the most interesting is the one from the Bruxellien, to which he applies the name *Pseudotrionyx*, and classes in the *Chelydridæ*. This form is characterized by the absence of horny plates and the presence of a scute-sculpture, like *Trionyx*, but was apparently furnished with a complete series of marginal scutes, while the plastron, although only imperfectly united to the carapace, is much more complete than in the latter. This genus evidently forms a connecting link between the typical *Trionychidæ* and those Tortoises in which the shell is complete; M. Dollo attaches more weight to the apparent completeness of the marginal scutes than to the sculpture of the scutes and the absence of horny plates, and therefore separates the genus, together with *Anostira* and *Apholidemys* of Leidy from the *Trionychidæ*; but we cannot help thinking, from the variations in the former respect between *Trionyx* and *Emyda*, that the arguments are at least as strong in favour of the opposite view, and for taking the presence of horny plates as a characteristic of the *Emydidæ*, in the sense in which that term is used by Dr. Sclater.

The second genus, *Pachyrhynchus*, is from the Lower Eocene, and is referred to the *Chelonidæ*; it is represented not only by the typical Belgian *P. Gosseleti*, but probably also by the three forms from the London Clay described by Professor Sir R. Owen under the names of *Chelone longiceps*, *C. planimentum*, and *C. trigoniceps*. The genus is distinguished from *Chelone* by the great length of the mandibular symphysis; by the triangular form, thickness, and slight depression of the palate; the depth of the latero-temporal notches; the separation of the nasals; and by the posterior nares being separated from the anterior ones by long narrow channels, and by opening on the posterior third of the basal aspect of the cranium. These differences M. Dollo is inclined to regard as of rather more than generic value.

M. Dollo is to be congratulated on this paper, and especially on the careful diagnosis of characters distinguishing all his work.

R. L.

CORRESPONDENCE.

THE VOLCANIC ERUPTION OF NEW ZEALAND.

Sir,—Almost every geologist will have read the deeply interesting accounts and speculations by Mr. Archibald Geikie and Dr. Hector in "Nature," and of Mr. R. Etheridge, jun., in this Magazine. As the district affected is one likely to be subjected to a careful investigation, may I be permitted to draw attention to a few facts of important bearing on vulcanological science that should be cleared up. In my paper on the geology of Vesuvius and Monte Somma and in other communications, it was pointed out that after a long state of quiescence of a volcano, the subsequent eruption should be of the *explosive* or *plinian* type. That is to say, the stony products should consist essentially of pumice due to the length of time that

the magma had remained in contact with aquiferous strata, gradually absorbing water, and consequently the impossibility of the outflow of lava until all the water-saturated magma has been ejected. In relation with this the presence of the three divisions of the ejectamenta; the lowest or first being a very vitreous pumice, except for the presence of pre-eruptive minerals such as the felspars, amphibole, mica, and magnetite of first consolidation; the second or middle division being far more microlithic, with the presence of pyroxene or other eruptive or post-eruptive formed minerals; and the third or upper division consisting of ash due to the loss of cohesion within the magma in consequence of the advanced stage of conversion of the glassy part into "formed" or individualized matter.

In many tufas, and especially those formed from the third or upper division of the products of a *plinian* eruption, or of any pumiceous ash, there are an abundance of little pisolitic concretions of great perfection. Scrope has suggested drops of water falling in the dust as the cause of their production. To me they seem rather a segregation similar to what occurs in the felspathic and siliceous glazing cream in pottery manufacture; but there is still much doubt, and observation would be of much value if made on the new ash, as we do not know whether they are formed immediately, or after long exposure and soaking by moisture. One thing should be remembered, and that is, that a few small ones may be inclosed in a larger one, which is not compatible with Scrope's theory.

The next point is the vesicular structure in ashes, which often so well mimics that of lava, that in old decomposed rocks much doubt may exist as to whether a given mass may be a lava or a tuff. I think the drops of rain, suggested as an explanation of pisolites, is the real influence at work in producing these vesicular cavities.

Next, it would be interesting to know whether new cones (or more properly crater-rings) have been formed within the craters of explosion towards the end of the eruption.

Observations on the proportion of the *essential*, *accessory*, and *accidental* ejectamenta should be made in each of the subdivisions of the deposits, and at different distances from the centres of explosion.

Observations of the green and dry wood buried in the pumice would clear up the question as to whether the peculiar lignitization or carbonization to be seen at Pompei, not only in wood, but also in bread, fruit, cloth, grain, etc., is due to burning, baking, or subsequent decomposition. In Pompei neither glass nor lead was fused where buried by the falling pumice. This I have shown to be due to the low temperature of the pumice from the loss of heat in converting liquid or dissolved water into vapour on the relief of pressure during the eruption.

Lastly, search should be made for fulgurites, which have been met with at Pompei.

H. J. Johnston-Lavis.