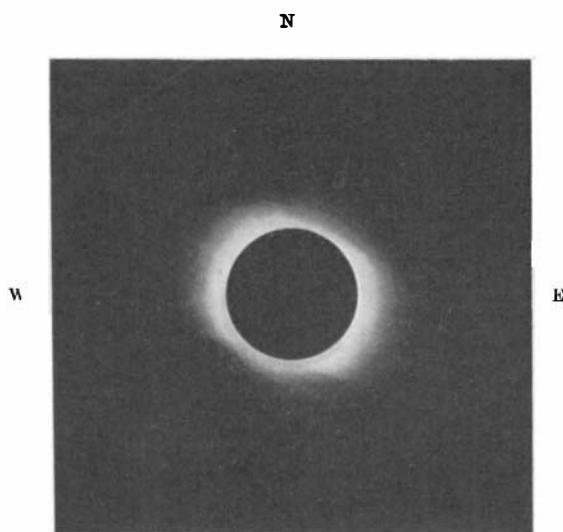
The morning of the eclipse dawned cloudy, and the clouds persisted until the middle of the afternoon. At the time of the eclipse, which occurred a few minutes after noon, the clouds were comparatively thin; and Prof. Perrine's cable home did not afford much hope that useful results had been secured. The negatives were developed in the week following, and a cable dispatch conveyed the very welcome news that useful results had been secured with all the instruments. The photographs have reached home in perfect condition, and a careful examination here confirms the contents of the cablegram.

The negatives secured with the 40-foot and the smaller cameras show the inner corona as well, probably, as if there had been no clouds to interfere; but the longest recorded streamers are limited to about one and one-third solar diameters. The photographs are full of interesting details, some of their features being unique. They will be very valuable in studies looking to an explanation of the origin of the solar corona.

Four cameras of 11 feet focal length were used in making an examination for a possible planet nearer the sun than the planet Mercury. Photographs of the portion of the sky to be occupied by the eclipsed sun were obtained on Mount Hamilton the night before the apparatus was shipped to Sumatra. Photographs of this same region of the sky were secured at the time of the eclipse. During the first half of totality, when the clouds were thin, the negatives show stars down to nearly the ninth magnitude; but during the latter half of the eclipse, with thicker clouds, no stars were recorded. For about half the area to be examined the results were, therefore, very satisfactory; but for the other half nothing was secured. A comparison of the photographs made here and in Sumatra should lead to the detection of any unknown bodies.

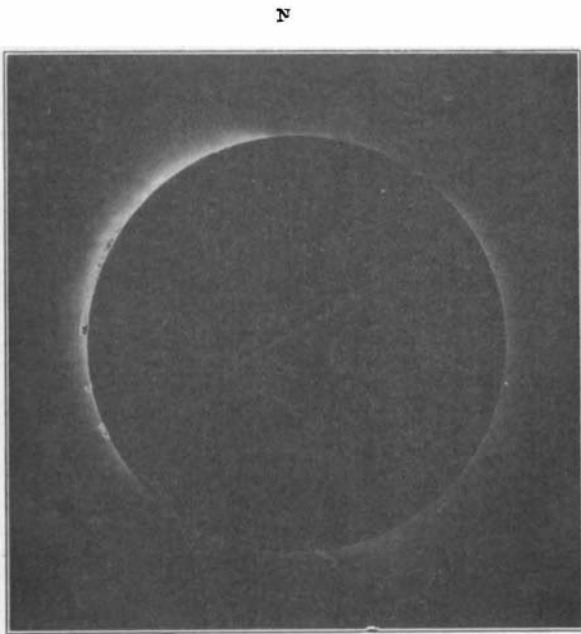
The photographic results from the polarigraph and the two spectrographs were better by virtue of the clouds than they would have been with a clear sky. In new work of this kind there is very little to guide the observer in forming his estimate of the length of exposure required. In

this case it has happened that the reduced brightness of the sky gave proper density to the negatives, whereas with a perfectly clear sky the photographs would have been over-exposed, and some of the desired results thereby lost. These fields of work are



**PHOTOGRAPH OF CORONA WITH FLOYD TELESCOPE.**

highly technical in their nature; but it will interest many to learn that the outer part of the corona shows a large percentage of polarized light, whereas the light of the inner corona is polarized much less strongly. The conclusion to be drawn from these



**PROMINENCES AND EXTREME INNER CORONA FROM NEGATIVE SECURED WITH 40-FOOT TELESCOPE.**

results is, that the light from the outer corona is largely reflected or diffused sunlight, whereas that from the inner corona originates from the incandescent corona itself.

The spectrum of the outer corona as recorded on

the photographs appears to be identical with the solar spectrum, whereas the spectrum of the inner corona is entirely different in that it shows no trace of dark lines. The conclusion to be drawn from these extremely valuable results is precisely the conclusion drawn from the polarigraphic results.

The general conclusion to be drawn from the many valuable results obtained by the expedition is, that the coronal structure surrounding the sun is made up of matter, probably very finely divided, ejected from the surface of the sun with great velocities, just as we have matter ejected now and then from terrestrial volcanoes with comparatively small velocities. This conclusion is entirely in accord with that reached by Prof. Schaeberle in 1893 from a different train of reasoning, and from an entirely distinct set of facts.

Illustrations herewith show the details of the extreme inner corona as secured by a short exposure with the 40-foot camera; and of the different features of the corona as photographed with the Floyd camera of 70-inch focus.

W. W. CAMPBELL, *Director.*  
Mount Hamilton, November 2, 1901.

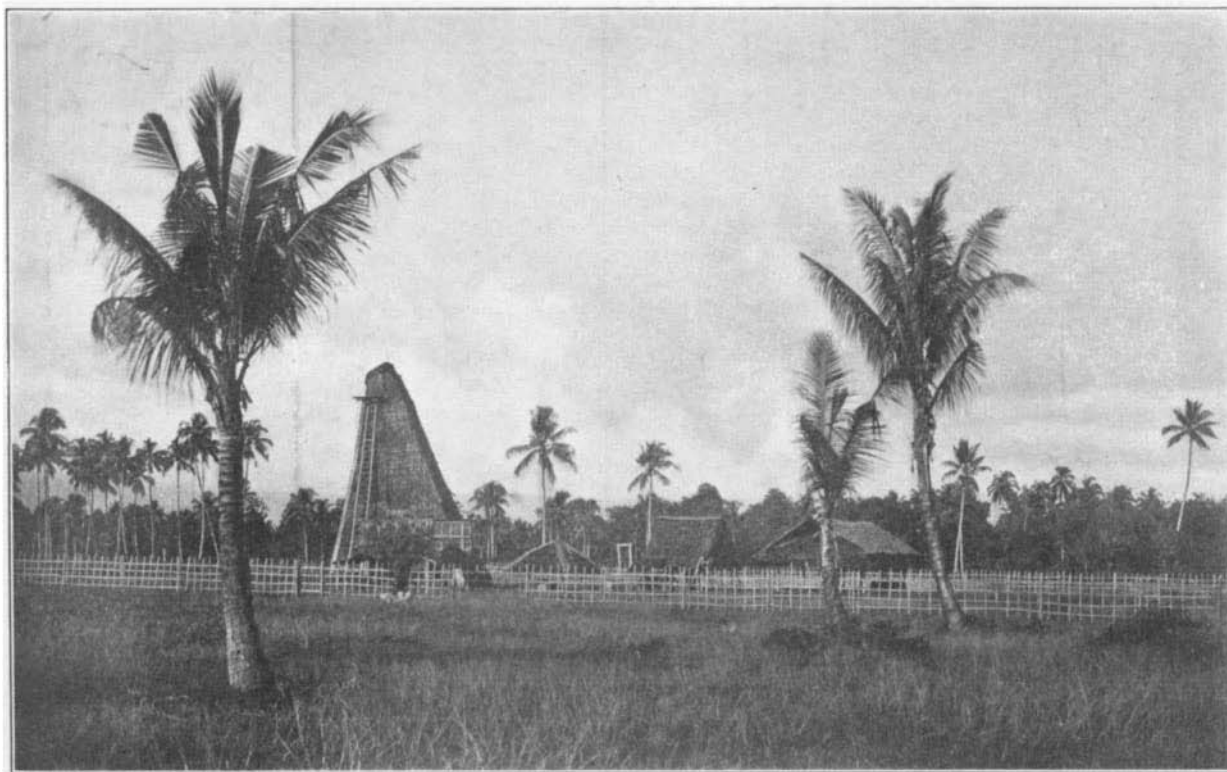
**SOME EXHIBITS AT THE AUTOMOBILE SHOW.—II.**

Continuing our notice of this year's most excellent exhibit at Madison Square Garden, we draw attention to the fact that if these annual displays are a correct indication of the year-by-year advance made in the industry, the past twelve months must be conceded to be by far the most progressive and interesting in the history of the automobile in this country. In our previous notice of the Show we referred to the fact that the freak machine was conspicuous by its absence—a gratifying fact in itself, and doubly so when we remember that the fine assemblage of machines on exhibit was marked by really extraordinary improvement in every respect, and in none more so than in the general contour and finish. For simplicity, grace and harmonious proportion of parts we think the time will soon come, if it is not already here, when the American-made automobile will be pronounced the handsomest on the market.

Although not many motorcycles were shown, those on exhibition appeared to be serviceable machines. The recently-completed 6-horse power Marsh motorcycle for pacing purposes cut quite a figure at the Show on account of a sign in front of it declaring it capable of 60 miles an hour. As a matter of fact, the machine has made a trial mile in 1 minute 23.5 seconds on a State roadway near Brockton, Mass., and we presume that the sign was intended to make it known that a speed of a mile in one minute or a rate of 60 miles an hour was expected. If the machine accomplishes a mile in one minute the feat will not be surprising in view of the great power of the motor. The lines and unusually rigid construction of the wheel are sure to make it a favorite with those who wish to emulate the speed of the swiftest of high-power automobiles.

A rather showy machine of compact appearance was the Searchmont touring car, designed for long and continuous runs. The framework, especially heavy, is provided with a flexible joint to accommodate inequalities of the roadway. The car is driven by a 12-horse power, double-cylinder motor, and has two speeds ahead and one reverse. The wheels are 32 inches in diameter, and the wheel base measures 5 feet 6 inches. It is furnished with a touring basket in front, for which, if desired, a cushion may be substituted providing an extra seat. The approximate

weight is 1,800 pounds. Among the more massive machines in the exhibition was the Desberon steam lorry, which is constructed on the lines of the Thornycroft steam lorry, but with improvements and modifications introduced by the present builders. The boiler, which is located at the front, is of the water-tube type. The engine, which is of 25 to 30 horse power, is geared for two speeds, and the truck, which weighs 4½ tons, has a capacity of 4½ tons of freight, making a total weight of 9 tons. The construction is simple and, of course, massive, as may be judged from the fact that the wheels have a tread of 6 inches, and the steel tires are 1 inch in thickness. It may be mentioned as an item of



**LICK OBSERVATORY-CROCKER ECLIPSE STATION, PADANG, SUMATRA.**