

- Professor H. Coquand—The Cretaceous Strata of England and the North of France, compared with those of the West, South-west, and South of France, and the North of Africa.
- J. Evans—On some Cavities in the Gravel of the Valley of the Little Ouse. (See *ante*, page 443.)
- Dr. E. Crisp—The Skeleton of a Fossil Whale, recently found on the Eastern Coast of Suffolk.
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CORRESPONDENCE.

MR. WITCHELL ON THE COTTESWOLD VALLEYS.

SIR,—For many months past I have not troubled you with any communication on the subject of denudation, as I have been almost constantly travelling in the hilly districts of Devonshire, the Welsh borders, and North Wales. Since I last wrote, very little on this subject has appeared in your Magazine, excepting an article by the accomplished disciple of Playfair, Mr. Geikie, who advocates doctrines for which few geologists would be prepared, and which are at open variance with the maxim (hitherto regarded as established) laid down by Mr. Whitaker,¹ that in comparison to the huge

¹ See *GEOL. MAGAZINE* for Oct. and Nov. 1867, Vol. IV.

and “continental” denudations and removals of rock by the sea, “the present irregularities of the earth’s surface are mere scratches;” and an abstract of a paper by Mr. Witchell on the Denudation of the Cotteswolds.

Mr. Witchell believes that the combes of the Cotteswold valleys have been formed by the springs they contain. Before, however, the occurrence of springs in combes can be regarded as furnishing any evidence that the combes were excavated by them, it is necessary that the following questions should be answered. Do the springs along a line of escarpment occur generally at intervals such as might lead one to expect to find them in the parts which run back into combes? Is there sometimes more than one spring in a single combe? Do springs in combes occur on the sides, at the back, at the mouth, or in apparently accidental positions? [I once saw a subterranean stream, not far from Crickley, flowing out of the side of a short valley, in such a way as to show that it could have had little to do with the excavation of the valley.] Are not the springs in some combes the indirect result of the surface-drainage of the areas of the combes? Is it a fact that *all* the Cotteswold combes contain springs? Supposing the connection between the Cotteswold combes and springs to be so great as Mr. Witchell asserts, then the dry combes of the Chalk and other districts could not have been formed by springs, for it is as reasonable to believe that springs have broken out in combes after their formation, as that springs have disappeared from combes. With regard to the supposition that the sea would not have selected the parts of escarpments containing springs to hollow them back into combes, it may be remarked that these are the parts which would have yielded most readily to its undermining action, and the parts where coast-slips would have chiefly occurred. I believe that the denudation of the Cotteswold hills (which can only be thoroughly understood by considering it in connection with other districts) has been effected as follows:—Tidal and other currents must have furrowed the original table-land (if a table-land free from considerable undulations ever existed) into shallow passes¹—one side of these passes, owing to its being the *uporop* side, the side exposed to wind, or the side on which currents chiefly impinged, was rendered steeper than the other,—while the sea occupied the passes, coast-slips occurred on the parts moistened and loosened by springs—the sea swept away the slipped débris, cleared out and smoothed the irregular vacancies left by the slips so as to give rise to the curvilinear hollows called combes. The drift on the upper slopes of the Cotteswold valleys is of much the same nature with that on the flat tops of the plateaux. It is just what might have been left by currents, or waves acting under conditions unfavourable to the rounding of stones. In many places it forms an extensive and uniform covering or *lining*, which could not possibly have been left by small streams; while I am prepared to prove,

¹ Both ends of these passes have since been deepened by streams, in many places to a very great extent; for atmospheric denudation is more active in some parts of the Cotteswold district than in any part of South Britain with which I am acquainted.

from a long series of observations, that, in common with other slope drifts in England and Wales, the bulk of it is not a mere disintegration *in situ*, but the effect of lateral displacement in a great measure irrespectively of the form of the ground. D. MACKINTOSH.

BIRKENHEAD, 12th Sept., 1868.

ON THE DISTURBANCE OF THE LEVEL OF THE LAND NEAR
YOUGHAL, ON THE SOUTH-EAST OF IRELAND.

SIR,—In your May number, which has just reached me, I find Colonel Greenwood considers me in “error” when supposing depression of the land necessary to account for facts observed at Youghal; but in the remarks which follow this I fail to see that the author of “Rain and Rivers,” while admitting one of my propositions, proves the other wrong.

If it be granted that as the sea erodes a line of coast *at rest* the beach may travel landward, surely while the sea erodes “the *whole* line of coast,” the peat beneath the travelling beach ought to be eroded also, and dispersed instead of being submerged. The peat under Youghal Bay, however, not having been eroded and dispersed, we may conclude that the land there was not at rest during the submergence of the peat.

But the gist of Colonel Greenwood’s argument lies in his assertion that “the stream or the rain valley cuts its estuary far deeper [how much?] even than low-water-mark,” forming an arm of the sea.

Applied to the case in point, that is to say, that the rain valley excavated its estuary as much lower than sea level as is the surface upon which the first peat was formed, now far out under Youghal Bay. This point must be at a considerable depth, if my memory and information be correct, for I have seen from three to five fathoms water marked upon a chart somewhere about the place indicated by fishermen as the outer limit of where peat is known to occur. To this depth must be added the unknown thickness of the peat, which in parts of Ireland not uncommonly exceeds 20ft. However, taking it at 10ft., we have thus a rain-and-river valley excavated by these agencies to a depth of from 28ft. to 38ft., or, it may be, 40ft. or 50ft., below the level of the sea at low water!

Depression not being admitted, is it not fair to ask whether the beach of that period may have been of this height, and what kept the sea out of the valley before the beach was thrown up by some storm, so that peat could grow behind it? I may also, I trust, be excused for asking, if the stratified sand, gravel, and clay, with flints, which forms Clay Castle Hill, was thrown up to a greater height than 91ft. by storm, or ordinary waves, or otherwise, how does it come to contain sea shells at such a considerable elevation as it does?

I must here confess that “*raised beach*” is not an expressive term for such a local accumulation as that of Clay Castle, and was only used for want of a better. All low ground gradually elevated from the sea would, at one time or another, have formed its beach (as was once remarked to me by Professor Jukes), therefore one locality has no better claim than another to the name, used in a general sense.