tion, I devised the method described in NATURE (vol. xii. p. 517), showing that the polar and equatorial regions of the solar disc transmit radiant heat of equal intensity to the earth, and that the sun emits heat of equal energy in all directions. Adopting Secchi's doctrine relating to the retardation suffered by calorific rays in passing through atmospheres, viz., that the diminution of energy is as the depth penetrated by the rays, it may also be shown by an easy calculation based on the result of our investigations, that the absorption by the solar atmosphere cannot

exceed one-seventh of the radiant energy emanating from the photosphere.

5. Concerning the plan resorted to by the Director of the Roman Observatory, and others, of investigating the sun's image instead of adopting the method of *direct* observations, I will merely observe that the information contained in the several works of the Roman astronomer furnishes the best possible guide in judging of the efficacy of *image investigation*. Let us select his account of the investigations conducted between the

19th and 23rd of March, 1852. Having pointed out that in these experiments it was impossible to approach within a minute of the edge of the sun, and that during a later observation—date not mentioned—he had approached within a minute, the investigator observes: "But at this extreme limit, even making use of the most accurate means of observation, we find difficulties which it is impossible to overcome completely." In addition to this emphatic expression regarding the difficulties encountered, the author adds: "Moreover, it is impossible to study the edge alone, for the unavoidable motions of the image do not admit of its being retained at exactly the same point of the pile; we have therefore been unable to push the exactness as far as we hoped; and we have discontinued the pursuit of these researches, although the results obtained are quite interesting." (See revised edition of

"Le Soleil," vol. i. p. 205.) It is needless to institute a comparison between a system of which its founder speaks so despondingly, and one which enables us to push our investigations to the extreme limit of the solar disc, admitting of entire zones being viewed at once, instead of only small isolated spots.

J. ERICSSON

The Glow-worm in Scotland

THE Glow-worm is not uncommon on the Island of Cumbrae, Bute-shire. I have seen it there occasionally for the last thirty years (see vol. xiii. pp. 188, 208).
DAVID ROBERTSON
Millport, Island of Cumbrae, Jan. 18

OUR ASTRONOMICAL COLUMN

STAR WITH SUSPECTED LARGE PROPER MOTION.—It would appear by a communication from Prof. Winnecke, Director of the Imperial Observatory at Strasburg, that the large proper motion exhibited by a comparison of Argelander's positions of the ninth magnitude star, No. 11237-8 of Oeltzen's catalogue (southern zones) with Taylor's observations at Madras in 1838 or 1839, to which reference was lately made in this column, does not really exist, there being evidently an error in Taylor's mean place for 1840 given at p. clxiii. of vol. v. of the Madras Observations. Prof. Winnecke finds that the differences of right ascension and declination between this star and Oeltzen 11226, are sensibly the same as at the time of Argelander's observations (1851), and the latter star is known to have but very small, if any, proper

motion. Taylor's star must therefore be struck off the list of cases of great proper motion lately given.

ATLAS — 27 f PLEIADUM.—A very interesting observation was made at Strasburg on the occasion of the occultation of this star—a Struve's *difficillima*—on the 7th of the present month. As we recently stated, this star does not appear to have been seen double since the last Dorpat observation in 1830. On the 7th inst., however, Herr Hartwig observing at Strasburg with an excellent Fraunhofer, of 42 lines aperture, power 159, remarked that the star did not disappear instantaneously; after the principal mass of light had vanished there remained a luminous point for about six-tenths of a second, a circumstance which favours the duplicity of the object, notwithstanding the failure of recent efforts to divide it. It brings to our recollection Burg's observation of the