



RECENT VIEWS RESPECTING THE CONSTITUTION OF THE SUN. BY ARTHUR HARVEY, ESQ., F.R.S.C.

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At the base of a mountain the view is usually limited and obscured, but the horizon widens and the prospect gains in clearness on the upward climb. Still, when the Alp is scaled, peaks beyond peaks become visible. So in science, and especially in astronomy, some new fact or theory is daily added to the general store, but it is only thereby made evident that there is far more beyond our ken than within it, and we are compelled to think of the last words of Laplace:—
 “Ce que nous savons est peu de choses; ce que nous ignorons c'est immense!”

The sun is the orb of which, in comparison with its importance, we know least, and its various phenomena are almost all, as yet, mere riddles. What was thought fifty years ago to be assured knowledge has not held firm, while even modern views as to his constitution are uncertain and indefinite, notwithstanding the array of new facts of which we have become the masters through the aid of the huge telescopes, the perfected spectroscopes and the photographic instruments lately brought into use.

Changed views as to the sun have been forced upon us by the alteration of our ideas about the earth, in which, too, there has been a revolution within a life time.

No longer are we told that the height of our air is forty miles. Auroræ can now with reasonable certainty be numbered among atmospheric phenomena and I have proved one remarkable auroral arch to have been over 150 miles above the ground.* We now know that falling stars light up by friction in the air, and in tracing the path of a remarkable bolide seen in Toronto, I learned that it became luminous at the height of 80 or 100 miles.† The trail of that meteor became snake-like before it vanished, the sinuosities having a breadth of half the apparent diameter of the moon. If these were caused by air-waves, such as Mr. Napier Denison has told us of,‡ these waves had a breadth of at the least 2,000 feet. Laplace, a hundred years ago, said the atmosphere was bounded by a lenticular shaped surface of revolution whose volume is about 155 times that of the solid earth and should reach out to a distance of about 26,000 miles at the equator and 17,000 at the poles. Professor Woodward, lately President of the Mathematical Society of America, appears to agree with him.§ New gases have been discovered in the air, and its constitution is even thought to change as we ascend in it. Carbon dioxide decreases, hydrogen increases and it is thought by some that on the aerial outskirts there is hydrogen alone or with the smallest admixture of the

* Transactions Astronomical Society of Toronto, 1893, p. 78.

† Transactions Astronomical Society of Toronto, 1868, p. 118.

‡ Transactions Canadian Institute, February 6th, 1897.

§ Science January 12th, 1900.