

XII.—*Notes on a Section of the Wardie Shales with Igneous Intrusions, exposed in the Stank, Corstorphine; and on the Draining of the Old Lochs at Gogar and Corstorphine.* By D. TAIT. (With Plate IX.)

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INTRODUCTORY.

THE chief purpose of this communication is the description of a hitherto unrecorded section of Wardie Shales and igneous

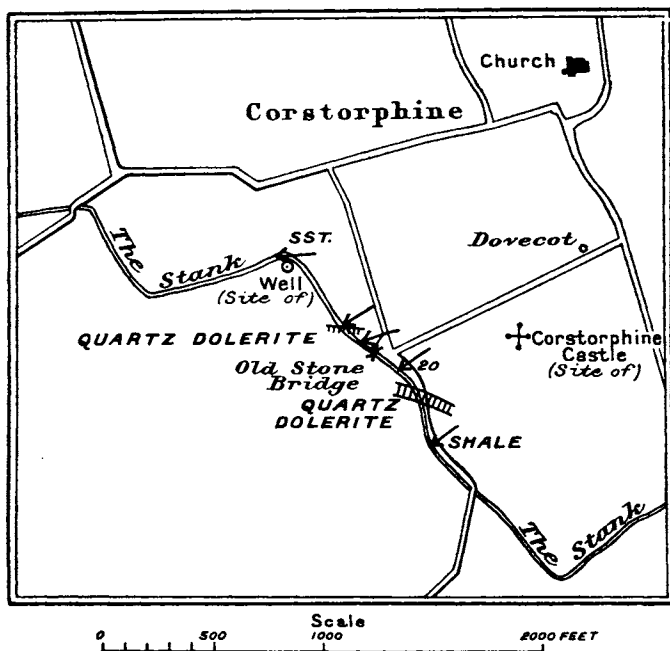


Fig. 1. Map showing rock exposures at the Stank, Corstorphine.

intrusions into them in The Stank, at Corstorphine. The Stank was made for the purpose of draining two lochs called Gogar Loch and Corstorphine Loch, both of which have now entirely disappeared.

ROCK SECTION.

A section is exposed in The Stank at the west end of Dovecot Road. Its northern extremity is where the Stank turns sharply

to the south-east. This part is entirely artificial and in it is exposed a fairly continuous rock section for about 380 yards. (See Fig. 1).

The rocks in this section have a dip of about  $20^{\circ}$  to the west. Beginning at its northern end, where the highest bed is exposed, we find a white sandstone on the north bank of the cutting. Passing to the south-east there is a dark shale which is contact altered; beyond that, 23 yards north-west of the stone bridge at the west end of Dovecot Road, a dyke is exposed cutting across the bedding of the shale. The whole width of this dyke is not seen, but it must be from 12 to 14 feet, and its direction, though not easy to determine, on account of the poor exposures, is approximately east and west. A microscopic section of this dyke shows it to be a quartz dolerite. It is, therefore, not an offshoot from the olivine dolerite of Corstorphine Hill. South-east of this point, on both sides of the old stone bridge already mentioned, sandy and clayey shales, with the lamellibranch *Nucula*, are to be seen on the west side of the cutting. As we continue southwards from the bridge this shale gradually becomes lighter in colour and hard and splintery. These shales quite evidently have undergone a considerable amount of contact-alteration. About 80 yards south of the bridge another dyke is met with. Though it cannot be determined with precision owing to the poor exposure this dyke also has approximately an east and west direction. Its width is from 25 to 30 feet. The microscope shows that it is also a quartz dolerite. To the south-east dark sandy shales are again exposed.

The position of these beds in the Wardie sequence is at present not known.

#### THE PREGLACIAL TOPOGRAPHY OF THE AREA AND THE ORIGIN OF THE LOCHS.

The Gogar and Corstorphine lochs had a late glacial origin and to a large extent are due to the filling with boulder-clay of the preglacial channels of the Almond and the Water of Leith.

Mr Cadell, in his "Story of the Forth" and in our own *Transactions*, gives abundant evidence to show that the Almond in preglacial times flowed in a channel at a much lower level than the present one and that it entered the sea at a depth of about 200 feet below the present high-water mark. Near the western end of Gogar Loch, at Turnhouse Railway Station, there is a bore which went down to a depth of 100 feet in boulder-clay without reaching solid rock. As Turnhouse stands at about 100 feet above sea-level, probably in preglacial times the area occupied by and around Gogar Loch drained westward. At

the eastern end of Corstorphine Loch a bore was put down in Jeffrey's Brewery at Roseburn to a depth of 200 feet before it reached solid rock. That is to say, at this point the old channel of the Water of Leith is 50 feet below sea-level. Exactly midway between these two bores lies the rock section in the Stank between the two old lochs. This is suggestive of its being the old watershed between a streamlet draining westward into the Almond and another eastward into the Water of Leith, and indicates how different the preglacial topography was from that of the present day. The difference is due chiefly to the great amount of glacial material occupying the preglacial channels of the Water of Leith and the Almond.

The old lake deposits laid down on top of the boulder-clay are perhaps the most interesting feature of these lochs. From them James Bennie collected a large number of species of arctic plants and also some animals which indicate the cold climate under which these lakes once existed. These lake deposits diminished the size of the lochs very considerably, as also did the deltaic deposits of the Water of Leith at the eastern end of Corstorphine Loch.

We shall consider next the draining of the lochs by human agencies, the evidence being supplied by a series of old maps chronologically arranged.

#### THE OLD MAPS.

The maps, shown on Plate IX, figures 2, 4 and 5, are photographed from G. U. Selway's "A Midlothian Village," published in 1890. Figures 1, 3 and 6 are from maps now on exhibition in the Royal Scottish Museum. For permission to photograph them I have to thank Dr Galt. For taking the photographs I have to thank Mr R. Lunn.

*Fig. 1.*—The earliest map in the series is that by Timothy Pont, who surveyed the county probably between 1580 and 1610. This map was published in *Bleau's Atlas* in 1640. Here the two lochs are shown as of nearly equal size, and possibly larger than in any later map.

*Fig. 2.*—The next is copied from Adair's MS. map in the Advocates' Library, dated 1680. Here Corstorphine Loch is half the length of Gogar Loch. As the lochs drain eastwards this is just as one would expect. The more easterly one would be drained first and as operations went on the more westerly parts, that is to say the parts more distant from the outlet, would be affected last.

*Fig. 3.*—In a revised edition of Adair's map, published in



1745, Corstorphine Loch is represented as about one-third of the length of Gogar Loch.

*Fig. 4.*—John Laurie's map, dated 1766, shows only Gogar Loch, and the site of Corstorphine Loch is divided into fields.

*Fig. 5.*—In Armstrong's map, dated 1773, there are no lochs. The site of Gogar Loch is represented as a marsh with streamlets draining eastwards.

*Fig. 6.*—In 1811 another edition of Laurie's map was published. It retains the outline which served to show Gogar Loch in the 1766 edition, but within that area are the words Corstorphine Meadow, with symbols which no doubt are intended to represent marshy ground.

#### THE DRAINING OF THE LOCHS.

In 1661 an Act of Parliament was passed enjoining a strict attention to the clearing every two years what was called the great drain, and empowering every one interested in it to compel others through whose lands it passed to clear their parts. Timothy Pont's survey was made between 1580 and 1610, about sixty years before this, but this Act does not indicate the beginning of draining operations but rather the keeping up of work already done.

The New Statistical Account, which was published in 1845, says that the Stank was widened and deepened about fourteen years ago (*i.e.* 1831), and that the part in which the rock section is exposed was then dealt with is made clear by the statement that a deep ditch was made on the north side of the Physic Well, which completely destroyed the spring.

From these records we learn that in 1661 these lochs were being drained, and at various times till 1831, a period of 170 years, we note their gradual disappearance. Since then, for about a hundred years, the farmer has grown his crops on their sites, and now the builder has begun to build on them.