

CORRESPONDENCE

SEA-LEVELS IN MALAYA

SIR,—In his recent book on the Pleistocene Period, Dr. F. E. Zeuner, writing on fluctuations of sea-level, says (1945, p. 241): “Scrivenor (1943, p. 122) found evidence for a sea-level of about plus 50 feet O.D. in Malaya, and less ambiguous evidence for one at plus 200 feet.” I am writing this letter hoping to stop the circulation of an error comparable with that of Stanislas Meunier (1890) about tin-ore alleged to have been deposited from a hot spring, which was finally demolished by Dr. W. R. Jones (1914).

There is no doubt about an approximate plus 50 feet sea-level in Malaya. The best evidence I know is an old beach with coral and marine shells at the north end of Gunung Geriang, a limestone hill in Kedah, six miles inland. The position regarding a plus 200 feet level is, however, very different, and far from “less ambiguous”. The evidence was the supposed occurrence of marine sponge-spicules in rhyolite-ash in Perak that were the subject of papers by me in this *Magazine* (1930, 1943), of a letter from me (1942), and of a paper by Dr. K. P. Oakley (1940). In my 1943 paper I recounted the unusual sequence of events that had led up to it. Putting aside for the moment all the doubtful bodies in the ash, there were in it unquestionable sponge-spicules that Dr. Oakley had not mentioned in his 1940 paper, although he listed the slides containing them as part of the material on which it was based; and later he said that these spicules must be marine because among them were spherasters, which were unknown in freshwater sponges. I had also found monaxons and spherasters in the mud of Lake Chini on the other side of the Malay Peninsula, and said that if spherasters only occur in marine sponges then these latter must be marine, and showed a rise of plus 200 feet in sea-level; but there were no marine organisms associated with them. My original idea about the bodies in the ash (1930, p. 387) was that they were of freshwater origin because of their position and association with freshwater diatoms, and in my 1943 paper I expressed doubt whether spherasters must postulate marine origin (p. 13).

Not being an authority on sponges, but having relied on others for guidance, I do not blame myself for not having found before 1943, papers showing that both spiny and smooth spherical spicules like those in the Perak ash do occur in freshwater sponges. By a happy chance I found in the biological laboratory of Bedford Modern School Ward and Chandler's *Freshwater Biology* (1918), with a chapter by E. Potts on sponges and figures of both spiny and smooth spheres. A bibliography enabled me to refer to a much earlier publication by Potts (1887), in which he wrote of *Spongilla fragilis* (p. 201): “Upon nearly every slide of prepared gemmules or spicules may be seen a few abnormal spherical forms bristling with spines and reminding one of the pollen of Malvaceous plants or the ‘calthrops’ in sometime military use.” Plate vii, fig. vi, shows globular and discoidal masses frequently seen in *Spongilla aspinosa*. I have found further support for freshwater spiny and smooth spheres in Annandale (1911) and Weltner (1901 and 1913). In the earlier paper Weltner says about silica-pearls, which resemble the

smooth spheres in the Perak ash : " I have seen these spheres especially frequently in a full-grown *Ephydatia fluviatilis* which I collected on 12th April, 1891, in the Hellensee in the north of Berlin (trans.)." I refrain from detailing all the evidence I have found to save your space. These spiny and smooth spheres were regarded as abnormal or pathological ; but so little is known of tropical freshwater sponges that they may be commoner than was thought ; moreover, whatever may be their origin and whatever the exact term that should be applied to them, the important fact is that they occur at all ; and in my opinion the spiny spheres show that the spherasters in the Perak ash and the Lake Chini mud are not necessarily of marine origin. The association of freshwater diatoms and the absence of any obviously marine organisms in either case make me feel sure that they are of freshwater origin. I hope that someone will be able to carry on this work by looking for living sponges in Lake Toba (North Sumatra), in Lake Chini, and the swampy River Bera in Pahang.

These sponge-spicules are therefore no evidence for a plus 200 feet sea-level in Malaya ; but in the light of the mass of interesting information Dr. Zeuner gives, there is much to discuss about previous sea-levels, and I hope to return to the subject later.

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