some months past, a fact of which the members of the British Association may take advantage this year. It is now Scotland's turn. W. H. C.

Ophrys muscifera

ON the afternoon of June 2, 1878, I observed some new facts, which, I think, are of importance in elucidating the hitherto mysterious fertilisation of the Fly-Orchis. In sunny weather and under normal conditions the labellum secretes fluid, and a broad central longitudinal stripe of its surface is covered with small drops. Of fifty fresh flowers I found the labellum in thirteen covered with drops, in twenty-five shining with adhering moisture, in twelve without any conspicuous trace of fluid. The two small shining projections on each side of the base of the labellum (the sham-nectaries of Sprengel) were quite dry in all the flowers. In one flower I saw a fly (Sarcophaga sp.) sitting on the labellum and licking the drops. Its head was directed towards the base of the labellum. On my approaching it flew away before having reached the sham-nectaries, and the flower visited by it was found without pollen on the stigmas, and with both pollinia in their cells. Nevertheless, it is most probable that this fly, if not disturbed by my approach, would have stepped forward on the labellum, and, trying one of the sham-nectaries, would have removed one of the pollinia and perhaps transferred to the stigma of another stem, in the manner described by Charles Darwin ("Fertilisation of Orchids," p. 47).

For observing the fluid secreted by the labellum it may be essential to examine plants in their native habitats, not plucked ones. HERMANN MÜLLER

Lippstadt

The Jura

IN the midst of the enjoyment of quiet and beautiful scenery I cannot refrain from writing, in the interest of geology, to attract attention to the facilities for the study of the Jura range afforded by a railway recently opened from Bâle, *viâ* Délémont and the Münster Thal, to Bienne. It crosses the range at, relatively to the anticlinal, a considerable angle, necessitating no less, as I am told, than twenty-five tunnels great and small (I did not count them myself).

Consequently, in a short morning's railway ride the traveller sees a vast deal of Jurassic structure, added to which the Münster Thal, formerly a rather tiring day and a half's drive, is replete with rock, forest, and pasture scenery of very great beauty.

Travellers thus crossing the Jura on their way to the Alps and returning from Lausanne by Vallorbes to Paris, will thank me, I think, for pointing out what, if only from a scientific point of view, are two recently-developed routes, far more interesting than the customary approaches to this land of wonders. I repress poetic and mountaineering sympathies.

Pension Mounoud, Veytaux-Chillon, Canton Vaud, June 21 MARSHALL HALL

THE TRANSIT OF VENUS PHOTOGRAPHS[1]

THE photographs which have been measured were taken with the five photoheliographs made by Mr. Dallmeyer for the Transit of Venus expeditions, on "patent plates" 6 inches square, the images of the sun being very nearly 3·9 inches in diameter. The dry process of Capt. Abney was used throughout.

The measuring instrument, the determination of the errors of its glass millimeter scale, and the method of obtaining the optical distortion of the photoheliographs, have already been described in the Society's *Proceedings*. It has been found by an elaborate investigation that the lines of equal distortion were sensibly circles concentric with the centre of the field. The actual correction for distortion for that zone of the field in the points to be measured generally fell, was exhibited on the board, and was almost identical for all five instruments.

Before commencing the measures of a negative, the position of the line of centres was marked upon the film by a simple mechanical process. This operation has been performed independently by Mr. Burton and myself, with no sensible difference. I have paid no attention to the marks left by Mr. Burton on the plates, and found that my own coincided with them in direction.

In placing the negative in the instrument the circular carrier was turned about until the line of centres was truly parallel to the direction of the sliding motion of the microscopes.

When the negatives are placed under the microscope with an amplification of only five or six diameters, the limbs of both planet and sun, even those which are pretty sharp to the unaided eye, become extremely indistinct, and the act of bisecting a limb with the wire or cross of the micrometer is mere guess-work. The deposit of silver fades off gradually to nothing, and the denser the film the broader generally is the zone of fading off and the more uncertain the measures. In many cases the difficulty is aggravated by ruggedness due to atmospheric disturbances, but the smooth and gradual fading off is the chief cause of uncertainty.

There is only *one* really sharp picture in the whole collection, including the Indian and Australian contingents, and that is one of Capt. Waterhouse's wet plates, taken at Roorkee with a Dallmeyer instrument precisely similar to the others.

It should be remarked that in these instruments the artist has attempted to unite the photographic and visual foci on the collodion film. No doubt some sharpness of the photographic image was thus sacrificed, but this has little or nothing to do with the unfortunate failure of the photography generally.

Each photograph has been measured six times by Mr. Burton and six times by myself. I am not able to include in my series of measures all the photographs measured by Mr. Burton, for the reason that when some of them were viewed through the microscope I could see nothing to bisect, either from the extreme faintness of the film, or from its too gradual fading off.

Mr. Burton generally employed a cross of webs, but I have preferred a single very fine web, the breadth of which was eliminated in the mean by the mode of bisecting.

It had been suggested that the measuring instrument should possess the power of rotating the sun's image about a mechanical centre. This would be useful in some cases of rugged limbs when the sun's image was not rendered elliptical by refraction, but in my opinion would make no material difference in the accuracy of measurement. The rotation could only be applied to the limbs of the sun, whereas, perhaps, the greatest difficulty had been at the limbs of the planet.

From the measures, corrected for distortion, were obtained the photographic diameters of the sun and of *Venus;* the former presumably enlarged, the latter diminished by irradiation in a sensibly equal degree. The sum of the measured diameters in millimetres was compared with the sum of the tabular diameters, subject to errors, for the scale value, and thus every photograph furnished its own scale.

The measured distance of centres affected by errors of semi-diameter was then compared with the tabular distance affected by errors of parallax, right ascension, and north polar distance. From each photograph was formed an equation involving all the unknown quantities, of which the errors of parallax and of semi-diameters were the more important.

The rigorous solution of the equations resulting from Mr. Burton's measures is,

$$\begin{aligned} \text{Mean solar parallax} &= 8''\cdot165 - \cdot209\,(dR + dr) \\ ,,\ d\ \text{R.A.} \ \ldots &= +\ 5\cdot38 + \cdot287\,(dR + dr) \\ ,,\ d\ \text{N.P.D.} \ \ldots &= -\ 5\cdot10 - \cdot882\,(dR - dr). \end{aligned}$$

The parallax deduced being absurdly small—altogether inadmissible, indeed—the Astronomer-Royal suggested that the quantity $(dR+dr)$, or the sum of the corrections to the tabular semi-diameters, should be considered the

[1] Paper read by Capt. Tupman at the meeting of the R.A.S. on June 14, on the measurements of the Transit of Venus photographs.