

increase of $\frac{1}{300}$ which takes place at the maximum eccentricity is competent to raise the mean temperature of the earth by nearly 2° F.; and this increase of heat being maintained for thousands of years could not fail to affect the position of the lines of perpetual snow. Whether there would be an actual increase of 2° F. in the mean temperature I need not discuss, because as regards the formation and dissipation of snow and ice the essential element appears to be the quantity of heat absorbed in the course of the year.

13, BELVEDERE PLACE, DUBLIN, Feb. 27.

W. H. L. MONCK.

ON THE CORRELATION OF THE GRÈS DE BELLEU WITH THE
LOWER BAGSHOT.

SIR,—In discussing Prof. Prestwich's new correlation of our Eocenes, I could not help calling attention to the fact that while in his table the position of the Grès du Soissonnais would be below the London Clay, its Flora coincided with that of our Lower Bagshot at Alum Bay, above the London Clay. This apparent anomaly is capable of explanation.

The only comprehensive publication on the Flora of the Paris Basin is by Watelet, and though his determinations possess little interest, the illustrations are sufficient in most cases for comparison. The plants represented therein are mainly from Sézanne and Belleu, with a few from other localities. The precise age of the *travertins* of Sézanne is, in the absence of direct stratigraphical evidence, an unsolved problem, but the aspect of its flora is so ancient that it is difficult not to agree with Saporta, Schimper and others who place it in the Pal-eocene. It is in fact allied rather to the newest Cretaceous floras of Europe than to any Eocene flora, and its nearest representative in our country is the flora of Ardtun in Mull. The few plants from the Grès "*intercalés dans les Sables de Brâcheux*" and from the Lignites are insufficient to tell us anything, but those from the *Calcaire Grossier* are well-marked Bournemouth species. It is with the vast majority, however, from the Grès de Belleu, that we have to deal, and these we cannot hesitate in correlating with our Lower Bagshot of Alum Bay. The forms common to the two are a Fern, the Palms, all those highly characteristic forms called *Comptonia* and *Dryandra*, the large *Ficus Bowerbankii* and other species of *Ficus*, *Laurus*? *Salteri*, *Quercus* or *Castanea eocenica*, a supposed *Cinnamomum Larteti*, the flower called *Porana*, leaves of *Acer*, and bean-pods of *Acacia* and *Cesalpinia*. The *Podocarpus elegans*, *Marattia Hookeri*, and particularly the *Aralia primigenia*, so characteristic of Alum Bay, are absent, but the two former are equally absent in the corresponding beds so close at hand as Studland. On the other hand, the Belleu beds are far richer in the trinerved leaves known as *Daphnogene* and *Cinnamomum*. Such differences are, however, always met with in separate patches of plants, even if on precisely one horizon and near each other, and do not suffice to affect the main fact, that the facies of the floras is as a whole the same, and very different indeed to any flora above or below them. I have had large series of the plants from both

localities pass through my hands, and the similarity is beyond all question. Now these plants are found in the Grès "*supérieurs aux lignites*." The Lignites themselves rest in the neighbourhood of Paris on mottled clay, absolutely identical with that of our Reading beds, and are the undoubted equivalents of the Woolwich series, consisting of stiff bluish clay with blackish bands and some fossil wood, exactly as in the Croydon cutting. Immediately on their eroded surface we find the calcareous Bracklesham beds with *Nummulites lævigata*, so that there is a hiatus in the Paris area represented in our series by the Oldhaven, London Clay, and Lower and Middle Bagshot.

We may place the Grès de Belleu anywhere in this interval, and the only reasonable conclusion to be drawn is that they do not belong to the Soissonnais series at all, but lie on it unconformably, or only apparently conformably on it, just as our Lower Bagshots lie on the London Clay at Alum Bay. In this case, while Prof. Prestwich's correlation of the "London sands" or marine so-called Lower Bagshot with the sands of Cuise-la-Motte and the Upper Ypresian is unaffected, the totally distinct fresh-water and true Lower Bagshot will also have its equivalent in the Paris Basin.

The suspected connection between the Floras of Alum Bay and Sheppey is strengthened by the flora of these Grès, for I have recognized quite a number of casts of fruits in them which are identical with Sheppey forms.

J. STARKIE GARDNER.

LARGE IRISH BOULDERS.

SIR,—In the Co. Galway, as mentioned in my Geology of Ireland, p. 248, also in the Geol. Survey Memoirs, the boulders are larger and more numerous than elsewhere in Ireland, much larger than any I have seen in the Co. Wicklow. The Ballagh Stone, a few miles N.W. of Galway, is about $21 \times 24 \times 20$ feet. Clogh Currill is as large, and very like one of the ancient castles, while many others are much larger than the ordinary cabins of the country; they are all granite blocks. Huge limestone blocks once existed on the sandstone ridge near Ballingarry, Co. Limerick, but I am afraid that now they are all quarried away and burnt into lime (Geol. Survey Mem.). In the Co. Waterford Du Noyer drew attention to the huge conglomerate blocks, some of which he figured (Geol. Survey Mem.). The largest I saw was Clogh-na-Kilcluney, to the S.E. of the Comeragh Mts. One nearly as large is Clough-lowrish, figured by Du Noyer. In the Co. Wicklow, Wyley seemed to consider the largest to be that of Boleynass, near the Devil's Glen. Kath boulder, near the Bush Railway Station, Co. Louth, is $32 \times 20 \times 9$ feet (Geol. Survey Mem.). In this district there are many whinstone blocks of large dimensions. S. W. of Ballina there are many erratics referred to years ago by Sir R. Griffith and Archdeacon Verschoyle. One granite block N.W. of Carrowmore has been calculated to exceed 415 tons in weight (Geol. Survey Mem.).

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