

the soil, no matter how slowly or feebly the process operates or proceeds.

(5) That such implied decomposition, deformation, destruction, reunion, and new combinations of particles and substances of the soil explain why some soils are more fertile than others where science fails to find any difference in them; while others prove less fertile than experiment would indicate or suggest.

(6) That the almost daily recurring changes of weather and less frequent seasonal changes, both as to temperature and humidity, with the help of animals, decay and finally crumble and disperse exposed wood, etc., until it is gone, and suggests how thoroughly the same repetition of precipitation and evaporation is also working, though unseen, just below the grass.

If this incessant oscillating or slow-motion progress of the water through the soil be a fact, then I should suppose that where it has operated with greatest vigour, there, other things being equal, would the soil be thickest and most productive; and *vice versá*, where the surface evaporation was most sluggish. Possibly the heavy rains and intervals of high temperature of the tropics account for the great fertility of their soils as much or more than for their richness as regards composition.

It will thus be seen that the leading idea in these propositions is *evaporation*—the upward motion (capillary attraction) of the contained-water of the soil working upon the inorganic and organic solid constituents of it, *in conjunction with the descent of moisture* in the forms of rain, snow, fog, etc.

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SECTION EXPOSED AT THE DRY DOCK, TROON, AYRSHIRE.

SIR,—The section of rocks exposed in the Dry Dock being constructed at Troon, Ayrshire, may be worthy of preservation in the GEOLOGICAL MAGAZINE. It is as follows:—

	Feet.
A. "Forced" or Artificial material	8
B. Bedded, coarse-grained trap	8
C. Volcanic dust	7
D. " " bluish	1
E. Grey, fine-grained, banded rock	1½
F. Water of Ayr Hone stone (seen)	8

A. Consisted of general rubbish, with fragments of pottery, etc., but not very old.

B. Towards the north end of the dock works this bed was much thicker, having apparently at that point *cut out* the beds below it to some depth, the "bedding" of the *upper part of the trap* being quite regular.

C. This bed had at one time been worked in a pit, the dock works having cut through the old workings. Six feet was the depth of the bed taken out by the pit, the working places being about fifteen feet wide. Nothing historical is preserved as to this pit, but there is a tradition that contraband goods were hid in the workings, and the material from the mine—which has been called "china

clay"—exported to France. About the middle of the dock works this so-called "china clay" was yellowish at the top part, whitish in the middle, and bluish at the bottom. It is exceedingly fine-grained, can be scratched with the nail, and falls to powder readily on exposure to the weather; but when put into an open fire and raised to a good red heat it will scratch glass.

D. This bed is perhaps just an extra-dark band of C.

E. Transition bed from D to F.

F. This bed does not differ from the real *Water of Ayr Hone* or *Whetstone*, and has already gained a reputation as a whetstone and polisher. It is of various shades of colour from light grey to dark grey—the lighter the colour the softer the material—but they all show the peculiar "mirl" of the *Water of Ayr* stone. Bed E has also this "mirl," showing that it is a transition stage between the "china clay" and the "Hone" bed.

All the beds below the trap exposed in the dock works are perhaps just fine volcanic dust deposited in water, and some of them are more or less stratified, although the stratification is often very faint.

The Hone bed contains nodules of a greenish material with a little *pyrites* and *mica* (white), some of the nodules showing concentric rings towards the outside; and the bedding planes of E have a slight sprinkling of mica.

The trap B is probably an intrusive bed—Whin Sill—and has hardened the "china clay" at its junction with that material. This hardening is well seen towards the north end of the dock, where the clay has been somewhat mixed up with the trap. On the west shore of Troon Point, trap, very coarse in appearance from weathering, is also seen at one or two points to have clay inclusions, the clay in both the above cases being converted into *hornstone* or *porcellanite*, and this substance, like the heated clay, also scratches glass.

The position of the beds is somewhere in the Upper Coal-measures (of Scotland).

The *Water of Ayr Hone*-bed crops out near Carreath, three miles east from the dock section, and is at present worked in two places, on the *Ayr Water* to the south of Torbolton, as a polisher and whetstone, ten miles south-east from the dock section. This seems to point to a powerful Carboniferous volcano having existed in the neighbourhood, the fine dust from which appears to have been deposited in pretty still water (probably fresh). Ferns (which I have seen) have been found embedded in the Hone-stone at the *Water of Ayr Works*.

In the dock section I observed no organic remains, but some parts of the "china clay" bed have faint light-coloured markings, suggestive of worm-tracks.

JOHN SMITH.

P.S.—On Saturday last a number of the members of the Geological Society of Glasgow, at my invitation, visited the Troon section and were much pleased with what they saw, the Hone or Whetstone bed being an entirely new deposit to all of them.—J. S.

MONKREDDING, KILWINNING.
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