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NINETY-FOURTH SESSION--1871.

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1871.

G. L. M.

were toned in the ordinary bath of hyphosulphite and gold, in general use some years ago for paper prints.

Mr. Newton gave the following formula for a developer, which he had found as energetic as iron, and which produced very fine effects in copying engravings, as well as in portrait work :

Stock Solution.—No. 1. 6 grains of pyrogallic acid.
6 grains of tannin.

Stock Solution.—No. 2. Saturated solution of sulphate of copper, 4 oz.
Acetic acid (No. 8), 2 oz.

When about to develop, mix equal quantities of Nos. 1 and 2.

Mr. Peter F. Weil exhibited a series of stereographs of animals, in amusing attitudes and dress, from plates made under an ordinary skylight.

Mr. O. G. Mason presented four prints from negatives made at Bellevue Hospital.

Mr. D. C. Chapman exhibited a large collection of photographs which he had obtained in Europe, during his recent visit. Several large prints of the city and bay of Naples, with Mount Vesuvius in the distance, were very fine. Among the stereographs, was a very interesting picture of the swinging chandelier, used by Gallileo, in studying the vibrations of the pendulum at Pisa; and others, of excavations at Pompeii. Also photographs of lava, thrown out of Mount Vesuvius, in the eruption of 1868, which lava, Mr. Chapman found to be yet very hot. He also exhibited several pictures of curiosities, belonging to ancient Rome. He remarked that he had been unable to find any true stereographs of the interior of St. Peter's church; those mounted and sold as such, were merely duplicate prints from single negatives. He found the standard of photography, very low in Italy; although there were a few worthy exceptions.

Adjourned.

April 4, 1871.

Mr. HENRY J. NEWTON, in the chair; Mr. O. G. MASON, Secretary.

Mr. O. G. Mason made a verbal report of progress in his division of work, as one of the committee "On the preparation and preservation of silvered paper." He had kept paper unchanged since its preparation in March, 1870.

Mr. H. J. Newton exhibited a collection of very fine glass positives, made by the colodio-chloride process.

Mr. Peter F. Weil exhibited one dozen group and composition stereographs, made under ordinary gallery light. The novel arrangement, and pleasing effects produced in these pictures, were much admired by those present.

Mr. O. G. Mason presented six stereographs of cases photographed at Bellevue hospital, illustrating the effects of disease and its surgical treatment.

Mr. Wm. Kurtz exhibited and explained the working of a ingenious and convenient camera attachment, for producing vignette negatives. The device consisted of a bar or strip of wood, projecting from the lower part of the front of the camera box, and extending under its entire length, forming a sub-base. In the upper surface of this base or bar, extending along its entire length, were three grooves, in which three slender rods had a free motion and which was regulated by the operator while observing the image of the sitter on the focusing screen. To the ends of two of the rods, projecting in front of the box, was attached a light frame of wood, in such a manner, that the operator could, by advancing the slender rod in the right hand groove, turn it to an acute angle with the axis of the lens; and by the same means turn it to the left, by advancing the left hand rod; or the whole frame might be made to advance or recede, by the simultaneous action of both rods. In the frame, thus carried by the right and left hand rods, was hung another very light frame, covered with tissue paper, in which was a cut, or opening, of proper size and shape, to produce the desired vignette. This paper covered frame was hung, through the center of its two perpendicular sides, to short sliding guides, which could be moved up and down in grooves in the inner surface of the outside or larger frame, thus enabling the operator to elevate or depress the vignette opening to suit his purpose; while a modification of form and of effect of light was produced by inclining the top or bottom of the frame from perpendicular, by means of the light rod in the central groove of the sub-base, this rod being provided with several joints for that purpose.

Mr. Daniel C. Chapman, who was attached to the Sicily division of the United States Expedition for observing the recent total eclipse of the sun, read the following paper:

PHOTOGRAPHING THE SOLAR ECLIPSE OF 1870.

The appropriation made by Congress, for the purpose of observing the total eclipse of the sun, to take place December 22d, 1870, and be visible in the south of Europe, was placed in the hands of Prof.

Pierce, of Cambridge, Mass., Superintendent of the U. S. Coast Survey. By him, the expedition was organized, and formed into two divisions; one party was to make observations in Spain, and the other in Sicily. To Prof. Winlock of Harvard College, Cambridge, Mass., was entrusted the arrangement of the details of the party going to Spain; while the arrangement of the photographic apparatus, including telescope, tent, etc., for the party going to Sicily, was placed in the hands of L. M. Rutherford, Esq., of New York. The principal thing to be obtained, was a suitable telescope with portable pier, equatorial and clockwork; after considerable difficulty, a telescope of six inch aperture was procured. This telescope required to be corrected for photographic use, in the same manner as Mr. Rutherford had previously corrected the thirteen-inch-object-glass, in his own observatory, to be used for celestial photography. This was accomplished by placing in front of the object-glass of the telescope, a flint glass lens of such curves as would shorten the focal length of the telescope, so as to be about one-seventh less than its usual length for vision. In the ordinary photographic cameras, the visual and chemical foci are made to coincide for the sake of convenience. Neither are in the best condition, one set of rays being over-corrected, and the other under-corrected; therefore, a telescope for vision is still more over-corrected for photography; that is, the focus of the actinic rays is outside of that of the luminous rays, and thus the rays are so dispersed, as not to produce a good focus at any point; but, by the addition of this lens, the focus of the actinic rays is shortened, and brought inside of the luminous focus, at a point where the greatest sharpness and rapidity of action is obtained. The camera box which was attached to the telescope, was of peculiar construction. A portrait lens of short focus was placed in a box of about thirty inches in length, in such a position as to copy the image made in the focus of the telescope, and enlarge it at the back end of the box.

By this arrangement we were enabled to expose plates in the focus of the telescope, and also in an enlarged portion at the back end of the box, without making any change, which would greatly facilitate our operations, for we intended to expose in the principal focus during totality, and in the enlarged portion during the partial phases. Our tent was twelve feet wide by sixteen feet long, and of sufficient height to accommodate the telescope, a portion of one side of the roof being made to roll up, and through which we were to work the instrument. In one corner, and under that part of the tent which did not open, was the chemical room, constructed of black muslin, and ventilated at

the top. In the side of the chemical room near the telescope, a pocket was made, with a flap on each side, by means of which the plate holder could be passed in and out without admitting light into the room. I carried with me a complete set of photographic materials, cameras, etc., and even the water to make my bath with, so that I might not be dependent on anything there, except water to wash the plates with.

I sailed from New York on the third day of November, and, to my great delight, found on board the steamer a number of scientific gentlemen belonging to both divisions of the expedition, some on their way to Spain and others to Sicily. After a moderately quick and rather pleasant passage we arrived in Liverpool on November 14th. Here our instruments were reshipped by the way of Gibraltar to Sicily. Preferring traveling by land, I went across the continent, and on my way fell in with Prof. Pierce and Mr. Schott of the United States Coast Survey, and in company with Mr. Schott went on to Sicily, in advance of others of the party.

On December 5th we arrived in Catania, the place decided upon as the base of observations. Our first business was to find a suitable spot on which to pitch our tent and set up the instruments. In this we were very fortunate, for the garden of the Benedictine Monastery, with the use of several rooms in the building, was tendered us by Prof. Sylvester, through the American consul. This garden contained several acres of ground, beautifully laid out and arranged with shade trees, orange groves, flower beds and ornamented walks. The place being protected on all sides by a high wall of solid masonry, it was all we could desire. A suitable locality was soon selected and in a few days we had everything in working order. About this time we were joined by Mr. Lockyer, Prof. Roscoe, and others of the English party of observation. Among this party I had the pleasure of again meeting our much esteemed friend and eminent photographer Dr. H. Vogel, of Berlin, Prussia. For several days prior to the eclipse we took photographs of the sun, so that the locality of any spots which might be passing the limb of the sun could be accurately determined, for the purpose of ascertaining whether they had any connection with the protuberances or the corona. The morning of the day of the eclipse was spent in a general preparation for the event. Mr. Lockyer proposed to signalize the first contact observed in the spectroscope, according to Prof. Young's method, which he did by the firing of a pistol, still there was no visible contact.

But the instant there was visible contact, our first negative was

taken, which showed plainly that actual contact had taken place several seconds previous, and coinciding exactly with the time of contact given by the spectroscope, thus proving that photography is more reliable in some cases than the eye. We continued to take negatives at intervals, varying from one to fifteen minutes apart, until about fifteen minutes before totality; then we made preparation for the total phase. In addition to the telescope I had mounted a photographic camera, of about twelve inches focal length and three inches aperture, on the telescope immediately over the axis. By the rapid action of this camera I expected to get a more extended impression of the corona, in proportion to the sun's diameter. Four plates were prepared, three for the telescope, and one for the camera, and placed in the shields. Two plates were to have a very short exposure, one at the commencement, and one near the end of the totality, the object being to show the locality and shape of the protuberances on both sides of the sun. Two other plates were to be exposed for the corona, one in the telescope, the other in the camera. As the length of the total eclipse was only about one minute and a half we designed that at least one minute should be devoted to obtaining the corona alone; but in securing this most important part of the eclipse we were doomed to disappointment, at least so far as photography was concerned. About five minutes before totality, a cloud passed over, entirely excluding both sun and moon from view; but as the cloud was somewhat broken and was traveling quite rapidly, we hoped to get a glimpse of the total phase, if we could not obtain photographs. In this we were partially successful; the thicker portion of the cloud passed off in time to give us a view of a portion of totality for the brief space of four or five seconds; and in this time I was enabled to get a slight impression in the camera, but nothing through the telescope. However, to the eye, enough was visible to gratify our curiosity. In about five minutes after, the cloud passed away, giving us clear sky again. We then continued to make negatives, as before, until near the end of the eclipse, when the sky was again overcast which prevented our obtaining views of the last contact. On the two following days we made negatives of the sun, for the purpose of ascertaining whether there were any spots about to appear which were not visible on the day of the eclipse; but none were found. Notwithstanding our bad luck, we were glad to find that the other division of the United States observers which went to Spain was eminently successful, as shown by the full reports of its operations already published.