Touch, Fintry and Gargunnock Hills, Stirling

[NS 650 867]–[NS 626 895]–[NS 730 934]

I.T. Williamson

Introduction

The Touch, Fintry and Gargunnock hills between Fintry and _Stirling comprise the most north-easterly fault-bound block of the Dinantian Clyde Plateau Volcanic Formation. The GCR site representative of this fault block comprises the whole of the spectacular, NNW-facing escarpment of the Touch and Gargunnock hills and the WNW-facing scarp of the Fintry Hills to the west (Figure 2.23) and (Figure 2.24). Prominent high points are Stronend [NS 629 895] (511 m), Lees Hill [NS 660 910] (411 m) and Carleetheran [NS 688 919] (485 m). A terraced, or 'trap', topography is particularly well developed along parts of the escarpment and the slopes immediately above (Figure 2.25). The highest ground and dip-slopes form an undulating and relatively poorly exposed moorland plateau. This terrain is mainly covered by a veneer of peat, though streams have cut through this and underlying glacial deposits, locally exposing bedrock. The Touch Hills have less cover of superficial deposits. Landslips are a major feature of the escarpment face, and talus and small alluvial cones have developed in many places.

The volcanic rocks were not sub-divided on early geological maps of these hills and only brief descriptions were given by Geikie (1897), who included them within the Clyde Plateau. Dixon (1938) was the first to give more details and to sub-divide the lavas. Little, if any, advance on this was made prior to the Geological Survey's re-mapping during the 1950s, almost entirely by W.A. Read, and the subsequent publication of the accompanying memoir (Francis *et al.,* 1970). That work remains the most detailed study of the district.

Description

The Clyde Plateau Volcanic Formation exposed along the northern escarpment of the Gargunnock Hills and Fintry Hills is conformable upon the Clyde Sandstone Formation of the Inverclyde Group (Paterson and Hall, 1986). This is predominantly composed of fluvial sandstone and conglomerate (Read and Johnson, 1967) and it is probably of late Tournaisian (Chadian) age. The Gargunnock Burn [NS 7072 9298] to [NS 7067 9333] is also selected as a GCR site for the Dinantian strata below the lavas (see Cossey *et al.,* in prep.).

The upper age of the Clyde Plateau Volcanic Formation is less easily defined than its base as, outwith the GCR site, the highest lavas are separated from overlying volcanic detritus by a markedly diachronous erosional regional unconformity (Dinham and Haldane, 1932; Francis *et al.,* 1970). This unit of conglomerates, sandstones and mudstones, derived from the weathering of the volcanic formation, is similar to the Kirkwood Formation in the western blocks of the Clyde Plateau Volanic Formation (Paterson and Hall, 1986) and is probably of late Visean age.

Evidence for Dinantian volcanism prior to eruption of the earliest lavas is contained in beds of reworked volcaniclastic detritus below the oldest flows at several localities. Francis *et al.* (1970) included these within the uppermost part of the Clyde Sandstone Formation and noted increasing amounts of volcaniclastic detritus upward in the formation. Near Craigend, on the northern slopes of the Fintry Hills [NS 6229 8953], for example, 'white pebbly sandstones are reported to grade up into yellowish and greenish volcanic detritus which locally contains plant impressions'. Some beds closely resemble sedimentary units intercalated with the lava succession. In the Gargunnock Burn [NS 7072 9295] dark-red mudstones underlie the lavas and contain grains of plagioclase, pseudomorphs after olivine and decomposed basalt. These were derived either from preexisting volcanic rocks or from ash-fall deposits.

The lava-dominated main volcanic sequence is 300–400 m thick and thins northwards and eastwards. The lavas are mainly plagioclase-phyric basalts described traditionally as olivine basalts of 'Markle' (macroporphyritic) and 'Jedburgh' (microporphyritic) types. They are more comprehensively described as plagioclase ± olivine ± Fe-oxide-phyric basalts,

basaltic hawaiites and hawaiites (Macdonald, 1975). Some flows may be composite. There are also subordinate trachybasalts and mugearites, the latter mainly in the upper half of the succession.

Most of the lavas comprise a central massive facies between marginal rubbly, clinkery and amygdaloidal facies suggesting that they are aa lava. However, many show structures transitional between aa and pahoehoe lava types. Some, for example, exhibit rounded or elliptical masses of either massive or crudely columnar lava enveloped within less structured amygdaloidal lava and autobreccia. These structures may be considered as auto-intrusive features, perhaps representing cross-sections through infilled lava tubes. Such features are more common in pahoehoe lava fields. Some flows are clearly traceable along strike for several kilometres whereas others are more localized, perhaps only a kilometre or less in section. This probably reflects varying volume, viscosity and effusion rates as well as local topographical control during eruption. The lateral persistence, uniform stratigraphy and relatively constant thickness of most of the flows, as seen on the comparatively well-exposed northern escarpment, are typical of continental flood-basalt terrains. Many of the lavas have irregular weathered tops, and lateritic palaeosols (boles) are developed on some. These are seen particularly well at Double Craigs in the Fintry Hills, for example. A thick intercalation of laterite, detrital volcaniclastic sedimentary rocks and possible beds of reworked tephra (the Slackgun Interbasaltic Member), occurs in the lower half of the sequence. This marks a prolonged episode of weathering and the re-distribution of weathered and unconsolidated volcaniclastic materials.

In marked contrast to most of the other regional blocks of the Clyde Plateau Volcanic Formation, there are no agglomerate-filled necks cutting the volcanic sequence in the Touch, Fintry and Gargunnock hills, but there are rare plugs. A good example is the irregular intrusion of microporphyritic olivine basalt within the Slackgun Interbasaltic Member at the Dun, north-east of Fintry [NS 628 873]. However, several basaltic and doleritic dykes cut the volcanic sequence and the underlying strata. Most are thin, nearly vertical bodies trending a few degrees either east or west of north. Two major sills intrude the upper parts of the Clyde Sandstone Formation. The Skiddaw Sill, composed of trachybasalt, is confined to the northern and western slopes of the Fintry Hills. The distinctive Downie's Loup Sill, exposed below the northern escarpment of the Touch Hills, is a composite mass of trachybasalt with abundant large feldspar phenocrysts in its lower part, but is aphyric and finer grained in its upper part.

In the west of the GCR site the lavas dip generally between 4° and 8° towards the southeast and south, but farther east the strike swings round so that they generally dip eastwards and north-eastwards at 5° to 15° (Figure 2.23). Along the northern escarpment of the Gargunnock and Fintry hills, the dips of the lower lavas are greater than the dips of those higher in the sequence. There are some large open fold structures, but it is not clear to what extent these reflect major palaeosurface irregularities, volcanotectonic activity, or later tectonic events.

There are relatively few faults in the Gargunnock and Fintry hills. A number trend either north-west or NNW generally with small throws down to the north-east. One of the largest is the Balmenoch Burn Fault which throws down to the ENE by at least 30 m. In other parts of the GCR site, some of the very large, approximately E–W-trending structures that affect the Stirlingshire Coalfield (e.g. the Wallstale and Auchenbowie faults) also cut the Clyde Plateau Volcanic Formation.

A few major- and trace-element analyses of lavas from the Touch, Fintry and Gargunnock hills have been published in papers by Macdonald (1975), Macdonald *et al.* (1977) and Smedley (1988a), with additional data available in theses by Craig (1980) and Smedley (1986a). As with the Clyde Plateau Volcanic Formation in general, the lavas are mildly alkaline to transitional in character, meaning that basic members of the suite comprise both nepheline- and hypersthene-normative types. They can be assigned to the differentiation series ankaramitic basalt–basalt–hawaiite–mugearite–benmoreite–trachyte–rhyolite, although rocks more evolved than mugearite are not recorded from this GCR site.

The detailed lithostratigraphy of the Clyde Plateau Volcanic Formation in the Touch, Fintry and Gargunnock hills was established by Francis *et al.* (1970). Eleven lava 'groups' were recognized and these are now regarded as members of the formation. The members interdigitate in part and their boundaries may be diachronous (Figure 2.24). There are important lateral variations, with slightly different sequences in the north and east forming the Touch and Gargunnock hills and in the south and west forming the Fintry Hills. Correlation between the Touch, Fintry and Gargunnock hills sequence and the volcanic sequences in the Campsie Fells, Kilsyth Hills and Denny Muir has been established by

Forsyth *et al.* (1996) (Figure 2.4). The succession exposed in the GCR site is as follows (Table 2.1).

Basal Member

The Basal Member is only present in the eastern area of the Touch and Gargunnock hills, where it forms minor cliffs at the foot of the main escarpment. It comprises a thin sequence of varied lava types with trachybasalt being the most common. In the Baston Burn, (between [NS 7311 9352] and [NS 7315 9340]), Francis *et al.* (1970) recorded a 31 m-thick section comprising at least four flows. A basal, thick and laterally persistent mugearite is overlain by plagioclase-macrophyric and plagioclase-microphyric flows.

Baston Burn Member

The Baston Burn Member comprises mainly plagioclase-macrophyric flows but, as Francis *et al.* (1970) only refer to them as 'Markle basalts', the sequence may also include basaltic hawaiite and hawaiite. Rare plagioclase-microphyric units may represent parts of localized composite flows. From Baston Burn to Gargunnock Burn, both the thickness and the number of flows increases.

Table 2.1 **Succession of the Clyde Plateau Volcanic Formation in the northern part of the Touch, Fintry and Gargunnock hills.** (After Francis *et al.,* 1970, table 7.)

Fintry Hills	**Touch and Gargunnock hills**
Kirkwood Formation	
Conglomerates, sandstones and mudstones derived from weathering of Clyde Plateau Volcanic Formation	
—————— Regional diachronous erosional unconformity ——————	
	Touch House Member (thickness not known) Feldspar-macrophyric olivine basalts
	Black Mount Member (>24 metres) Microporphyritic basalts and subordinate trachybasalts
Fintry Hills Member (>122 metres) Feldspar-macrophyric olivine basalts with a high proportion of microporphyritic basalts and rare trachybasalts	**Gargunnock Hills Member** (91—>152 metres) Feldspar-macrophyric olivine basalts and composite basalts with subordinate microporphyritic basalts and rare mugearites
Shelloch Burn Member (40–60 metres) Trachybasalts, microporphyritic basalts and feldspar-macrophyric olivine basalts	**Lees Hill Member** (0–40 metres) Trachybasalts
Spout of Ballochleam Member (24–92 metres) Feldspar-microphyric basalts; Stronend Interbasaltic Beds in middle part	
Slackgun Interbasaltic Member (0–79 metres) Tuff (possibly volcanic detritus),l aterites and weathered lavas	
——————Unconformity——————	
Skiddaw Member (0–37 metres) Feldspar-macrophyric olivine basalts and composite basalts	**Baston Burn Member** (9–67 metres) Feldspar-macrophyric olivine basalts
	Basal Member (30–46 metres) Trachybasalts, feldspar-macrophyric olivine basalts and feldspar-microphyric basalts
Clyde Sandstone Formation	
Fluvial sandstones and conglomerates; some reworked volcaniclastic detritus in upper part	

The Gargunnock Burn section [NS 7073 9320]–[NS 7234 9297] shows the maximum development of the sequence, with at least ten flows, totalling about 67 m. Farther west, successive flows are truncated by the overlying Spout of Ballochleam Member, and at Standmilane Craig [NS 6760 9214]–[NS 6683 9176], the section is reduced to only two flows, totalling 12 m.

Skiddaw Member

From the western end of the Gargunnock Hills into the Fintry Hills, the earliest lavas of the Clyde Plateau Volcanic Formation are assigned to the Skiddaw Member. The lavas are plagioclase-macrophyric types, similar to those of the Baston Burn Member, along with some composite basalt and microporphyritic basalt flows. At Slackgun [NS 6572 9122], below Lees Hill, Francis *et al.* (1970) recorded a 34 m-thick section. Partial sections are seen in the nearby Boquhan Burn and there are intermittent exposures along the western slopes of the Fintry Hills below Stronend. South of Skiddaw [NS 6210 8905], the member appears to be absent, so that the succeeding Slackgun Inter-basaltic Member and beds within the upper part of the Clyde Sandstone Formation possibly merge and are difficult to distinguish from each other.

Slackgun Interbasaltic Member

The Slackgun Interbasaltic Member is a heterogeneous unit. There are intermittent exposures along parts of Standmilane Craig, but the best are at Slackgun [NS 6576 9118]–[NS 6577 9112], where Francis *et al.* (1970) recorded some 34 m. There are scattered exposures along the northern and western slopes of the Fintry Hills. Here there are three important sections: volcaniclastic rocks occur in the Boquhan Burn [NS 6526 8994]–[NS 6523 9014] (48 m), and the Cammal Burn [NS 6433 8697] (probably in excess of 61 m), at much the same stratigraphical level as thick and massive red laterite in the Balmenoch Burn [NS 6482 8694]. The Slackgun Interbasaltic Member is not present in the eastern Gargunnock Hills nor in the Touch Hills, where an unconfor-mity separates the Baston Burn and Spout of Ballochleam members.

There are two main lithofacies associations. The lower part is characterized by thick lateritic deposits and rare, thin and laterally impersistent olivine-phyric basaltic lavas, whereas the upper parts form a stratified sequence composed of tuff and volcaniclastic sedimentary rocks. Some of the coarser-grained beds may be cross-bedded and some contain large spindle-shaped clasts that may be volcanic bombs. The lateritic deposits mostly derive from deep subaerial weathering of volcanic rocks *in situ,* but locally may show evidence of reworking. The member possibly formed, at least in part, during a relatively quiescent interlude in the development of the lava field. Craig (1980) interpreted it as the degraded remains of a line of ash cones.

Spout of Ballochleam Member

The type locality for the Spout of Ballochleam Member is the Boquhan Burn at the Spout of Ballochleam [NS 6490 8963]–[NS 6526 8994], where there are nine lavas, totalling 85 m. At least eight flows are exposed in the cliffs of the western Fintry Hills. All but the lowest lava are plagioclase-microphyric basalts and hawaiites. At [NS 6425 9047], the lowest lava, scoriaceous olivine-microphyric basalt up to 20 m thick, envelops large rounded bodies of massive basalt interpreted as infilled lava tubes. A similar sequence, more than 100 m thick, occurs in the southern Fintry Hills. In the eastern Touch Hills there are fewer flows, totalling about 30 m, but farther west both their number and thickness increase. At Easter Blackspout [NS 6912 9252]–[NS 6911 9242] and east of Standmilane Craig the sequence is more than 80 m thick.

The Stronend Interbasaltic Beds, comprising a laterite up to 2.75 m thick, occur in the middle part of the member and are seen best below Stronend at [NS 6288 8885] and in a tributary of the Cammal Burn at [NS 6399 8764].

Lees Hill Member

The Lees Hill Member generally forms the crest of the Gargunnock Hills escarpment at the top of cliffs formed by the Spout of Ballochleam Member. There are a few rare olivine-plagioclase-macrophyric flows, but otherwise the Lees Hill Member is dominated by trachybasalt. Francis *et al.* (1970) recorded a 40 m section of at least two thick trachybasalt flows in the Gargunnock Burn (between [NS 7065 9249] and [NS 7059 9222]).

Shelloch Burn Member

The Shelloch Burn Member comprises a variable sequence of trachybasalts and mugearites, along with olivine-plagioclase-macrophyric basalts ('Markle' type) and microporphyritic basalts. Its fullest development is in the northern Fintry Hills where it varies in thickness from 40 m to 60 m. Representative sections are exposed in the Shell-och Burn [NS 6509 8913]–[NS 6523 8924], the Boquhan Burn [NS 6468 8967]–[NS 6490 8963] and in the crags along the

western side of the Fintry Hills [NS 6281 8910]–[NS 6304 8870].

The Shelloch Burn and Lees Hill members cannot be correlated despite their similar strati-graphical positions, their lithological similarities and their close proximity. Regionally, they probably correlate with the Langhill and Lower Lecket Hill lavas in the Campsie Fells block (Craig, 1980; Forsyth *et al.,* 1996).

Gargunnock Hills Member

The Gargunnock Hills Member forms the greater part of the dip-slope of the Touch and Gargunnock hills. It comprises mainly plagioclase-macrophyric ('Markle' type) basalt (at least four flows of which are composite), several microporphyritic basalt lavas and rare mugearite. There are also significant lateral variations in the sequence, with micro-porphyritic basalt more common towards the Fintry Hills and the local development of the composite flows. In the eastern Touch Hills the member is more than 90 m thick, but it may have originally exceeded 150 m in the Gargunnock Hills. It can be divided into two units. Part of the upper unit is well exposed on Craigbrock Hill [NS 7385 9295] and in the Touch Burn below Gilmour's Linn [NS 7395 9252]. The remainder is seen in the area around Scout Head [NS 7354 9337]–[NS 7350 9313], where Francis *et al.* (1970) recorded a 75 m-thick section.

Fintry Hills Member

The Fintry Hills Member is the youngest unit of the Clyde Plateau Volcanic Formation in the western parts of the Touch, Fintry and Gargunnock Hills GCR site, where it forms the highest ground of the Fintry Hills, south-east of Stronend. The sequence consists of plagioclase-macrophyric ('Markle' type) lavas intercalated with a high proportion of microporphyritic basalts and rare mugearites, and is at least 122 m thick. It may be equivalent to the Gargunnock Hills Member in the Gargunnock and Touch hills, and regionally may correlate with the Denny Muir, Kilsyth Hills and Holehead lavas in the Campsie Fells block (Craig, 1980; Forsyth *et al.,* 1996).

Black Mount Member and Touch House Member

The youngest flows of the Clyde Plateau Volcanic Formation in the Touch, Fintry and Gargunnock hills are not seen within the GCR site. The Black Mount Member comprises at least 24 m of microporphyritic basalt and subordinate trachybasalt and the Touch House Member is composed entirely of plagioclase-macrophyric lavas.

Interpretation

Correlation of the Touch, Fintry and Gargunnock hills sequence with other sequences in the Clyde Plateau Volcanic Formation is illustrated in (Figure 2.4). The lower members are not easily correlated with sequences in the Campsie Fells and are perhaps localized developments. Although substantial fragmental deposits occur at the base of the formation in the Kilpatrick Hills, they thin eastwards and are not seen to continue into the Campsie Fells block. In the Kilsyth Hills and Denny Muir area of the latter, the lowest member comprises interbedded proximal facies lavas and thick tuffs, the latter comprising up to half the total thickness. It is possible that the volcaniclastic beds within the upper parts of the Clyde Sandstone Formation in the Fintry and Gargunnock hills, are distal equivalents of these tuffs.

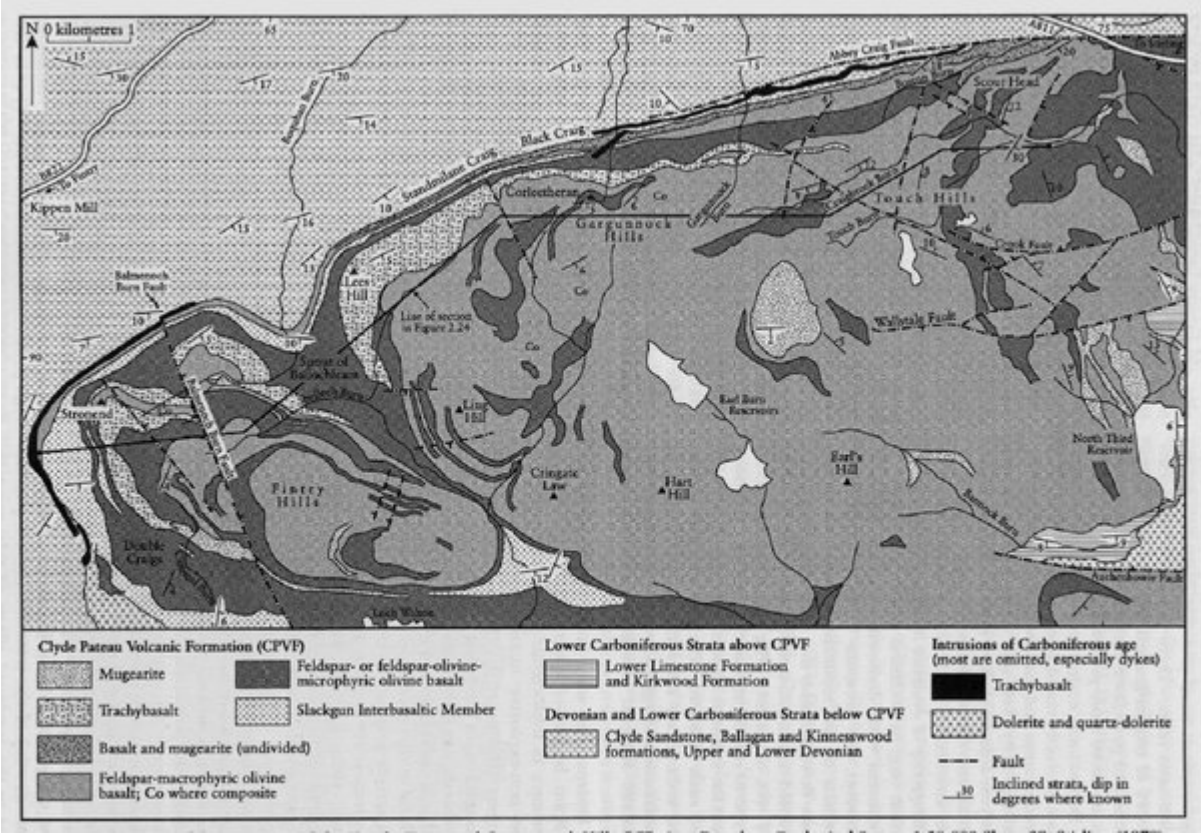
Evidence for the existence of small shield volcanoes, vents and caldera structures is abundant throughout the northern Clyde Plateau; many eruption sites lie along linear features. However, unlike the sequences in the Campsie Fells and the Kilsyth, Kilpatrick and Renfrewshire hills, there are only rare plugs and no recorded agglomerate-filled vents or calderas within the Touch, Fintry and Gargunnock hills block. Also, the dykes present seem to be too few and insignificant to be considered the main sources of the lavas. Hence, it is more likely that most of the laterally continuous pahoehoe flows with 'continental flood-basalt' characteristics are the distal products of eruptions along the linear vent–fissure systems in the Campsie and Kilsyth hills (Whyte and MacDonald, 1974; Craig and Hall, 1975; Hall *et al.,* 1998). Other flows, exhibiting proximal features and interbedded tuffs, may have been derived more directly from less voluminous eruptions centred upon small composite shield volcanoes south-west of the area.

Some members of the Clyde Plateau Volcanic Formation apparently thicken south-westwards from the Gargunnock Hills towards the Campsie Fells. This is especially clear in the Spout of Ballochleam Member and its proposed equivalent, the Campsie lavas, as illustrated in (Figure 2.4). This could suggest the existence, in addition to the vents and structures such as the Waterhead Central Volcanic Complex (Craig, 1980; Forsyth *et al.,* 1996), of at least one major volcano in the Campsie Fells. However, there is considerable evidence to support, at least locally, the views of Tyrrell (1937) that the Clyde Plateau was more the result of coalesced lava flows erupted from a large number of small, closely spaced volcanoes. The absence of clear evidence of vent structures in the Touch, Fintry and Gargunnock hills block is in stark contrast to the well-documented Campsie Fells block to the south-west (see GCR site report).

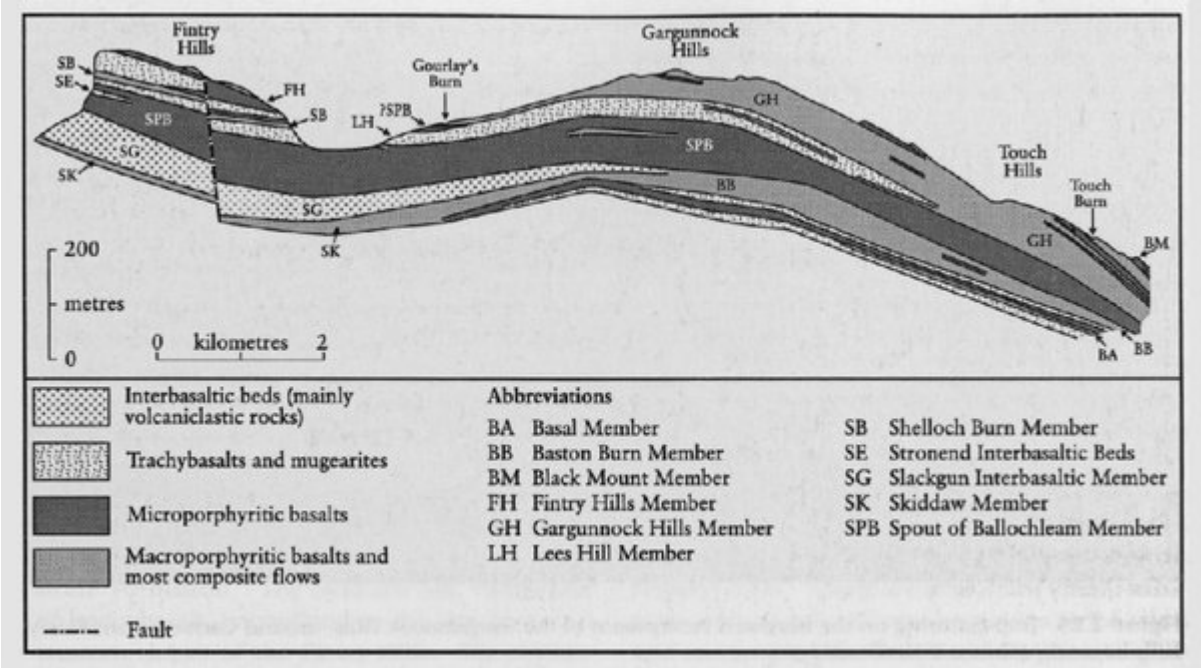
Conclusions

The Touch, Fintry and Gargunnock Hills GCR site represents the most north-easterly of several large, fault-bound blocks that make up the overall outcrop of the Visean Clyde Plateau Volcanic Formation, by far the thickest and most extensive outpouring of Carboniferous or Permian volcanic rocks in the whole of Britain. Sub-parallel terracing, or 'trap' topography, is well developed and is seen particularly well on the long, spectacular, north-facing escarpment of these hills. The GCR site includes rock-types ranging from basalt to mugearite in composition, and there are several examples of ash-fall tuffs, probable remnants of ash cones, interflow sedimentary deposits derived from the reworking of the volcanic rocks, and soils that developed between eruptions. A detailed stratigraphy has been established, enabling comparisons with other blocks within the outcrop of the Clyde Plateau Volcanic Formation, thus allowing realistic three-dimensional models to be constructed for the evolution of the entire lava field through time.

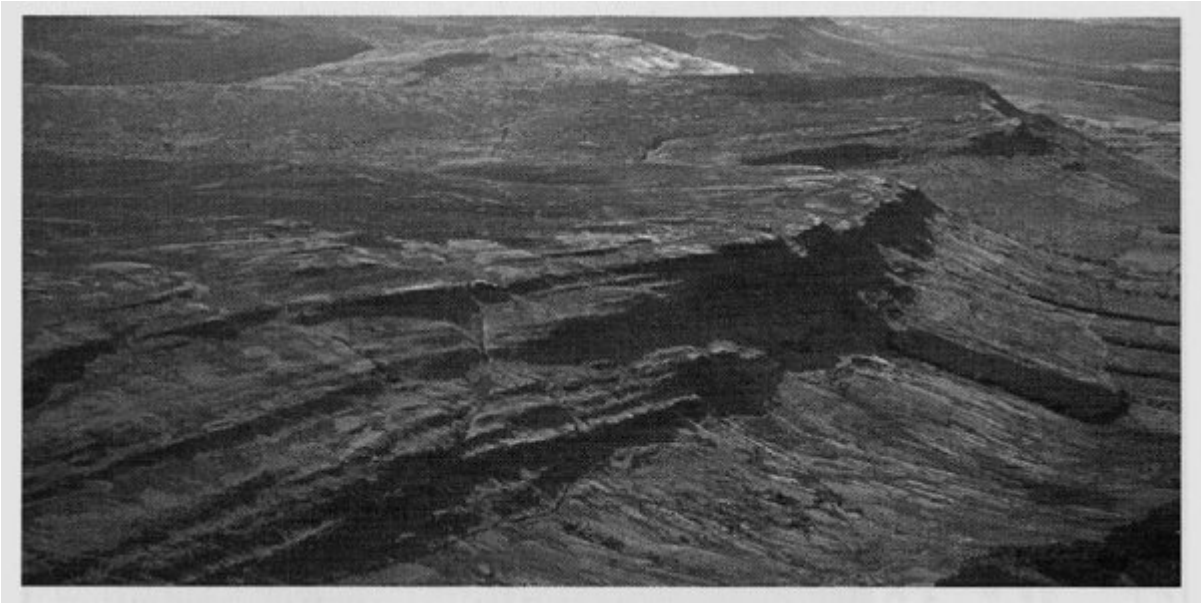
References



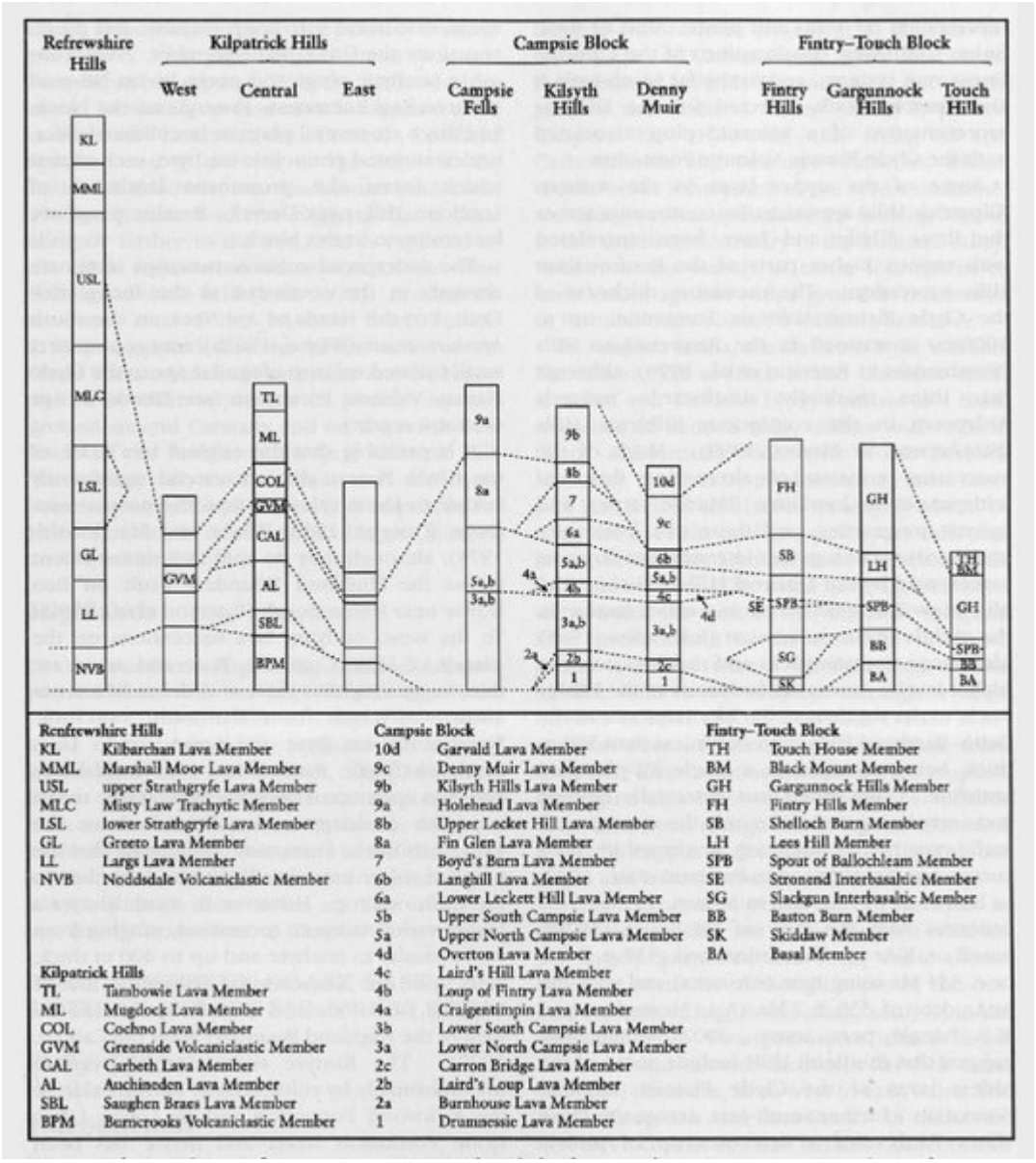
(Figure 2.23) Map of the area around the Touch, Fintry and Gargunnock Hills GCR site. Based on Geological Survey 1:50 000 Sheet 39, Stirling (1970).



(Figure 2.24) Cross-section of the northern part of the Touch, Fintry and Gargunnock Hills GCR site showing the dominant lava-types and boundaries between members of the Clyde Plateau Volcanic Formation. After Francis et al. (1970).



(Figure 2.25) Trap-featuring on the northern escarpment of the Gargunnock Hills, around Carleetheran; Fintry Hills beyond. (Photo: P Macdonald.)



Renfrewshire Hills

KL	Kilbarchan Lava Member
MML	Marshall Moor Lava Member
USL	upper Strathgryfe Lava Member
MLC	Misty Law Trachytic Member
LSL	lower Strathgryfe Lava Member
GL	Greeto Lava Member
LL	Largs Lava Member
NVB	Noddsdale Volcaniclastic Member

Kilpatrick Hills

TL	Tambowie Lava Member
ML	Mugdock Lava Member
COL	Cochno Lava Member
GVM	Greenside Volcaniclastic Member
CAL	Carbeth Lava Member
AL	Auchineden Lava Member
SBL	Saughen Braes Lava Member
BPM	Burncrooks Volcaniclastic Member

Campsie Block

10d	Garvald Lava Member
9c	Denny Muir Lava Member
9b	Kilsyth Hills Lava Member
9a	Holehead Lava Member
8b	Upper Lecket Hill Lava Member
8a	Fin Glen Lava Member
7	Boyd's Burn Lava Member
6b	Langhill Lava Member
6a	Lower Leckett Hill Lava Member
5b	Upper South Campsie Lava Member
5a	Upper North Campsie Lava Member
4d	Overton Lava Member
4c	Laird's Hill Lava Member
4b	Loup of Fintry Lava Member
4a	Craigentimpin Lava Member
3b	Lower South Campsie Lava Member
3a	Lower North Campsie Lava Member
2c	Carron Bridge Lava Member
2b	Laird's Loup Lava Member
2a	Burnhouse Lava Member
1	Drumnessie Lava Member

Fintry–Touch Block

TH	Touch House Member
BM	Black Mount Member
GH	Gargunnock Hills Member
FH	Fintry Hills Member
SB	Shelloch Burn Member
LH	Lees Hill Member
SPB	Spout of Ballochleam Member
SE	Stronend Interbasaltic Member
SG	Slackgun Interbasaltic Member
BB	Baston Burn Member
SK	Skiddaw Member
BA	Basal Member

(Figure 2.4) Correlation of composite sections in the Clyde Plateau Volcanic Formation. Based on information in Forsyth et al. (1996); Hall et al. (1998); and Paterson et al. (1990). N.B. formal designation of these units as members is currently in progress.

Fintry Hills	Touch and Gargunnock hills
Kirkwood Formation Conglomerates, sandstones and mudstones derived from weathering of Clyde Plateau Volcanic Formation Regional diachronous erosional unconformity	
	Touch House Member (thickness not known) Feldspar-macrophyric olivine basalts
	Black Mount Member (>24 metres) Microporphyritic basalts and subordinate trachybasalts
Fintry Hills Member (>122 metres) Feldspar-macrophyric olivine basalts with a high proportion of microporphyritic basalts and rare trachybasalts	**Gargunnock Hills Member** (91–>152 metres) Feldspar-macrophyric olivine basalts and composite basalts with subordinate microporphyritic basalts and rare mugearites
Shelloch Burn Member (40–60 metres) Trachybasalts, microporphyritic basalts and feldspar-macrophyric olivine basalts	**Lees Hill Member** (0–40 metres) Trachybasalts
Spout of Ballochleam Member (24–92 metres) Feldspar-microphyric basalts; Stronend Interbasaltic Beds in middle part	
Slackgun Interbasaltic Member (0–79 metres) Tuff (possibly volcanic detritus), laterites and weathered lavas Unconformity	
Skiddaw Member (0–37 metres) Feldspar-macrophyric olivine basalts and composite basalts	**Baston Burn Member** (9–67 metres) Feldspar-macrophyric olivine basalts
	Basal Member (30–46 metres) Trachybasalts, feldspar-macrophyric olivine basalts and feldspar-microphyric basalts
Clyde Sandstone Formation Fluvial sandstones and conglomerates; some reworked volcaniclastic detritus in upper part	

(Table 2.1) Succession of the Clyde Plateau Volcanic Formation in the northern part of the Touch, Fintry and Gargunnock hills. (After Francis et al., 1970, table 7.)