

discusses the land-ice and submergence hypotheses, and concludes that his observations distinctly strengthen the grounds for believing in a submergence of the land to an extent of not less than 1400 feet.

An Appendix contains details of nineteen mechanical analyses of tills, sands, and gravels, and a bibliography of papers, observations, and theories of the high-level drifts of Moel Tryfaen.

---

CORRESPONDENCE.

---

READE'S THEORY OF MOUNTAIN BUILDING.

SIR,—Mr. Jukes-Browne seems to hold peculiar, not to say exacting, views of the way scientific controversy should be conducted.

Having replied to Mr. Davison's criticisms on a fundamental principle, without a rejoinder from him, though nearly a year has since elapsed, I am now invited to go on answering him until some unnamed but "good physicists" are satisfied. I need hardly say that this is a labour I must decline. At the same time, I am ready to meet fairly any good physicists who are prepared to speak in their own names.

T. MELLARD READE.

March 9th, 1892.

---

ON A FAULT WITHOUT A THROW.

SIR,—The north-western part of the Wirral—the district forming the western horn of Cheshire—is very extensively faulted. The prevailing direction of the faults is north and south, but at places east and west faults are met with. These abut against the north and south faults and are generally terminated by them.

A remarkable characteristic of many of these east and west faults is that although they possess slickensided faces and there is evidence of great movements, there is little or no throw.

A very good example is now exposed near Caldý Grange Grammar School, West Kirby. There is a fine flank exposure of a north and south fault just behind the school. It was described by Mr. O. W. Jeffs in 1887 (Proc. Liverpool Geol. Soc. vol. v. p. 247). He mentioned three east and west faults which terminated against the main fault. Since that time another east and west fault has been exposed and was described by Messrs. Beasley and Lomas before the Liverpool Geological Society in February, 1892. This fault has been traced westwards from the main fault for about a third of a mile, and in one part forms a ridge of fault-rock beautifully slickensided about 6 feet wide and rising like a wall above the surrounding Upper Bunter to a height of 6 to 8 feet.

A transverse section is seen in a little cutting west of the Waterworks, and the beds are continued across the fault without the slightest displacement.

Similar east and west faults have been noticed at Storeton and other places, but, so far as I can ascertain, no satisfactory theory has been advanced to explain their peculiarities.

In the Caldý Grange fault the Keuper has been faulted down against the Bunter. It does not follow that the Keuper would move