

## SUN SPOTS OBSERVED MAY 31, 1896.

To the Editor of the SCIENTIFIC AMERICAN:

Prevailing severe storms have induced me to make two drawings of a large group of sun spots visible to the protected naked eye on May 31, 1896, as a dark spot near the lower limb of the sun, as shown in Fig. 1, and of which Fig. 2 is a telescopic enlargement. To those who recognize the direct influence of solar eruption on our earth's electrical state, with its consequent atmospheric disturbance, the appearance of such a large group at this time of storm would seem to afford some proof.

L. H. HORNER.

Springfield, Mass., June 1, 1896.

## Employment of Fogged Films.

At the London Camera Club conference Capt. W. De W. Abney suggested the following method of using fogged films: It sometimes happens that a celluloid film coated with a sensitive gelatino-bromide emulsion is accidentally exposed to light (light fogged), or has been exposed in the camera; but for some reason or other it is not thought desirable to proceed with development, etc. These "spoiled" films may be used in the following way: They are placed in a bath of potassium bichromate and sensitized just as though they were pieces of ordinary carbon tissue. When dry they are printed in the usual way, but with this important difference, viz., that the celluloid is put next the negative image, i. e., the printing is through the celluloid, and so first reaches the back of the film. Thus no transfer is needed, so that when the faint image of silver subsalts is visible, the development of the bichromated gelatine in hot water may take place just as though ordinary carbon tissue were being manipulated. Experience shows that it is found best to pour the hot water over and over the surface, so as to thoroughly wash out the soluble gelatine. We have now an image in gelatine containing a developable silver salt. Development may now take place in the ordinary way. Furthermore, where local treatment is required, brush development and brush fixation may be applied. This opens up a field for local treatment.

## A DESTRUCTIVE BOILER EXPLOSION.

BY FRANK WOODMANTY.

The W. P. Orr Linseed Oil Company's mill, at Piqua, Ohio, was wrecked by the explosion of one of the boilers Sunday night, April 5. Three men were in the building at the time, but none were seriously hurt. Had the explosion occurred an hour later, a number of employees would have been at work, as they were to go on duty at midnight. The capacity of the boiler was one hundred horse power and the explosion shook the entire city. A four story wing of the building, fifty-five by seventy-five feet, was completely razed and the main structure badly wrecked, besides doing considerable damage to other property.

A practical engineer of several years' experience gives his theory as to the cause of the explosion in the following:

"There is but one plausible theory, and that is what is known in our terms as 'foaming.' The cause most liable to produce this effect is the use of deleterious compounds, of which many are now manufactured ostensibly for the purification of boilers by removing exotic substances, such as scales of magnesia, lime or sulphur, but which in reality, from the fact that they are composed largely of sodium compounds, assist in creating extraneous matter. When this condition is produced, gases are almost certain to collect under the water and elevate it sufficiently to create a deceptive condition in the gage, on which most engineers depend for guidance.

"The result of this is that the heating surface of the boiler is exposed to a fierce heat, with nothing to cool it, on account of the elevation of the water. The consequence is obvious, especially where an engineer is

unable to detect this chemical change. During such a state of affairs steam may be rapidly created without the knowledge of the engineer, whose only resource for discovering this condition is in the engine, which always gives warning in a peculiar manner. Thus it is very clear that as much as one hundred and fifty pounds of steam might have generated, for this

who with a six inch photographic lens of forty feet focal length, specially constructed by Brashear for the occasion, will attempt to repeat and improve upon the remarkable results he obtained during the Chilean eclipse of 1893. On his plates the image of the moon will be nearly four and a half inches in diameter, and the corona will be more than a foot across.

Mr. Burckhalter, with a lens of twenty feet focus, will make photographs of just half the size, using an ingenious contrivance of his own, which, by means of a star shaped screen revolving swiftly in front of the photographic plate, gives to the outer regions of the corona an exposure many times longer than that allowed to the lower and brighter portion. It is hoped in this way to bring out satisfactorily on the same plate the whole extent of the corona in a single picture—a thing never yet accomplished. On negatives that show the outer portions well the inner portions have hitherto been entirely overexposed, and their interesting details quite obliterated.

From England Mr. Christie, the Astronomer Royal, takes

out a large party equipped to occupy at least two stations. A party also goes from France in charge of Deslandres, of the Paris National Observatory; but we have no information as to its composition and outfit, except that their work is to be mainly spectroscopic; nor do we yet know whether Germany will have a party in Japan.

In Siberia a number of stations will be occupied by the Russian astronomers, and some of them will be very thoroughly supplied with photographic apparatus. The most of them will make only visual observations.

In Norway and Finland the observers will be numerous, though for the most part amateurs. There will, however, be at least one English party provided with instruments precisely like those taken by Mr. Christie to Japan, so as to give strictly comparable results; and America will be fairly represented by several observers. But the sun will be rather low, and the duration of totality so short (less than two minutes) that the results are likely to be much less satisfactory than those obtained in Siberia and Japan.

The special aim of the observations will be, of course, to get information about the corona—its structure, the variations, if any, which occur during the two and a half hours while the shadow is traveling from Norway to Japan, and the peculiarities of the coronal spectrum. The identification of terrestrial helium a year ago has naturally much intensified the interest in the thus far mysterious element, provisionally called coronium,

which produces the most conspicuous line in the coronal spectrum, and has hitherto been found nowhere else, unless, perhaps, in one or two of the so-called "new stars." It is earnestly hoped that on this occasion we may get some new light on the subject.

But while the corona will be the principal object of observation, other matters will be looked after also. The spectrum of the "reversing layer"—the lowest region of the chromosphere—will be carefully studied, as well as that of any prominences that may be visible; and an attempt will be made to determine the precise region where the great "H" and "K" bands of the solar spectrum have their origin—bands at present ascribed to calcium, but in many ways very peculiar in their behavior if they are really due to that metal.

If the weather is fine, we may fairly expect real and important additions to our knowledge; but the "Prince of the Power of the Air" is a very malignant and intractable demon.—The Independent.

GOVERNOR MORTON has signed the bill relating to the use of the reservoir site on Fifth Avenue, New York City, for the erection of the new New York Public Library, Astor, Lenox and Tilden foundations.

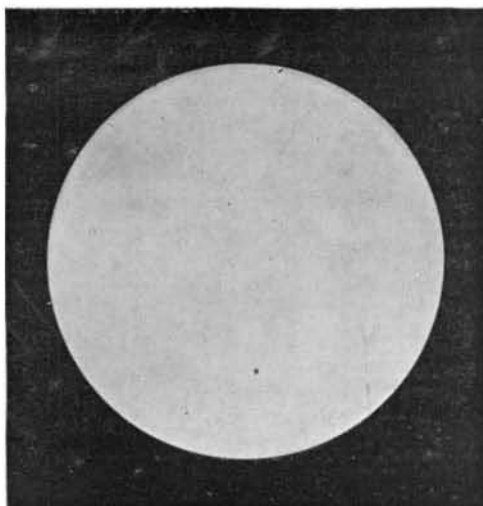


Fig. 1. SUN SPOTS OBSERVED MAY 31, 1896. Fig. 2.

amount, in my opinion, would have been necessary to produce the effect attained by this explosion."

## The Coming Eclipse.

The astronomers are beginning to put themselves in motion for the observation of the eclipse on August 9. As noted in these columns some time ago, it begins in the morning off the coast of Norway, and the track of the shadow passes over Finland, Northern Russia, Siberia and Yezo, the northern island of Japan, where it arrives in the afternoon.

In Norway and Finland the sun will be very near the horizon, and the duration of the obscuration will be less than two minutes. In Siberia, where the eclipse takes place at noon, the astronomical conditions will be the best; but considering the ease of access and the probable conditions of the weather, the Japanese stations have the advantage, and offer the best chances of success. The most important expeditions will go there.

From this country two parties have gone or are going. The largest, of nine persons, is under the charge of Prof. D. P. Todd, of Amherst College, and sailed from San Francisco about the twentieth of April on Mr. A. C. James' yacht Coronet. The heavy and elaborate equipment of apparatus was sent around the Horn last winter upon the yacht, and is sufficient to fit out three stations, provided, as is likely, that enough amateurs can be found on the ground to assist in the use of the instruments. The apparatus is so



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largely automatic that no great amount of special astronomical experience is needed for many of the proposed operations, which are for the most part photographic. The visual spectroscopic observations are also provided for, as well as polariscopic and photometric. Mr. and Mrs. James accompany the party, and Mrs. Todd goes with her husband.

The liberality of Col. Crocker and other friends in San Francisco enables the Lick Observatory to send out a second party, headed by Prof. Schaeberle,