

On an Exposure in the Keuper Clays and Marls, Derby.

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SOME hundred yards to the north of the Firs Estate Board School is an exposure of the strata belonging to the Keuper Clays and Marls, in which are some points worthy of notice. This is a large claypit attached to the brickyard of Mr. James Kent, in which are several excellent sections. The most interesting point is the fault shewn in Figure 1. Owing to the manner in which the clay has been

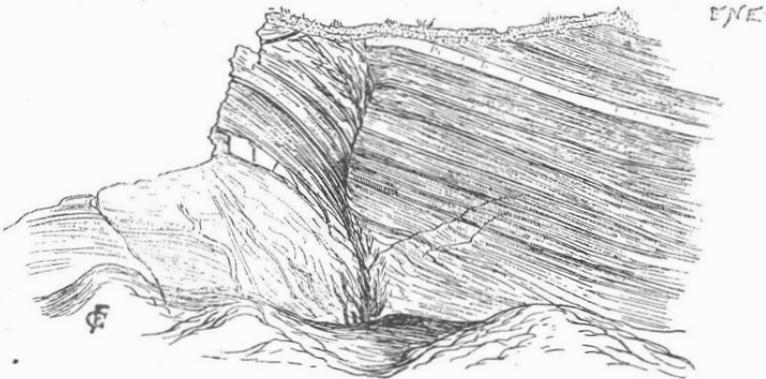


FIG. 1.

excavated, this fault is shewn in four sections. Faults usually present difficulty to the unexperienced in field geology. To correctly infer their existence from observations of the rocks as they occur at the surface, one must be carefully informed of the

local succession of beds. Few good examples occur locally—except, of course, in the coal measures—where faults are to be well seen in section. This is a very good example, although it is hardly possible to estimate the extent of the disturbance. It is most probably connected with the fault shewn upon the Geological Survey Map as passing through Derby, the line of fault in this exposure passing in a north-westerly direction. The direction of the section is shewn. On the west side of the fault the beds dip in an easterly direction at an inclination of 28° or more, and on the east side they dip in the same direction at an angle of 13° , becoming horizontal in about 100 yards from the fault. Minor faulting and contortion are, as might be expected, common in the immediate neighbourhood. The section is 40 or 50 feet in height. The smaller section to the north-west is still more interesting. It is shewn in Figure 2. To the south the beds are very nearly horizontal, while for a

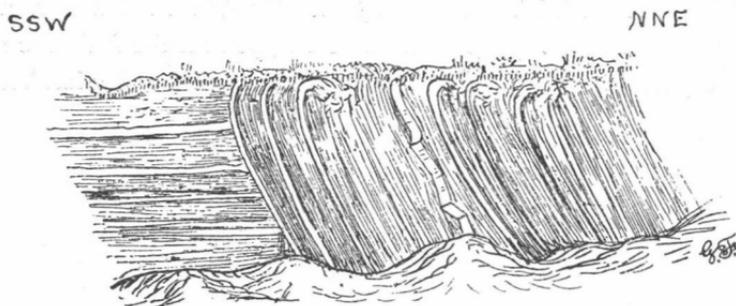


FIG. 2.

short distance on the north side of the fault they are nearly vertical, passing to a dip of 45° in a north-easterly direction in the space of a few yards. This section is 10 or 12 feet high, and exhibits the peculiar re-curling of the beds shewn in the figure. These bends are well seen in the grey marls, which are here and there fractured. In my opinion these are due to the passage of ice from the high ground which rises in a graceful amphitheatre some few hundred yards to the south and is capped by Boulder Clay, of which exposures may be seen

on the Burton Road near the top of Argyle Street, and in Littleover Lane. The phenomenon is by no means uncommon on the slope of a hill, where it may be referred to the action of *débris* sliding down the hill, but that explanation cannot hold here, as the ground is for several hundred yards around fairly level. Taking into account the neighbourhood of the glacial deposits referred to above, and the position of the beds, this seems to be the best—indeed, the only explanation of the phenomenon. There are several thick beds of marl in the pit, of considerable hardness, many of them exhibiting ripple-marks upon their surfaces. In some of them also are to be seen sharply-cut cubical indentations, as though a dice had been driven into the rock when in a plastic condition. These are, doubtless, cavities left by cubical crystals of rock salt, and are by no means uncommon in these salt-bearing strata. These and the ripple-marks indicate the shallow-water character of the deposits. The crystals of rock salt would be dissolved by the returning water, which would deposit sedimentary material in them. Doubtless, a search would lead to the finding of these pseudomorphs after salt. I have only seen the casts.

Considering the nature of the beds of rock salt and gypsum occurring in these strata, it is by no means unlikely that this fault is due to subsidence. The exposure is certainly an interesting one, and lies at our very doors.