

**OBSERVATIONS ON THE ECLIPSE OF MAY 28, 1900.\***  
BY HENRY RANDALL WEBB.

The Naval Observatory fitted out three expeditions under the general supervision and control of Prof. S. J. Brown, the astronomical director of the Observatory, which were stationed at Pinehurst, N. C., Griffin and Barnesville, Ga. While each of these expeditions was under the immediate charge of a staff of observers from the Naval Observatory, there were present at each several specialists from the scientific institutions of the country.

At Pinehurst, the eastern station, Prof. A. N. Skinner was in charge, assisted by Prof. Eichelberger, Mr. Theodore I. King, Mr. Culton and others from the Naval Observatory. Prof. Ames with his assistants was in charge of the spectroscopic observations. Prof. R. W. Wood, of the University of Wisconsin, was at Pinehurst with a stroboscope for observing the shadow bands, while Dr. F. L. Chase, of Yale University, made observations with an objective prism spectroscope. Drawings of the corona was the principal work at Pinehurst, both by the naked eye and by the telescope, the latter for sketching the finer details of the inner corona. For photographic work, instruments of various sizes were used, including the 40-foot photo-heliograph lens, giving an image of the sun  $4\frac{1}{2}$  inches in diameter. Each of these different instruments has its distinct advantage and it is necessary to use them all in an eclipse, in order to get the best results. The diameter of the picture is in proportion to the focal length of the instrument, but the difference upon the details is great. In the pictures made by the smaller instruments, the details of the corona near the sun are lost, but the general effect, including the length of the corona and the polar rifts, is distinctly marked. The larger lens with a greater focal length develops more distinctly the minor and very interesting details of the corona, while it fails to bring out the general effect.

The principal instruments in use at Pinehurst Station were two Dallmeyer lenses, 6 inches in diameter and 38 inches in focal length, and a Voigtlaender lens with 4 inches aperture and 8 inches focal length, besides the 40-foot photo-heliograph. The scaffold supporting it is double, the two parts being entirely separate: the outside part supports the tube of the large camera, while the inside part supports the lens. The plate holder is supported independently inside of the dark room. On the right of the picture is a shed, with canvas roof down, which protects the three equatorial telescopes and a polar axis supporting a number of cameras. Prof. and Mrs. Skinner are seen standing in front of this shed.

The three telescopes and the polar axis supporting the cameras appear in the second engraving. The barrel just above the shed is twelve feet from the ground and filled with water, which furnished the hydraulic head for running two water clocks or clepsydras; one to rotate the polar axis and one for moving the plate holder for the 40-foot photo-heliograph in the dark room.

In another engraving will be seen a nearer view of the portable transit house. This house has been all over the world with different eclipse expeditions.

Prof. W. J. Humphreys, of the University of Virginia, was in charge at Griffin, Ga.

This station had three different cameras. The largest was about 26 feet long and 12 feet wide, inside of which were reflectors upon which the result of the picture depended. The photographs were obtained by placing a highly polished silver mirror in front, where the sun

would fall directly on its face. The reflection would be thrown from it into the camera through a slit, three-quarters of an inch in length and one hundredth of an inch wide; falling upon a plate of delicate speculum metal, it will be again reflected to a highly sensitive plate, where the negatives are secured.

The Barnesville station was under the immediate



Portable Transit House which has been used on Many Eclipse Expeditions.

charge of Prof. Milton Updegraff, of the Naval Observatory. Prof. Brown chose this point to observe the eclipse.

But perhaps the largest collection of scientists was at Wadesboro, N. C., where were the observers from the Smithsonian Institution, Princeton University, the Yerkes Observatory and the British Astronomical Association. The party from the Smithsonian Institution was in charge of Mr. C. G. Abbot, and was accompanied by Dr. S. P. Langley, the secretary of the Institution, and several others. They had an immense camera, 185 feet long. The Princeton observers were

eleven in number, in charge of Dr. C. A. Young, and included Prof. Charles Brackett, Prof. Taylor Reed, Prof. William Libbey and others.

Prof. George E. Hale was in charge of the Yerkes Observatory party. His special study was the heat of the corona by means of a bolometer, an instrument capable of responding to the slightest degree of heat. Prof. E. E. Barnard, of the same party, had charge of the apparatus photographing the corona. They had a camera 62 feet in length, provided with a sliding framework with seven partitions, by means of which seven pictures could be taken in rapid succession.

Four of the eight representatives of the British Astronomical Association were women in charge of Miss Gertrude Bacon, a distinguished amateur astronomer. There were many other important stations. The Weather Bureau had several within the belt of totality, noticeably one at Newberry, S. C., in charge of Prof. Cleveland Abbe and F. H. Bigelow, while the amateur observers numbered hundreds. Careful drills took place at the different stations, and every one had his duty assigned to him and his work to do.

There was no disappointment in the weather during the eclipse, which left nothing to be desired at most of the stations. Many and valuable observations were made, but it will be some time before the numerous photographs which were taken can be developed and any definite results known.

Observations of the shadow bands varied very much at the different stations. Prof. Wood was not successful at Pinehurst, while two other observers at the same place were able to make a rough measurement of them showing that they were about five inches apart and moved at the rate of eight feet per second. At Barnesville, according to Prof. Brown, the shadow bands appeared like reflections of rippled water projected upon a screen. Prof. Quimby, who was at Wadesboro, said in regard to the shadow bands: "That curiously enough at every place where they were observed, they were different, that is to say, they moved in a different direction."

Dr. Langley said: "The bolometer was used for the first time in this eclipse, and by its aid the heat of the corona was successfully observed, and probably for the first time also."

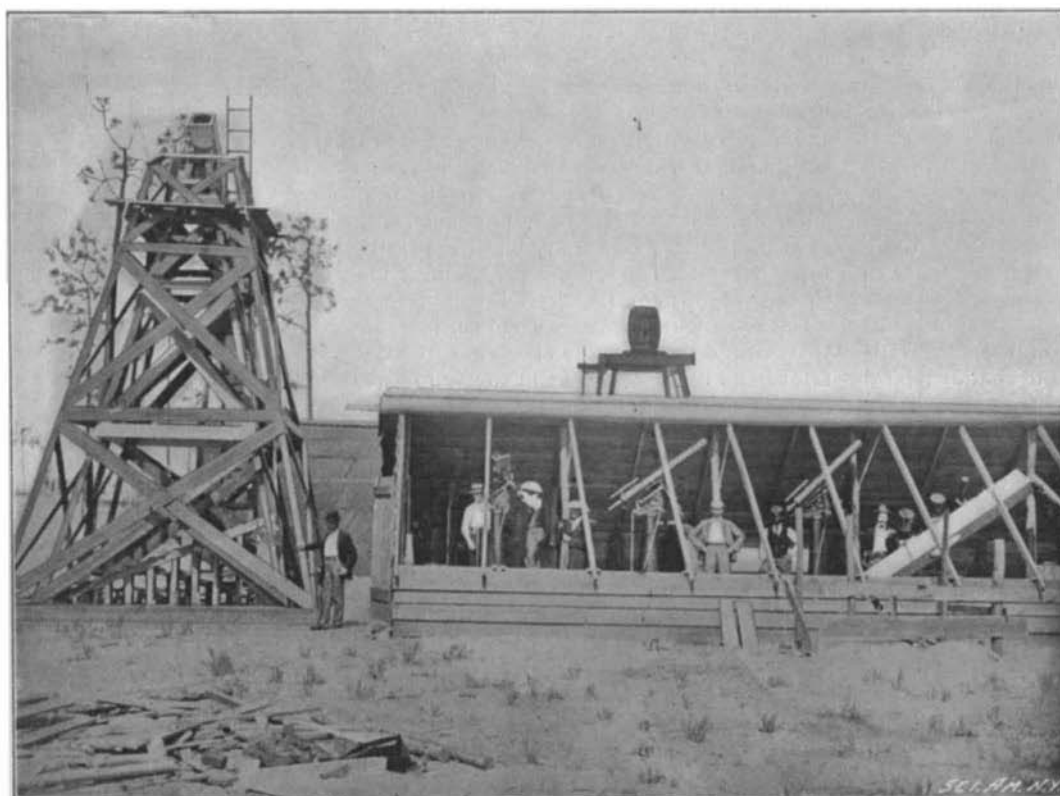
Mr. Nevil Maskelyne also introduced a new feature by taking six hundred cinematograph photographs of the eclipse.

A TRADE secret decision has recently been handed down in one of the German courts, which possesses considerable interest. The foreman of a factory invented a substance which was used by his employer in finishing rustling velvet. The foreman imparted the composition of this substance to other makers, and was sued by his employer, and in the lower court was found guilty. The defense was that the foreman had only parted with his own invention which was his intellectual property. The case was appealed and was dismissed on the ground that the foreman was employed by the firm, and his invention was only a part of the service which he owed to his employer and only an employe would be trusted with experiments which would lead to such an invention. On account of the facilities which his position offered he was enabled to make an invention which an outsider would not have made, and that he made it in consequence of his employment, for which he was duly paid. The court held that when he imparted his secret to strangers he violated the German law for "the suppression of base competition."

AN auroch's horn was recently found in a pit dug in lower Pomerania. It is believed that our domestic cattle are the descendants of aurochs. This animal survived on the Continent until 1627. Examples of its enormous horns may be seen quite frequently in churches and castles in Southern Germany, and in the south Rhine country.



The 40-foot Photo-Heliograph on its Scaffold.



General View of the Eclipse Installation.

THE PINEHURST, N. C., ECLIPSE STATION OF THE U. S. NAVAL OBSERVATORY.

\* It is not possible at the time of going to press to obtain satisfactory photographs of the eclipse. Most of the observing parties left their plates or their negatives behind in order that they might be carefully packed. The long exposure, while it develops certain necessary features of the eclipse, also results in the sun's rays burning out the negative in other spots and it has to be carefully worked up, a composite photograph being taken before anything satisfactory can be obtained. The results resemble the eclipse of 1878 very closely as figured in plate 21 of the United States Naval Observatory Report on the Total Eclipse of July 29, 1878.—Ed.