

the greater should be the income. On some of the choicest land in our State men are found who plough, year after year, the same "lots" their fathers ploughed before them, and are continually grumbling because their crops are small. They accuse their seed, the weather, everything—overlooking the great fact that certain necessary chemical properties have been literally sucked out of the soil.

This desired study does not depend upon reading alone; men often study each other. Let agricultural societies be formed whose avowed object is the dissemination of practical information. At this society let there be a full discussion of each other's wants. Let them call in assistance of scientific men, throwing away the old notion, that there is no community between the college bred man and the farmer. Science can assist in raising the grain upon the fertile intervals of the Champlain Valley, as well as the brawny ploughman who turns up the soil.

It is too often the case that such appeals to the farming community are regarded in the light of "buncombe." This ought not to be. The farmer should cure himself of the idea that reading and study are incompatible with his calling, and he should never again be heard to say that "John is going to college and Jim has got learning enough, because he's going to be a farmer." Instead of all this, let him labor to give dignity to his calling. Do not impress upon the mind of poor "Jim" that his education should stop when he is able to write his name. Make him understand that the investigation of important matters relating to his calling is something that he can do for himself. Make him understand that if he walks in the dark it is his own fault.—*Free Press.*

### On the Partial Eclipse of the Sun August 7, 1869.

By C. SMALLWOOD, M.D., LL.D., D.C.L. (1)

The varied and beautiful phenomena presented in an Eclipse of the Sun, form an important era in the life and study of the astronomer. They form a sort of triumph of his science, a winning-post, planted as it were, in the distant confines of space—a point of time graven on the history of the past—a land-mark placed as a beacon for the future—and a song of praise to Him, whose power and might are so manifest in the "Heavens that declare His glory, and in the moon and stars that He has ordained."

The occurrence of a total eclipse gives rise to appearances which have excited the admiration and wonder of the inhabitants of the earth in all ages; but the increase of knowledge, and a more definite theory of the properties of light, and the various improved and modern appliances of science for the investigation of these phenomena, have shed a bright lustre around these observations of a character at once sublime and of intense interest.

No experiments since the days of Newton, but the discovery by Fraunhofer of the dark lines in the solar spectrum, with the more recent invention of the spectroscope, could have led to those results which the total eclipse of last year, 1868, so fully determined, and which would seem to afford such positive proofs of the composition and nature of those protuberances, which, up to that time, had caused so much speculation among men of science.

We are not aware to what point of investigation these several objects have been brought during the past month by our American scientific brethren, or by the two or three Canadian observers who have been enabled by the liberality of the Dominion Government to witness and record, in a more favorable locality, those interesting phenomena which may justly be deemed physical and astronomical, apart from those which may be termed photographic, which, indeed, are only of a secondary, and less important character.

The recent investigations of Huggins and Lockyer on the sun's envelope, show that it is not necessary that an eclipse should take place for the observation of these peculiar and hitherto mysterious prominences, the spiral form or rotary motion of which remind us of those similar forms of nebulae, which Lord Ross has so well delineated from actual observation in his six-foot reflector.

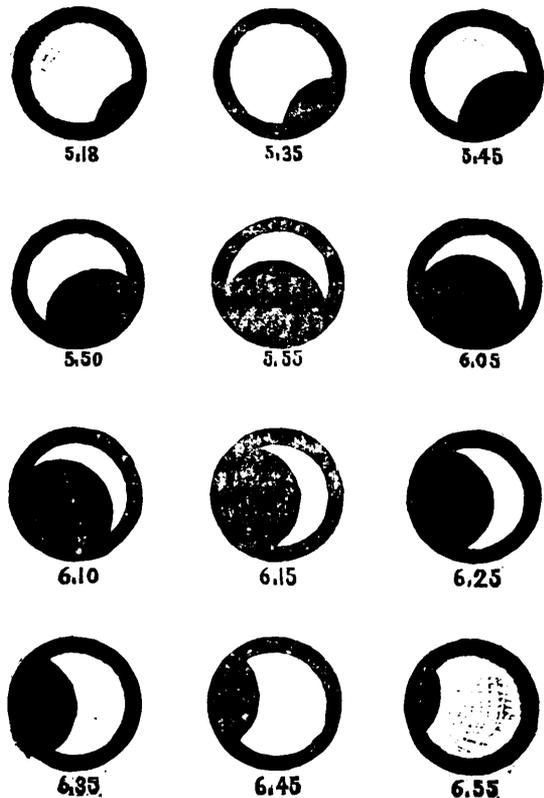
As far back as the eclipse which occurred on the 24th June, 1778,

(1) This Article is substantially that which was communicated by Dr. Smallwood to the "Canadian Naturalist" soon after the occurrence of the Eclipse. The paper had been previously read before the American Association for the Advancement of Science, by Dr. B. Edwards, of Montreal, at Dr. Smallwood's request, and was received with marked respect and gave rise to an interesting discussion upon the phenomena observed.

and was observed at sea by the Spanish Admiral Don Antonio Ulloa, these prominences were seen, and by him described as possessing rotary motion.

The observations here recorded were carried out at the Magnetic and Meteorological Observatory at this place, (Montreal,) latitude 45°31' N., and longitude 4 hours 54 m. 17 sec. West of Greenwich, and 182 feet above the mean sea level. Mr. Black kindly consented to act as assistant and time-keeper, an office he very faithfully and vigilantly fulfilled. Mr. Balch, one of the students in Arts, received some instructions, which he carried out at Tadoussac, while on a visit to that place.

The Observatory possesses no telescope which could be used with advantage: a 42 in. Dollond, 3 in. aperture, with a power of 40, was the only one which was available. A small comet-seeker, of about the same power, possessing a large field, was also brought into requisition. The screen glasses used in both cases during the whole time were red.



The first contact took place at 5 hours 7 min. 41.5 sec., Montreal mean time. The position at the telescope was taken at 5 o'clock, and my assistant was very exact, and marked well the calls and signals previously fixed upon. There was a slight agitation of the sun's limbs a second or two before the first contact occurred: it seemed as though the edge of the sun became suddenly lighted up as it were with rose-coloured prominences, shooting out coruscations of the same rose-coloured light towards the sun's bright disc, which display instinctively led to the strict observance of the position of the first point of contact. The contrast between the sun's bright disc and these rose-coloured protuberances was very distinct and well marked. The colour (as seen through the red screen) reminded me much of the *Strontian* light in a display of fire-works. These prominences increased, seeming to precede the moon's dark edge as a narrow band during the whole time, and preserving the same distinct rose colour.

The magnitude of the obscuration was  $9\frac{1}{2}$  digits, and was on the south side of the sun. The greatest obscuration occurred at 6 hours 6 min. 41 sec. The final contact, which occurred at 6 hours 58 min. 41 sec., was, from its position, hid from view.

Mr. Notman the photographic artist, made, at my suggestion, (as he kindly did in 1860,) some photographs of these appearances. (1)

(1) The light part represents the sun, the dark projections upon its disc the portion of the moon shewing the amount of eclipse at the times marked underneath (less 3 minutes).

The cut was executed by Mr. Delisle of Quebec.