

St. Moritz lies on the northern slope of a valley running from south-west to north-east. At the beginning of the observations the opposite slope was buried in snow, but the northern slope both above and below the point of observation was almost free from snow. Thus the most brightly illuminated part of the ground surface was of a dull brown or gray colour. Under these circumstances, the reading was about  $50^\circ$  in the middle of the day, being a little higher earlier and later, viz. about  $52^\circ$  at 10 a.m. (date October 21 and 22). These readings, as well as those mentioned below, refer to the highest point of the sky, which is distant  $90^\circ$  from the sun, and were taken when the whole sky was free from cloud. On October 26, after a five-inch fall of snow, the reading was  $41^\circ$  at 10.15 a.m.

By October 29 most of the fresh snow had gone, and I found at 11.40 a.m. the reading as high as  $48^\circ$ . After this we had several feet of snow, and at 12.50 p.m. on November 13, the reading was again  $41^\circ$ . Each of these readings is the mean of four, and I find two readings of the same thing seldom differ more than  $2^\circ$ . Hitherto I have not been able properly to evaluate the readings of my instrument in absolute measure, though I hope to do so later. But to gain an approximate idea of their meaning, I have calculated the polarizing power of the two piles on the assumptions—first that Fresnel's laws of the reflection of polarized light are accurate, and secondly that the index of refraction of my plates is 1.52. We may consider the light from the sky as consisting of two parts completely polarized, one in the plane of the sun, and the other perpendicular thereto. The ratio of these parts is .376 for the reading  $40^\circ$ , and .271 for the reading  $50^\circ$ . Again we may divide the light into a part unpolarized and a part completely polarized in the plane of the sun. The ratio of these parts is .546 for  $40^\circ$  and .428 for  $50^\circ$ . So it seems fair to conclude that the light reflected from the fresh snow was sufficient to increase the unpolarized part of the sky light by more than a quarter.

JAMES C. MCCONNEL.

St. Moritz, Switzerland, December 10.

#### The Ffynnon Beuno and Cae Gwyn Caves.

I WILL answer Dr. Hicks's question in as few words as possible. Nothing is to be gained by terming me a "highly prejudiced" observer, or by saying my views are of "no consequence" and "not worth anything." Your readers can form their own conclusions on these points. I am not "highly prejudiced" against, neither have I any "bias against," the existence of pre-Glacial man or of his "migrations"; on the contrary, I favour these subjects.

I did see the section of drift exposed at the Cae Gwyn Cave, and I can hardly describe it (from my own point of view) without giving offence. My view is this: the section showed nothing but rain-wash derived from the closely-adjointing non-Glacial drift. The section showed a re-made deposit, horizontally stratified, and with stones resting on their flat sides. No doubt there were Glacial stones in the rain-wash, derived from the ever-shifting post-Glacial marine drift close by; the latter being merely a re-laid Glacial drift. Stones with Glacial scratches may be found in the lower gravels of the Thames.

To me, the caves and their surroundings are in the highest degree suspicious, and in size insignificant, and not comparable with large and typical caves. They are small and painfully narrow tortuous passages only, on a hill-side, and close to the surface. The lower cave is furnished with a very large hole, opening up to the surface just above; and the upper cave had at one time a similar opening. The post-Glacial drift above is always on the move, and every shower of rain brings it down with its derived stones.

Since writing to NATURE, in November 3, I have referred to some of the papers published on these caves. I turned first to the list of mammalian remains, only however to find that the animals (like the implements) are entirely characteristic of the most recent post-Glacial deposits. Even near London we get in gravels of no great comparative antiquity the bones of *Elephas antiquus*, but in the caves merely *E. primigenius* is found. As regards antiquity, the animals no doubt overlap at both ends of the scale, but their meaning, as found in these caves, points in one direction only, and that is to the most recent and not to the most remote of Palæolithic times. None of the cave mammals are characteristic of pre-Glacial deposits.

It would seem that Dr. Hicks does not realize the nature of Dr. John Evans's criticism. La Madelaine is the newest of caves, and represents the most recent of Palæolithic times: it is

a kind of connecting link between Palæolithic and Neolithic times. Therefore, if Dr. Evans's criticism is taken with mine, the two clearly prove that there is a distinct chronological value in the classification, not that there is "no chronological value" as concluded by Dr. Hicks. Dr. Hicks also appears not to realize the fact that river-drift and cave implements do not only differ in roughness and abrasion but in style. The cave men used different implements from the river-drift men, they were changing from savagery to barbarism. If Dr. Hicks produces implements made by pre-Glacial men, he must show us something obviously older than the oldest river-drift tools, not fall back upon refined tools which are, to re-quote Dr. Evans, "precisely like many from the French caves of the reindeer period, such for instance as La Madelaine." If Dr. Hicks abandons his scraper, he is still in no better position, for his finely re-trimmed knife and the implement in the British Museum are identical in age and character with it. So are the flakes: the one with long narrow facets is characteristic of the latest, not of the earliest work. So is the pointed and drilled bone. No drilled bones have been found in moderately old river-gravels, and what is more, no instrument suitable for boring a small hole through bone has ever been found in such a gravel. Drilled bones and small flint drills belong to the very latest of Palæolithic times. In the remains of my own collection of Palæolithic implements I have here over a thousand examples of the major class, and an equal number of minor forms illustrative of the development of knife and scraper forms, but they give no support whatever to Dr. Hicks's conclusions; they all, in fact, point in a diametrically different direction. I am acquainted with Prof. Prestwich's views, and I believe I was the first person to find implements in the highest terraces of the Thames Valley; but I do not see that Prof. Prestwich's conclusions have any direct bearing on the Ffynnon Beuno and Cae Gwyn caves.

I do not suppose that any opinion of mine will influence Dr. Hicks, and I have no wish to influence him or any other observer. I merely wish to put on record the fact that, after many years' experience amongst drifts, and implements, and fossil bones, my conclusions are entirely opposed to Dr. Hicks's. Dunstable.

WORTHINGTON G. SMITH.

P.S.—Since the above has been in type, I have seen the report in last week's NATURE (p. 166), but I prefer to let my letter stand just as written before the report was seen by me. Prof. Hughes has cut away the geological and palæontological supports; I shall be content to resist the idea of the pre Glacial age of these caves on purely archaeological grounds.—W. G. S.

#### The Planet Mercury.

THE planet observed on the mornings of December 7 and 9 by your correspondent "G. F. P." (NATURE, December 15, p. 151), was probably not Mercury but Jupiter, as these bodies were near together at the time, and the latter was by far the brightest and most conspicuous. The circumstances, described by "G. F. P.," under which the object was noticed render it certain that it could not have been Mercury, for the latter was decidedly small, and might have been easily overlooked on the several mornings I saw it early in the present month. Jupiter, on the other hand, was very bright and plain, and might easily attract attention in the way stated by your correspondent. On the 9th instant the two planets were about  $3^\circ$  apart, Jupiter being situated to the west of Mercury.

Had "G. F. P." really observed the latter planet, he would have instantly remarked its half-moon phase in his  $3\frac{3}{4}$ -inch telescope, and must have mentioned Jupiter, as well as Venus, as visible at the same time.

There is no difficulty in observing Mercury with the naked eye if the planet is carefully looked for in the proper spot, at the times of his eastern elongations in the first half of the year and at the western elongations in the last half. I have seen the planet on certainly more than fifty occasions. In May 1876 I noticed Mercury on thirteen different evenings. Sometimes the planet is quite conspicuous in the twilight as a naked-eye object.

W. F. DENNING.

Bristol, December 16.

#### Meteor of November 15.

IN NATURE of December 1 (p. 105) Mr. B. Truscott writes of a wonderfully fine meteor seen at Falmouth on the night of Tuesday, the 15th ult., and asks in effect if it was seen by other