

of his department from its anomalous link with St. Andrews, and by his efforts and experience he did much to strengthen the offspring. By the time of his retirement in 1964, he was able to hand on a thriving teaching and research school in geology.

For his eminent work in petrology, Frederick Walker was to receive many honours. He was elected a Fellow of the Royal Society of Edinburgh in 1925 and a Fellow of the Royal Society of South Africa in 1940. The University of Cape Town granted him a Fellowship in 1949 "for outstanding original work" and this was renewed for a further term in 1954. On the occasion of a visit to Hobart in 1957 as guest speaker at a symposium on dolerites, the R.M. Johnston Memorial Medal was awarded to him by the Governor of Tasmania.

Frederick Walker travelled widely, saw much, and made many friends in the United States, the West Indies, Europe, Australia and South Africa. While he was in the United States, he worked at the Universities of Harvard, Columbia and Princeton, being visiting Professor at Princeton in 1949.

If he had a particular affection in his science, it was the geology of islands. His early work on the Isle of May, the Maiden Isle near Oban, and the Shiant Isles, was followed by studies in Islay, Jura and Arran. Outside of Scotland, he worked in the Faeroes, Cyprus and St. Vincent, and during 1949 he organised and supervised the geological survey of Mauritius. Though his connection with our Society was fated to be comparatively brief, and to last but ten years, he found time to lecture to the Society and to contribute a paper on the Islay-Jura dyke swarm to volume 24 of the Transactions.

Those of us who knew Fred Walker will long remember his staunch friendship, his searching mind, and his great modesty and kindness. He married Bunty Cowling in 1942, and their son, James, was born in 1944.

E. M. PATTERSON.

PAPER

Quaternary deposits near Garscadden Mains, Glasgow.

by W. G. Jardine

Between 1964 and 1968 temporary excavations in Quaternary deposits near Garscadden Mains (National Grid Reference NS 532713), at the municipal boundary of Glasgow and Bearsden, supplemented data recorded by G. F. Mitchell (1952). Three main groups of Quaternary sediments are present in the area: sands and gravels of the former Kelvin valley, glacial till, and stratified fossiliferous sediments.

The sands and gravels of the former Kelvin valley are exposed sporadically on the lower slopes of the hill to the north of Station Road, Bearsden, near its junction with Chesters Road (NS 533717). They were temporarily exposed in trench QT (Figs. 1 and 4) on the

hillside to the south of an affluent of Garscadden Burn, where they comprised lenses of stratified pebble- and cobble-gravel up to 8.5 ft. thick resting on stratified sand and coarse sand. In places the sand was cross-stratified, suggesting current deposition from the south.

Glacial till, of sandy clay texture, and containing occasional small fragments of local Carboniferous shale and sandstone, together with numerous pebble-size erratics of vein-quartz, quartzite and schistose grit of Highland origin, Old Red sandstone, and Carboniferous Markle and amygdaloidal basalt, occurs on the upper slopes of the hills surrounding the alluvial flat of Garscadden Burn and its tributary. The till is reddish brown in colour, varying from 2.5 YR 4/2 to 5 YR 5/4 (Munsell Color Company Inc. 1954), and was overlain at North Stonedyke (locality V, NS 536711) by up to 8 ft. of dark reddish brown (5 YR 3/4) sand or coarse sand which showed indistinct horizontal stratification, and in which were embedded a few pebbles and a few boulders up to 1 ft. by 0.5 ft. This sediment is believed to be a water-modified sub-glacial deposit, probably an ablation product of the ice mass which deposited the underlying reddish brown till.

A contact between the till and the sands and gravels of the Kelvin buried channel was nowhere exposed in the excavations. On the hillside slopes, however, the till always occurs higher than the sands and gravels. It is possible that the sands and gravels are banked steeply against the till, as implied in the sketch section by Mitchell (1952, Fig. 2), but much more likely that the till rests directly on the sand and gravel deposits (Fig. 3). The logs of exploratory bore holes sunk in 1962 near Canniesburn Hospital (e.g. at NS 542709), about half a mile to the east of the Garscadden Mains sites, corroborate this suggestion. The form of the surface of contact between the till and underlying sands and gravels is uncertain. In Fig. 3 the surface is shown as being approximately planar, but it may be undulatory or irregular; for example, originally there may have been a slight down-bulge of the till into a pre-existing hollow on the site of the present Garscadden Mains basin.

The fossiliferous sediments were exposed in trench PQ (Fig. 2). The sequence of sediments resembled part of the sequence described by Mitchell (1952, Fig. 2 and p.280), especially near locality P which lay within about 30 ft. of Mitchell's Manhole 8 and Boring 1. Froh

Fig. 1. Map of Garscadden Mains area showing locations of main excavations, PQ, QT and V, National Grid co-ordinates, and the physical setting of the Garscadden Mains basin. Contour heights in feet above Ordnance Datum.

Fig. 2. Plan, showing relative positions of main excavations.

Fig. 3. Sketch section from X to Y of Fig. 1, showing inferred stratigraphical relationships of main sedimentary units. Vertical exaggeration 4.4 x.

Fig. 4. Section of excavation QRST. Vertical exaggeration 2 x.

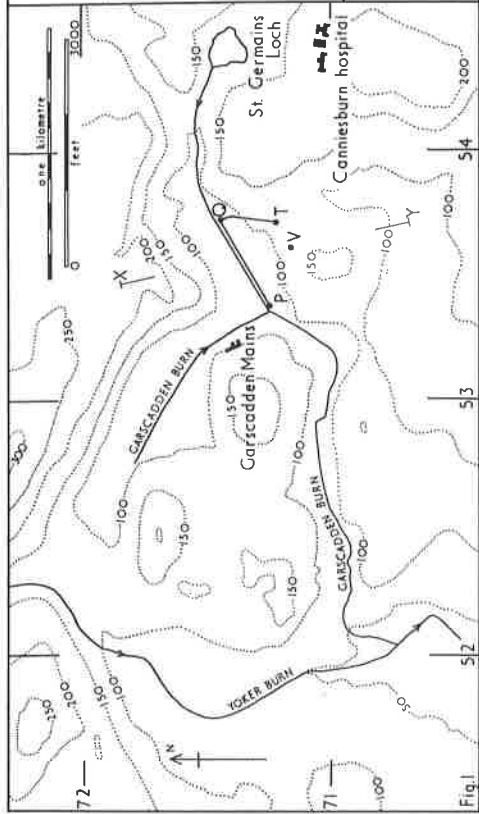


Fig.1

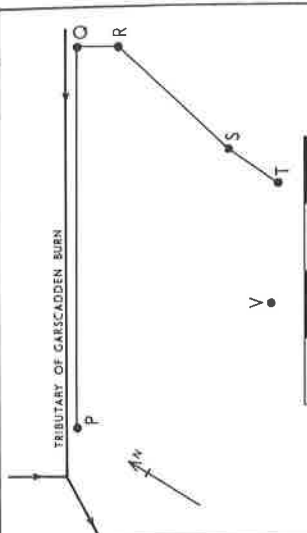


Fig.2

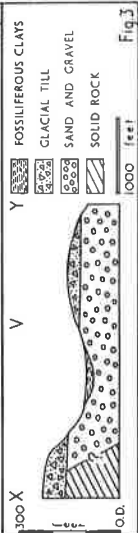
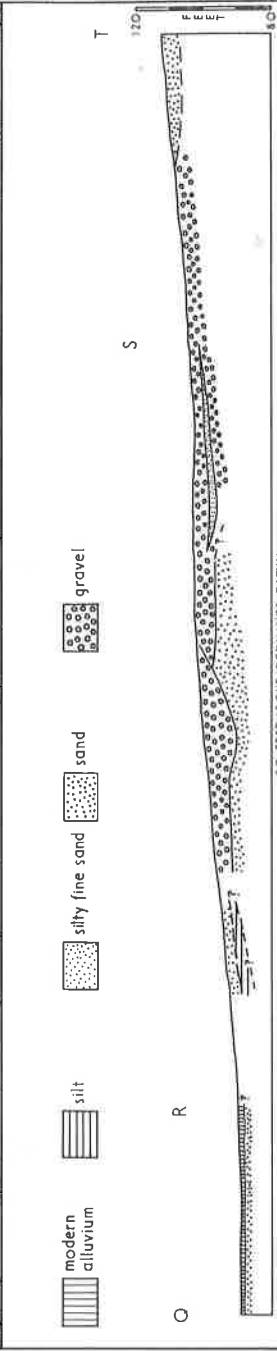


Fig.3



80 FEET ABOVE ORDINANCE DATUM

Fig.4

top to bottom, the sequence was: modern alluvium, 1 to 2.25 ft.; sandy clay with biogenic matter, including wood fragments and discontinuous peat lenses up to 0.5 ft. thick, 2 to 4.25 ft.; silty clay with biogenic matter, 1 to 1.25 ft.; sandy clay with marine shell fragments (*Littorina saxatilis* (Oliv), *Mytilus edulis*) and occasional pebble- and cobble-sized stones, 0 to 2.75 ft.; gravel, at least 2 ft. The lowermost unit is believed to be part of the sand and gravel sequence of the Kelvin buried channel.

On the margins of the alluvial flat, and on the lowermost slopes of the adjacent hillside to the south, laminated silts and silty clays were exposed briefly and discontinuously in excavations. Laminated sandy silt, occurring up to a height of approximately 116 ft. O.D., was also exposed in an excavation at NS 532717. The laminated sediments are believed to be the varved clays described by Mitchell (1952). The relationship of these sediments to other deposits was not seen in the excavations.

The evidence presented above indicates that probably both the reddish brown glacial till and the fossiliferous stratified sediments are younger than the sand and gravel deposits of the Kelvin buried channel. The relative ages of the till and the fossiliferous stratified sediments were not proved in the excavations, but almost certainly the fossiliferous stratified deposits are younger than the reddish brown till (cf. Mitchell, 1952; Jardine and Moisley, 1967). The sequence from oldest deposit to youngest, therefore, must be: sands and gravels of the Kelvin buried channel, reddish brown glacial till, fossiliferous stratified sediments. Inferentially, a short period of erosion, during which excavation or re-excavation of the Garscadden Mains basin occurred, must have intervened between deposition of the till and deposition of the fossiliferous stratified sediments.

References

- JARDINE, W. G. and MOISLEY, H. A. 1967. Note on a temporary exposure of Quaternary deposits at Scotstoun House, Glasgow. *Proc. geol. Soc. Glasg.* 108, 25-27.
- MITCHELL, G. F. 1952 Late-glacial deposits at Garscadden Mains, near Glasgow. *New Phytol.* 50, 277-286.
- MUNSELL COLOR COMPANY INC. 1954. *Soil Color Charts*. Baltimore.

SOCIETY MEETINGS—

12th October, 1967—

Miss M. A. Culley, Mrs. W. M. Gordon, A. Linn, H. McKee, Mrs. M. McKee and Miss C. B. Thomson, M.A., were elected Ordinary Members.

The Presidential Address, entitled "The Tertiary Igneous Rocks of Ireland—a century and a half of study," was delivered by Dr. E. M. Patterson.

The speaker commenced by referring to the geological mapping carried out during the early part of the 19th century. Work on the

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