can be seen every day, indicated that it was extremely improbable that the solar atmosphere was as extensive as some drawings of the corona would appear to require; and at a meeting of the Royal Astronomical Society the extreme variation in the drawings of the corona, as seen by observers of the same eclipse in different places, was pointed out in support of the spectroscopic evidence, which goes to show that in the *chromosphere*—the outer solar envelope of which the red flames are the higher waves—the pressure is extremely small, though the temperature is still comparatively high. The importance of this evidence will be obvious in a moment when we consider that an excessive outer atmosphere would require a greater pressure at its apparent base, and that a high temperature would render the outer atmosphere itself incandescent, and it would probably be as visible spectroscopically, as the red flames themselves.

Here, then, was one point at all events for the next eclipse. Another, scarcely of less interest and importance, was to compare the evidence of the spectroscope with that of the eye; to translate, as it were, the language of the spectroscope into the vulgar tongue, and thus utilize the former eye-records of the eclipses which happened in the pre-spectroscopic age.

We now come to the American eclipse which happened on the 7th of last August. It swept over the North American Continent diagonally, from Behring's Straits to a point in lat. 34 degrees N. on the Washington Meridian. It is stated that, although it traversed a central belt of well populated territory, there seems to have been scarcely a town of any considerable magnitude along the entire line which was not garrisoned by observers having some special astronomical problem in view. The Government, especially the Navy Department, and the various railway companies threw themselves into the inquiry with the utmost liberality, and the result is an enormous gain to science, of which America may well be proud; certainly an eclipse has never been so magnificently and extensively observed before. Of course, sufficient time has not yet elapsed to enable us to receive the results obtained by all the observing parties. In fact, the only report *in extenso* received up to the present time, so far as our knowledge extends, is that of Professor Morton's party, which is so full of interest that it deserves to be dwelt upon at some length. The spectroscopic results demand our first attention, as we have especially led up to them in what has gone before.

Premising that the conclusion is not endorsed by other observers, if we are to believe the newspaper accounts, we may commence by stating that the result arrived at by Professor Morton's party as to the nature of the corona—the most important inquiry—is, we may almost say, of a most *bizarre* description. In the first place, it is stated that the light of the corona is *not* polarized, thereby upsetting all the previous work on which the theory of the corona being a solar appendage was supposed to rest. Professor Pickering, in fact, found that while the sky was strongly polarized all round close up to the corona, that object itself was not a source of polarized light; the corona was observed colourless, projected on a ground of tints complementary in the two images of the corona and the surrounding sky, seen in the polarizing apparatus. Next we learn that the entire light from the totality phase gave a continuous spectrum; and next, most startling thing of all, Professor C. A. Young states that he has evidence that the *solar corona is a permanent solar aurora*! so that, to quote Professor Morton's report, "It would thus seem almost certain that the corona is simply an electric discharge, no doubt varying with great rapidity, as we see in the case of the aurora and to its variations we may attribute those apparent motions of the prominences which have been observed by so many, but which our large series of phothographs so conclusively shows not to have any actual existence."

The evidence for this statement lies in the fact that the bright lines which Professor Young states he saw in the spectrum of the corona are apparently, "by graphical construction," coincident with the bright lines observed by Professor Winlock in the spectrum of the Aurora Borealis. Of the nine bright lines seen by Professor Young in a prominence, three remained visible when the image of the prominence itself was removed from the slit,and the other lines disappeared. Professor Harkness, of Washington Observatory, states that he saw *one* bright line in the spectrum of the corona on a continuous-spectrum background. Now, although these observations deserve to be treated with the utmost respect, it is clear that with such a startling hypothesis resting upon them, they will have to undergo a very severe criticism, and some of this criticism lies on the surface. In the first place, the polariscope observation stands alone. In all prior eclipses in which that instrument has been employed, a directly opposite result has been obtained. Secondly, the fact that the spectrum of the light of the totality phase was continuous proves too much, if it proves anything; for, granting it not to arise from a faint light and a wide slit, a solar aurora could not give such a spectrum, and one of bright lines too. And, finally, Professor Young and Professor Harkness might have been analysing a high-level prominence when they thought they were analysing the corona, for one at least of the lines they attribute to the corona is among those already chronicled by Mr. Lockyer in the chromosphere spectrum.

Confining ourselves merely to these considerations, this at all events is clear—that the eclipse of 1870 must be well observed. The new method, so far from rendering observations of eclipses unnecessary, lends a vastly increased interest and importance to them, and we trust soon to hear that an eclipse expedition is being organized by the Government for 1870, on the 1860 model. There can be little doubt that it will be as rich in results as was its prototype.

We now come to the more ordinary observations of the eclipse made by Professor Morton's party. The photographers were extremely fortunate, and the history of the eclipse is written in an unbroken series of photographs. No less than thirteen pictures were taken during the totality by three instruments; these show abundant detail and, in some cases, much of the corona. Some special photographs were taken of the corona by means of a long exposure, and the result was to give almost as full a development to the object as that observed by the eye, the curved structure of the rays, and the varying intensity with which they shine in different points, being very marked. Professor Morton gathers from these photographs that the brightest outbursts of the corona light are associated with those prominences which are of a pointed and flame-like shape, those of a massive description appearing to cast a shadow on the corona. Another idea which Professor Morton gathers from the photographs is that an increase of light on the solar surface in contact with the edge of the moon indicates really, as Professor Challis has before suggested, a very rare lunar atmosphere. The prominences observed are described as follows:—

"The most conspicuous prominence is that which, at a hasty glance, seems to resemble the letter X, but, on more careful inspection, is perceived to be like an ear of corn. It consists of a solid central mass inclined at an angle of about 45° to the normal at the solar surface, and with three branches from near its upper end, one sweeping backwards in a direction generally parallel to the solar surface, another forward, as concerns the direction of the general mass, and a third branching out a little below and running in the same direction as this last. The appearance of the main body, which is of a spindle shape, and with spiral markings, is highly suggestive of a vortical motion which has swept these whiffs of light matter into their peculiar positions.

"It was believed by several observers, that this object moved rapidly while they were watching it; but as the same positions are shown in the eight different negatives, (taken at Burlington and Ottumwa,) which contain it, there can be no doubt of its permanent character.

"It appears, however, beyond doubt that motion, amid the light surrounding the sun, was observed, as there is much accordant testimony on the subject. But this motion, as we shall presently see, there is every reason to believe existed in the corona, and not in the prominences, which, however, might easily have the appearance of movement, if seen against a background of shifting light.

"Immediatly to the right of this ear of corn, was seen a region of soft light, among which rose two similar spindle-shaped masses inclining towards the corn ear.

"To the left appeared a mass of rolling cloud disposed in beautiful streams and curls, like the smoke from a bonfire or burning meadow, swept gently toward one side by a light wind. In connexion with these were some small masses, entirely detached and floating above the general body, as was the case in De la Rue's pictures.

"Other solid nodular masses appeared at other points; but the next most notable prominence was one which attracted the attention of all observers, and appeared to occupy a position on the lowermost edge of the sun. It is most clearly shown in the last pictures taken at each station, and resembles, in shape, a great whale with a body made up of dense, cumulous cloud matter, with a long tail clinging close to the solar edge, and stretching some 40,000 miles along. The length of the entire mass is about 110,000 miles, and the height of its more bulky portion about 28,000 miles, while its length being about 70,000 miles, we would have for its cubic capacity, assuming that its extent in the remaining direction is equal to its height, about 54,880,000,000,000 cubic miles.

"To the right of this, and only showing its entire length in the last picture of each series, was a caterpillar-like mass of cloud matter, very much like the solid rolls of horizontal vapor which are sometimes seen passing over a sheet of water. At one end rose a