

nearly all the Red Crag consists, the oblique layers of sand and shell corresponding to the oblique layers of sand and shingle in beaches. I have seen this structure extending for some distance in a railway cutting through Jurassic sandstone, but there was nothing to indicate that the tidal slope under which it was formed was greater than in the case of the Crag. It may be otherwise for aught I know with the old conglomerates, for I am not acquainted with them.

S. V. WOOD

DR. CALLAWAY points out that there would be nothing in the nature of the older deposits to indicate the existence of excessive tidal action. One point, however, suggests itself to me in connection with the increased force of winds and currents, which must necessarily have accompanied the high tides and more rapid rotation of earlier epochs.

While the general nature of the Palæozoic strata indicates that they were deposited along the margins of continental or insular masses of land, there is a remarkable absence of estuarine conditions in the older Palæozoic rocks. Indeed, except in some portions of the Carboniferous deposits, in which beds of coal occur together with such marine species as *Goniatites* and *Aviculopecten*, there seem to be no beds of Palæozoic age which can with certainty be referred to an estuarine origin. The earliest plant-remains, such as *Eophyton*, from the Fucoidal sandstone of Sweden, are probably marine algae, which currents might transport to great distances from land.

Now considering the frequency with which delta deposits occur in Neozoic strata, the almost entire absence of them during the immense earlier periods is a fact which seems to require some explanation.

Now it seems highly probable that excessive tides would have disturbed even inland seas (if any existed at that time) which are most favourable for the accumulation of deltas, and that strong marine currents would scour out even those sheltered estuaries, which, with moderate tides, would have been, like those now existing in the Mediterranean, comparatively free from tidal action. The delta of the Ganges is nearly the only instance of a great river delta forming in spite of tidal fluctuations; but, although the average height of the tide here seldom exceeds 10 feet, even this moderate amount is sufficient to prevent the delta from pushing its way far out to sea.

Another point which must not be lost sight of, in considering the influence of stronger oceanic currents, is the greater distance to which the coarser materials might be carried out to sea; so that it would not necessarily follow that those deposits, which we are accustomed to regard as evidence of the proximity of land, are of littoral origin. For with strong currents, even coarse grits and conglomerates might be widely distributed over the ocean floor.

J. VINCENT ELSDEN

Storrington, February 25

Palæolithic Man and Löss

I HAVE just been reading Geikie's "Prehistoric Europe," and am much interested by his digest of Dr. Nehring's discovery at Thiede and Westergehn. At p. 150 it is stated that "the lower beds at Westergehn have yielded traces of man such as flint flakes, charred wood, and heaps of smashed and crushed bones of various animals." And further on, "that they could not have come from any distance, an inference which is in keeping with the generally unrolled character of the stones and the state of preservation of the fragments of wood." At p. 151 he describes another interesting find by Count Wurmbrand near Zeiselberg. "At that place the undisturbed löss yielded a rich deposit of bones underneath which occurred a blackish stratum abounding with fragments of charcoal and worked flints." From the general appearance presented by the human relics and animal remains (mammoth, rhinoceros, reindeer, &c.) "it was evident that they could not have been transported from any distance."

An idea seems to be conveyed here that the remains in both cases had been carried by water and redeposited, but it appears to me that they have been found just where Palæolithic man left them. From the experience gained by eleven or twelve years' study of the sand-hills round the northern coast of Ireland and the finding of blackish layers containing flint flakes, implements, and broken bones of Neolithic age, I believe Dr. Nehring and Count Wurmbrand have hit on old land surfaces on which Palæolithic man lived; that the fragmentary bones have been scattered about by him after using the flesh for food; and that

the unrolled stones can be accounted for by supposing that he carried them to the spots where they were found.

The blackish layers in the sand-hills of the Irish coast, which I have found to contain flint flakes and implements, are covered with a great thickness of sand, and I have on several occasions expressed my opinion that this covering was accumulated slowly, first by the wind depositing the sand, and secondly by the grass retaining what it could shelter, the increase in thickness being dependent on the rapidity of vegetable growth. I first stated my views on this subject at the Belfast meeting of the British Association in 1874, and since in several published papers (see *Journal of the Anthropological Institute*, vol. vii. No. 3, and ix. No. 3; *Proceedings Royal Irish Academy*, 2nd series, vol. ii. No. 3). All the evidence given by Sir Charles Lyell in "The Antiquity of Man," and by Dr. Geikie in "Prehistoric Europe," in reference to löss (löss) clearly points to its being in its present condition an accumulation also produced by the joint agencies of wind and vegetation, and I have no doubt, from reading of Dr. Nehring's and Count Wurmbrand's finds, that during the slow and steady growth of the löss, many Palæolithic land surfaces and sites of camps or dwellings may have been buried up, and may now occasionally be found in an undisturbed state. Newer surfaces with included remains may also be found higher up, as in every stage the valleys would be the most desirable places to live in.

At p. 165 Dr. Geikie mentions a theory advanced by Baron Richthofen as to the formation of löss in China. I express no opinion as to the first production of the fine material, but as to its deposition by the wind afterwards. I believe he was on the right track. In the case of the sand-hills I have studied, the portions covered by grass are still becoming higher. Would it not be interesting to find out if the löss, in any protected part, is also increasing in thickness at the present time?

Cullybackey, Belfast, February 18 W. J. KNOWLES.

Pronunciation of Deaf Mutes who have been Taught to Speak

THE letter of Prof. A. Graham Bell in NATURE (vol. xxv. p. 124) is hardly conclusive of the matter. The evidence he adduces, though exceedingly valuable, is chiefly of a negative character.

M. Hément states as a matter of his own personal observation, that deaf-mutes who have been taught to speak, do so with the accent of their native district. M. Blanchard denies this because, according to him, the pronunciation of deaf-mutes does not possess that quality of accent distinguishing human voices. Mr. Bell agrees with the conclusion at which M. Blanchard has arrived, but denies the data on which the conclusion is based. Mr. Bell, in an examination of at least 400 deaf-mutes, has never noticed the tendency observed by M. Hément. "It is true," he adds, "that in a few cases dialectic (? dialectal) pronunciations are heard, but it always turns out upon investigation that such children could talk before they became deaf. The peculiarity is undoubtedly due to the unconscious recollection of former speech, and cannot correctly be attributed to heredity." M. Hément, however, reaffirms the accuracy of his own observations, and declares himself unable to conceive how in losing the case of speech, deaf-mutes should retain the unconscious memory of accent.

Prof. Graham Bell's theory will certainly not explain the case of Daniel Fraser, referred to in my previous letter, who is expressly stated to have "continued deaf and dumb from his birth till the seventeenth year of his age (*Philosophical Transactions*, No. 312). This case is all the more striking since the narrator mentions his inheritance of the Highland accent in a purely incidental manner.

I am fully aware of the weight to be attached to the evidence of an observer so able, precise, and accurate as Prof. Graham Bell, but that he has not noticed the peculiarity in question can hardly be held to invalidate the independent testimony of those who, in Paris, Madrid, and Inverness, declare that they have observed it. For my part I see no reason to doubt either their accuracy or their good faith.

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P.S.—It may be worth noting that the full discussion of the subject has appeared in the *Comptes rendus*, the current volume of which contains three notes by M. Hément, one by M. Blanchard, one by Mr. Bell, and one by the present writer.