Chapter 23 Trachyte and trachy-andesite dykes

The present chapter and the succeeding one will be devoted to an account of the trachytes, andesites, and pitchstones (with some rocks probably devitrified and otherwise altered pitchstones) which are found in the form of dykes, usually of no great size, at numerous localities in our area. Although our detailed survey has not embraced the whole of Skye, it may be taken as probable that these rocks belong especially to the south-eastern portion of the island. The principal known exception to this statement is made by a separate group of trachyte dykes in the Drynoch neighbourhood. We assign all the rocks, on such evidence as is obtainable, to some of the very latest stages of igneous activity in the region. Their relation in point of age to the latest intrusions of the Cuillins cannot be determined, but they seem to be the youngest rocks in their own area at least. Another reason for discussing together these various rocks, of which the extreme types differ widely, is that they seem to be genetically connected. More accurately, some of the andesites stand in close relation with the trachytes, and are linked with them by transitional varieties, while other andesites are apparently intimately related to the pitchstones. Trachytes, trachy-andesites, andesites, and pitchstones will be described in order in this and the next following chapters.

We notice first a group of *trachyte dykes* found in the district to the N.N.W. of the Cuillins, and especially on the moorlands about the head of Loch Harport. They occur indeed from near the upper part of Glen Brittle to Glen Vidigill at least. the ground farther to the N.N.W. not having been surveyed. The area of distribution, so far as it has been proved, is an oval with a long axis of about 6½ miles, following as usual the direction of the bearing of the dykes themselves. Drynoch is situated near the centre of the oval, and we may conveniently refer to these dykes as the *Drynoch group* (*see* (Figure 76)).

Within this area trachytic dykes are fairly numerous, though always outnumbered by those of basic composition. They are mostly of moderate width, the largest being about 15 feet across, and they follow courses which, while in the main straight and parallel, show some deviations and curvature on a small scale. They usually form salient features, and the larger ones are very conspicuous objects: a good example is the prominent dyke which comes down to the high-road near the bridge north of Drynoch Lodge. The most striking feature of these dykes in the field is a very pronounced fissile structure, brought out especially by weathering, and giving the rock the appearance of a shale. In the narrower dykes this structure runs parallel with the walls, but in the wider ones, and especially in their interior, it is often sinuous and irregular. It depends upon a flow-structure in the rocks.

Although, as remarked, these trachytic dykes stand out in relief from the basaltic lavas which they intersect, they have almost always suffered very considerably from atmospheric weathering, and it is difficult to procure specimens which can be regarded as representing the fresh rock. The best example found is one of the dykes in the burn by the old crofts of Satran, near Drynoch. The least altered portions of the rock are in the form of nodular masses, analogous to the spheroids in many basic rocks, but having a flat shape in accordance with the fissile structure already noticed. The freshest specimens have a very dark grey colour, but average examples are pale and often show a rusty staining connected with the platy fracture. The rocks are of close texture and dull aspect, and are non-porphyritic. A fresh example gave the specific gravity 2.72, but the usual figures are lower — 2.66, 2.64, or even 2.62 — the density being notably lowered by weathering.

Under the microscope these trachytes are seen to consist essentially of closely packed little felspar crystals, usually 1/200 inch or less in length, giving narrow sections with well marked parallel arrangement due to flow. They give sensibly straight extinction. Doubtless both orthoclase and oligoclase are represented, but it is not easy to judge the relative proportions of the two. That the potash-felspar is abundant, if not actually predominant, appears from the low density of the rocks, taking into account the considerable amount of heavier substances present, and the name trachyte may probably be used without impropriety. When freshest, the rocks are found to contain minute granules of augite, though always in subordinate quantity (S9812) [NG 412 303]. In other slides minute clotted patches of ferruginous matter, perhaps limonite, may represent destroyed augite. Little octahedra of magnetite are always present and in quantity more than equal to the ferro-magnesian element. There are sometimes a few scattered small flakes of biotite, more or less affected by resorption, as is usual in trachytes (S7857) [NG 422 292]. Although the rocks are never conspicuously

porphyritic, there may be a few small felspar crystals of an earlier generation, from 1/40 to 1/20 inch in diameter, consisting of orthoclase and less commonly oligoclase. These trachytes differ from the "mugearites" described in Chapter 15 chiefly in the absence of olivine, and there is possibly a relation between the two groups.

We pass on to describe an interesting group of dykes which have been carefully studied in the field by Mr Clough. In the course of mapping the rocks have been provisionally designated trachytes, and we shall retain this name for them as a group, although some of them have affinities also with the andesitic family as commonly understood. In Skye these dykes occur chiefly in the Sleat district, being found at intervals from the line of the Kylerhea high-road to within about a mile of the Point of Sleat, though in much less number than the basic dykes. They are more abundant than usual in the neighbourhood of Kinloch: in Allt Cùl Airidh Lagain, a little below the road, three or four are found in a length of 70 or 80 yards, while another occurs rather more than two-thirds of a mile above the road. There are also a number of dykes of this group about Heast and Ben Suardal, but they do not extend farther N.W. than Broadford. Mr Clough, who has supplied this information, has found similar dykes on the other side of the Sound of Sleat and far up Loch bourn; and he has also recorded them in the Cowal district of Argyllshire.<ref>See Geikie, *Ancient Volcanoes of Great Britain,* vol. *ii.,* p. 139; 1897; Clough in *Geology of Cowal*, *(Mem. Geol. Sur. Scot.)* pp. 166–171; 1897.</ref> It thus appears (*see* sketch-map, (Figure 76)) that the group as a whole belongs less to Skye than to the mainland of Scotland, where it has a wide distribution. The late age of all these dykes seems to be established by the fact that, while they have been observed in a number of cases to intersect basic dykes, the converse relation has been noticed in only a single instance. For convenience of reference we shall speak of these rocks as the *Broadford and Sleat group*.

The dykes are mostly of small or moderate width, and have the same N.W. or N.N.W. bearing as the basic dykes of the district. They are usually quite fine-textured or compact rocks, with or without scattered glassy-looking felspars about ¼ inch long, and showing no other mineral to the *eye* except an occasional small scale of brown mica. The ground-mass has a grey colour, which may become brown by weathering. Little calcite amygdules are very often seen. The most interesting feature of the dykes as seen in the field is the spherulitic or quasi-spherulitic structure which they very generally exhibit in their marginal portions. On this subject Mr Clough has supplied the following notes. It should be premised that what appears to the eye a pronounced spherulitic structure, and is so termed here, is usually resolved under the microscope into a rather imperfect or rudimentary type of radiate growth.

"The marginal portions of the granophyre, felsite, acid pitchstone, and trachyte dykes often contain conspicuous spherulitic structures, and so also do the corresponding parts of a few of the basaltic dykes. The spherulitic portions of these dykes display many characters in common, and these may be described together.

"Spherulitic bodies are as a rule confined to the portions of the dykes which are within eight or nine inches of the sides. They are sometimes isolated and approximately spherical in shape, but more usually they form rudely spherical or polygonal bodies which are in such close conjunction, or union, at their ends that they form structures resembling *rods or strings of beads.* The average diameters of the isolated spherulites and the greatest breadths of the spherulitic rods are found to be much the same in any dyke so long as we confine our attention to one thin layer of rock which is parallel to the sides, but in layers at different distances the dimensions vary greatly. Six or eight inches off the side the coalesced spherulites are often the size of a pea, but in layers nearer the sides they are less, and within an inch or two of the side they are perhaps less than mustard seeds, and the rod-like bodies appear almost like threads. On surfaces parallel to the dyke-side the rods are generally in close juxtaposition, so that the whole surface is covered with them. On such surfaces they are generally straight and parallel, but on larger surfaces slight alterations, and sometimes sharp twists of direction, are observed, all the rods appearing to bend at the same axial planes of folding.

"The rods on one surface parallel to the dyke-side are not necessarily parallel to the rods on the adjoining surfaces nearer to or further off the side. They are, it is supposed, generally parallel, but several instances have been noticed in which the directions of the rods on one surface differ from those on a closely adjoining surface by as much as 30° or 40°. This is well seen in a trachyte dyke that crosses Allt Réidh Ghlais nearly 400 yards below the road".

"In the spherulitic portions of many of the dykes amygdules of a greatly elongated form occur. They are sometimes an inch or two long, though their diameters are not more than 1/40 inch. It has been noticed in a good many places that the long axes of the amygdules are parallel to the spherulitic rods in the same portions of the dyke, and in no case have they

been seen to be different. It seems probable therefore that the rods are parallel to a direction of flow of the molten magma in which they were formed. To that supposition objection may perhaps be made on the ground that, as already stated, the directions of the rods on closely adjoining surfaces are not always the same. It seems quite possible, however, that the flow movements were of a much more complicated order than would at first seem probable, and that the direction of flow in one part, at a certain distance from the side, may have been different from the direction a little further from the side. Let us suppose, for instance, that in a certain layer near and parallel to the dyke-side the direction of flow immediately preceding the period of consolidation of that layer was in a certain direction: that layer is consolidated and the direction of the latest flow is fixed and still discernible: after this consolidation a short period of time may elapse before another layer parallel to but a little further off the side consolidates, and in this period the direction of flow has possibly altered so as to be no longer parallel to the former direction.

"Whether, however, the spherulitic rods are indications of directions of flow or not it seems desirable to observe their directions in various localities. They are not often vertical. They are apparently more often horizontal than vertical. Most commonly they are diagonal, and perhaps on the average about half way between horizontal and vertical. When diagonal, and the dykes are striking in their usual N.W. or N.N.W. direction, the lower ends of the rods are in some localities the N.W. ends, and in others the S.E. We cannot say that the former case is more frequent than the latter".

"It seems possible that the materials of some dykes have travelled for great distances in a direction not very far from horizontal from some source of comparatively limited extent near one end of the dyke outcrop. On this supposition we can understand how dykes may retain uniform characters for long distances, and it seems unnecessary to postulate a deep-seated source lying almost vertically below the whole extent of their outcrop".

"Perhaps the simplest way to show the directions of the rods is to draw a rectangle to represent the exposure of the dyke in which the rods are observed. The two long sides of the figure represent horizontal lines and the side on the observer's left hand represents the N.W. side of the exposure. Lines are then drawn to represent the rods (*see* (Figure 77)). In the list accompanying the figure the localities and lithological varieties of the dykes to which the diagrams in the figure refer are stated, and the cases in which the amygdules are known to be elongated parallel to the rods are indicated. The diagrams marked by '*a*' refer to the dyke situated furthest N.E.; the diagram marked by '*b*' refers to the dyke coming next to this on the S.W. side, and so on. In case of exposures which belong perhaps to one dyke at different parts of its course the diagram referring to the exposure furthest N.W. is given first, and it is joined by a bracket to the diagrams referring to the other exposures".<ref> The diagrams given in the figure are only a part of those drawn in the field. </ref>

"Some dykes which show no spherulites yet contain conspicuously elongated amygdules. In the marginal portions the directions of elongation always lie in planes which are approximately parallel to the adjacent side, but in different localities they are inclined at different angles to the horizon, just as the amygdules in the spherulitic dykes are".

"In the trachyte dyke in Allt Réidh Ghlais the spherulitic rods are not all so close together as usual. Sometimes two adjacent rods gradually diverge, but after running a certain distance and bending about a little they come together again. In the spaces between two rods we cannot always be sure that there are any spherulitic forms, but in other places there are obscure forms, and some of these are arranged in lines which are almost at right angles to the enclosing rods".

"In some of the dykes with elongated amygdules and spherulitic rods there are also phenocrysts of felspar, but these phenocrysts sometimes have their long axes at a considerable angle to the rods and amygdules. This is well seen in the pitchstone dyke of Allt Duisdale, in which there are a number of phenocrysts of sanidine, and in the trachyte dyke in Allt Cùl Airidh Lagain nearly three-quarters of a mile above the road. In the latter dyke the amygdules have a decided tendency to bend round the sides of the phenocrysts".

"As already stated, the amygdules in the interiors of most of the dykes are generally larger than those at the sides. In most of the trachyte dykes those in the interior are also much less elongate than those at the sides. In the basaltic dykes elongate amygdules are rare in all parts. Perhaps in these dykes it was unusual for there to be Any further flow movement in the molten magma after the amygdules were formed".

"In the interiors of some of the trachyte dykes the forms of the amygdules indicate directions of flow which make considerable angles with the sides. In a thin vertical dyke, four or five feet thick, in Ob Lusa, in a steep exposure crossing the dyke almost at right angles, the amygdules near the centre give nearly circular sections. A little way on either side of the centre they give oval sections, and these become more elongated the further from the centre they are. The long axes of the sections incline downwards from the centre towards the side and become steeper the nearer they are to the side. Close to the side they are parallel to it and approximately vertical.

"In a dyke in Allt Cùl Airidh Lagain, also, rather less than a third of a mile below the road, vertical exposures across the central part of the dyke show that the long axes of the sections of the amygdules incline downward from the centre towards either side, and become steeper as the sides are approached".

"In dykes in Allt a' Choin, about a quarter of a mile N.N.E. and 300 yards slightly E. of N. of Kinloch, the long axes of the sections of the amygdules in the interior parts have a tendency to dip N.E. In the dyke in Allt Réidh Ghlais the long axes seen in a section at right angles to the strike of the dyke are in one place near the centre nearly horizontal: in other places only a few inches off the S.W. side they dip S.W". (C. T. Clough.)

Evidences of the inclined or even horizontal direction of flow in dykes, as described by Mr Clough, have not often been observed in the country farther west and north, for the reason that the types of dykes most favourable for such observations are there wanting. An exception must be made, however, for the Coirechatachan group of dykes, which often show the beaded lines or rods described above, and always with a considerable inclination to the vertical. It is to be noticed too that the inclination of the rodding varies in some instances rapidly as we pass along the dyke (Figure 78). This has already been remarked in the well-known "Beal dyke", near Portree, where the structure is exhibited in the tachylytic selvage of a basic dyke allied to the mugearite type (p. 337).

Petrographically the trachytes and trachy-andesites of Sleat and the Broadford district, as represented ,.by Mr Clough's specimens, show some range of variety. Most of them, however, fall under one fairly marked type. These are rocks of specific gravity 2.59 to 2.64, sometimes with a few scattered felspar phenocrysts. When these occur they are either sanidine or more commonly a plagioclase felspar: in one case a crystal with albite-lamellation gave extinction-angles 24° and 28° from the twin-line, indicating some variety more basic than andesine. The general mass of the rock always consists essentially of a plexus of little felspar crystals with other minerals in smaller quantity. The characteristic ferro-magnesian silicate is brown biotite, which in the form of very numerous minute flakes is constantly found in all the fresher rocks. In some other cases greenish and yellowish ferruginous pseudomorphs with finely granular magnetite may represent biotite; though more probably vanished hornblende, since these and fresh biotite sometimes occur together and are of somewhat different habits. Minute octahedra and skeletons of magnetite are constantly found and often very numerous; while another constant constituent is apatite, which is relatively abundant in very fine needles. Exceptionally there is a small amount of interstitial quartz.

The felspars which make up the bulk of the rock are partly orthoclase, partly oligoclase. This can be directly verified in the less fine-textured rocks, and in the others may be inferred from the low density of the rocks — assuming, what seems to be true with few exceptions, that there is no glassy residue. The crystals vary in length, in different examples, from about 1/50 to 1/200 inch or less. When of relatively large size, they have an elongated rectangular shape, the monoclinic felspar in simple crystals or carlsbad twins, and the triclinic showing both carlsbad and albite twinning. When the crystals are smaller, they are of very slender shape, and the distinctive characters are lost. There is constantly a tendency to grouping in sub-parallel bundles and in fan-like and sheaf-like forms, and this is more pronounced in proportion as the texture of the rock is finer (Plate 27)., Fig. 1. These imperfectly radiating structures compare rather with the "variolitic "structures of some andesitic and basaltic rocks than with the true spherulites of acid rocks. They closely resemble, for instance, what is seen in certain narrow dykes and veins of variolitic andesite on Carrock Fell, Cumberland.<ref> Harker, *Geol. Mag.,* 1894, pp. 551–553.</ref>

These remarks apply more particularly to the interior portion of a dyke: at the edge the micro-structure may present some modification, with a closer approximation to a true spherulitic structure.

Some dykes belonging to this group, more especially in the Broadford neighbourhood, differ from the preceding in being more decidedly of orthoclastic composition, and these have an ordinary trachytic structure with little or no tendency to radiate growths. A good example is a dyke from rather more than ½ mile N.N.E. of the summit or Ben Suardal (S9569) [NG 633 214]. It is a fine-grained cream-coloured rock studded with little brown dots, and shows a certain parallel structure parallel to the walls of the dyke, an arrangement shared by the few small porphyritic felspars. The specific gravity of the somewhat weathered rock is only 2.50. A thin slice is seen to consist essentially of a plexus of minute felspars of rod-like appearance in section, doubtless mostly if not wholly orthoclase. The brown dots referred to are little patches of limonite, mostly shapeless but in places apparently pseudomorphs after biotite.

On the other hand, we find, among dykes which we are not able to separate as a whole from the same group, rocks of decidedly andesitic character. This is shown by oligoclase, or some variety near oligoclase, becoming the dominant or the sole felspathic element, while augite appears usually instead of biotite, and magnetite becomes more abundant. With these differences there is of course an increased density. Such rocks may or may not show spherulitic structures and "rodding" on the edge of the dyke. A typical example of these occurrences, which mineralogically approach augite-andesites, is a dyke from rather more than one sixth of a mile S.W. of the summit of Ben Suardal. It is a close-grained grey rock with little scattered black specks of augite, and has the specific gravity 2.75. In a slice (S6748) [NG 629 205] the augite is nearly colourless, building scattered imperfect crystals which sometimes show an hour-glass structure between crossed nicols. Magnetite is quite abundant in irregular crystal-grains of early separation. The bulk of the rock consists of little imperfect prisms of felspar, apparently oligoclase, sometimes grouped in bundles. A similar rock, of specific gravity 2.72, forms a dyke ¼ mile S. by W. of Suardal Farm (S9574) [NG 622 215], and other dykes probably of like nature are found in the district.

Although glassy varieties are exceptional among dykes referable to this group, they are not wholly wanting. Here probably we may place a rock collected by Mr Clough in the Isle of Soay (S9988) [NG 465 141]. It represents the vitreous portion of a spherulitic dyke 1 foot in width, and is a dark rock of specific gravity 2.50, with resinous lustre. It is apparently a pitchstone corresponding in composition with an andesite or a trachy-andesite. In a thin slice it shows a much deeper brown colour than is seen in the acid pitchstones, though not so deep as in the tachylytes. Different deptbs of colour are related to secondary changes, as is proved by their distribution with reference to a system of curved perlitic cracks. In the glassy matrix there are certain paler spots, 1/50 to 1/20 inch in diameter, of the nature of spherulites. These depolarise feebly, and show a rough radiate disposition, but without distinct fibrous structure.

The last-mentioned occurrence is quite outside the area of distribution which we have laid down above for the trachy-andesite dykes of Skye, and it is possible that we have to do here with a distinct group or sub-group. We have already seen some indication of this in the minor ultrabasic intrusions, with the further point of resemblance that the Soay occurrences assume the sill instead of the dyke form. Another of Mr Clough's specimens from Soay, taken from a two-inch sheet exposed on the south coast of the island, is a trachyte, but of a type somewhat different from those of Broadford, etc. It is a dull grey, compact-looking rock, enclosing grouped phenocrysts of orthoclase and some oligoclase, with a few pseudomorphs perhaps representing augite. The ground-mass is composed essentially of little felspar microliter, with sensibly straight extinction, showing no tendency to radiate arrangement.

It is unfortunate that we have no chemical analyses of any of the above rocks, which might throw light upon their nature and affinities. We quote, however, the analysis (A) of one of the trachyte dykes of the Cowal district, which may be taken as very similar to some of the Broadford and Sleat group; also that of the well-known vitreous rock of the Sgùrr of Eigg (B), which will be referred to later.

	A	B
SiO_2	56.4	65.81
Al_2O_3	19.0	14.01
Fe_2O_3	3.5	4.43
FeO	4.8	not det.
MgO	1.5	0.89
CaO	2.6	2.01
Na_2O	4 5	4.15

K_2O	5.0	6.08
Ignition	2.6	2.70
	99.9	100.08
Specific gravity	2.48	[2.42]

A. Trachyte, dyke, Dunans, near head of Glendaruel, Argyllshire (S3452) [NS 0384 9100]: anal. J. H. Player, Geikie's *Ancient Volcanoes of Great Britain,* vol. *ii.*, p. 139; 1897: also *Geology of Cowal* (*Mem. Geol. Sur. Scot.),* p. 170; 1897.

B. Subacid Pitchstone, Sgùrr of Eigg: anal. Barker North, *Quart. Journ. Geol. Soc.,* vol. *xlvi.*, p. 379: 1890. [Specific gravity taken from another specimen.]

Among the most interesting of the more aberrant types found within the area of distribution of the Sleat trachytes, and presumably to be attached to that group, are certain rocks which seem to have close affinities with the ceratophyres of certain authors. One such rock is noted by Mr Clough as forming perhaps the broadest and most conspicuous dyke of this group. It comes to the coast nearly a mile N.N.E. of Tarskavaig Point. "It is perhaps ten yards wide, and in a S.E. direction makes an almost continuous ridge for about a mile: soon after this it ceases to be traceable in its old line, but about forty yards N.E. of the apparent end another dyke of similar character appears and is traceable for more than a mile in a S.S.E. direction, crossing Gillean Burn in three different places. The two dykes in the burn between half a mile and two-thirds of a mile slightly W. of N. of the top of Cnoc an Sgùmain, near Armadale, are perhaps continuations of this". — (C. T. C.)

A specimen taken to the west of Loch Gauscavaig is a fresh rock of specific gravity 2.61, with little glassy-looking porphyritic felspars up to ■ inch in length. In a thin slice (S7370) [NG 585 105] these felspars seem at first sight to be simple crystals and carlsbad twins; but there are little patches in them which show a close twin-lamella-tion with very low extinction-angles, and elsewhere there are vague indications of a like intergrowth on a more minute scale. It seems probable therefore that we have to deal here with crystals of micro-perthite and cryptoperthite (anorthoclase of some authors). These felspars occur only rather sparingly, and more rarely there is a phenocryst of light brown augite 1/20 inch long. The general mass of the rock (Plate 26)., Fig. 2 is of medium texture or, in comparison with the trachytes, coarse. It consists mainly of rectangular felspars, up to about 1/30 inch in length and of rather stout build. Most of them are not to be distinguished from sanidine, in simple crystals or carlsbad twins; but in places there are obscure indications of a very minute twin-lamellation, and it is probable that these felspars are of the same nature as the phenocrysts. There are rather abundant imperfect crystals and grains of augite, up to 1/50 inch, and a little magnetite, which is moulded on the felspar crystals.

The dykes, mentioned above, to the north of Cnoc an Sgùmain, in a branch of the Glen Meadhonach river, are also of peculiar nature. The more north-westerly of the two is in its interior a rather finely crystalline rock of specific gravity 2.60, having something of the dark look of a dolerite. It encloses little glassy-looking felspars of stout build, to over ■ inch in diameter. In a thin slice (S6851) [NG 610 045] these are seen to be a good deal fissured, and to contain inclusions of the ground-mass. They show in places the fibrous look, the rather patchy extinction, and the vague appearance of very fine lamellation which suggest cryptoperthite. Some smaller crystals of augite and a few magnetite grains also belong to the earlier stage of crystallisation, and there is the abundance of minute needles of apatite which we have noted as one of the characteristics of the Sleat trachytes. The ground-mass is mainly an aggregate of roughly rectangular but interlacing crystals of felspar; but has a peculiar appearance owing to very abundant little rods and needles of augite, partly decomposed, the smaller ones arranged in parallel groups or in sheaf-like bundles (Plate 26), Fig. 3. Many of the felspars of the ground-mass show fine twin-lamellation, but often this is visible only in portions of the crystals.

This dyke takes on a much finer texture at its margin. A specimen taken an inch or two from the edge gave the specific gravity 2.57. In a thin slice (S6850) [NG 610 045] the ground-mass is much obscured by alteration, but it seems probable that a glassy base is or has been present, and crowded delicate fibres of felspar are discernible in places. The specimen is a dull grey compact rock with the usual scattered fresh felspars. The other dyke at the same locality has a selvage of black, more or less vitreous, rock 2 inches thick. It has a pitchy lustre, encloses yellowish felspar phenocrysts up to ¼ inch in length, and gave a specific gravity 2.55 to 2.57. In a thin slice (S6849) [NG 612 044] the felspars show no conspicuous twin-lamellation, but have, as before, in places a faintly defined striated appearance suggestive of a

microperthitic intergrowth. Both these and an occasional augite crystal enclose patches of the ground-mass. There are in addition numerous microlites of felspar and augite and a few granules of magnetite. The ground-mass consists of a brown glass crowded with densely packed bundles of slender felspar fibres. Towards the margin these bundles take on a general parallelism and become more separated from the glass, which appears in yellowish strings or streaks. This rock resembles in many respects those of the Sgùrr of Eigg and Hysgeir, though it is perhaps somewhat more basic in composition. There is considerable similarity between the porphyritic felspars of the several rocks.<ref>Judd, *Quart. Journ. Geol. Soc.,* vol. xlvi., p. 380; 1890: Harker, *ibid.,* vol. lii., p. 372; 1896.</ref> An analysis of the Sgùrr of Eigg rock is quoted above (B).

One dyke bearing a certain resemblance to the above has been met with far outside the area of distribution of the trachytes. It occurs on the slope between Druim an Eidhne and Loch na Creitheach, about 350 yards W.N.W. of the northern end of the lake. The rock shows a fine-textured grey ground, enclosing dull porphyritic felspars up to ½ inch in length. These have rounded outlines and, excepting a narrow border, are dark, as if from numerous inclusions. Excepting for the shape of the felspars, the rock resembles to the eye the Norwegian rhomb-porphyries. Its specific gravity is 2.71. A thin slice (S7486) [NG 509 213] shows that these felspars are usually grouped together in aggregates. They are evidently corroded, and often show a line of secondary inclusions a little within the curved outline. Some show the fine lamellation and nearly straight extinction of oligoclase, and this felspar is seen in places in evident microperthitic intergrowth with orthoclase. Other crystals, without clearly visible lamellation, have something of the appearance of cryptoperthite. The other elements of the earlier crystallisation are apatite, magnetite, and augite, preceding the felspar in order as named. In one place the augite is seen in micrographic intergrowth with the felspar. The ground-mass is of small felspar prisms, with sensibly straight extinction and no evident twinning, granules of augite, and some minute crystals of magnetite.

It is possible that this dyke, remote from the others, belongs to a different and much earlier epoch, and is to be regarded, together with certain dykes near Elgol and. elsewhere already described (on pp. 288–290), as a specialised derivative from the magma which gave rise to the chief group of minor acid intrusions in Skye.

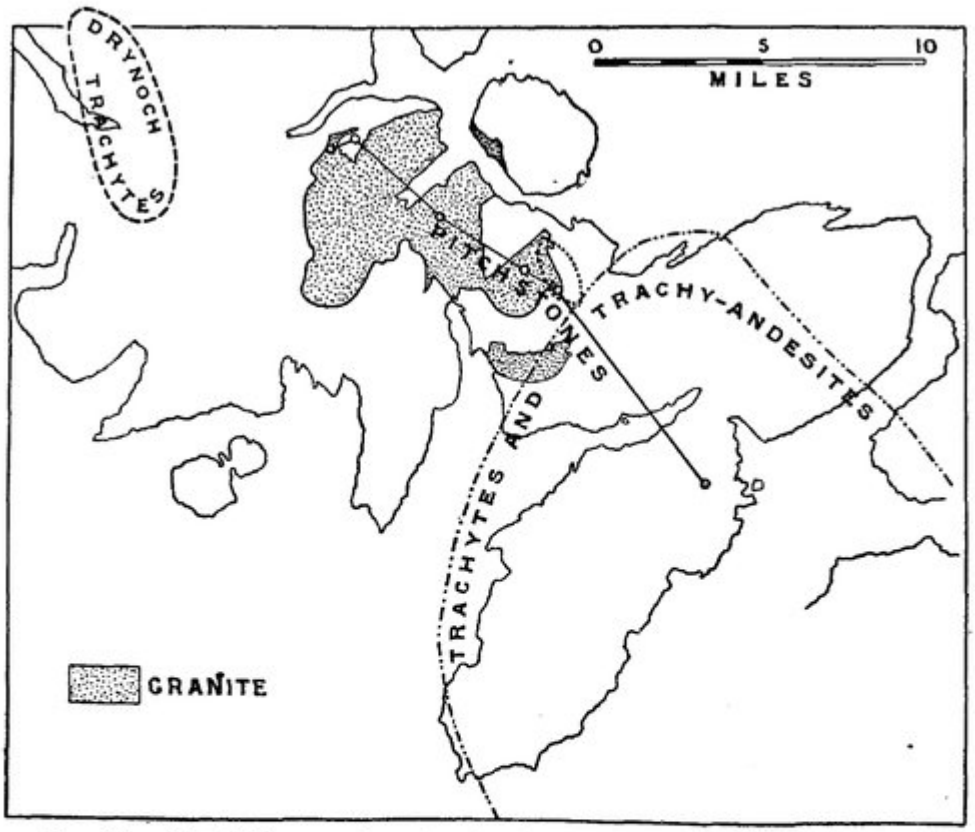


FIG. 76.—Sketch-Map to show the distribution of some trachytic and other dykes.

(*a.*) The broken line encloses the oval area of distribution of the Drynoch group of trachytes.

(*b.*) The line made up of dots and dashes marks the limits of distribution in Skye of the trachytic and allied dykes of Sleat and the Broadford district.

(*c.*) The small circles connected by straight lines indicate the known localities of acid pitchstone dykes.

(*d*) The small oval enclosed by the dotted line shows the area affected by the Coirechatachan type of dykes, probably altered pitchstones. It falls in the middle of the narrow strip of country including the occurrences under (*c*).

(Figure 76) Sketch-Map to show the distribution of some trachytic and other dykes. (CL) The broken line encloses the oval area of distribution of the Drynoch group of trachytes. (b.) The line made up of dots and dashes marks the limits of distribution in Skye of the trachytic and allied dykes of Sleat and the Broadford district. (c.) The small circles connected by straight lines indicate the known localities of acid pitchstone dykes. (d) The small oval enclosed by the dotted line shows the area affected by the Coirechatachan type of dykes, probably altered pitchstones. It falls in the middle of the narrow strip of country including the occurrences under (c).

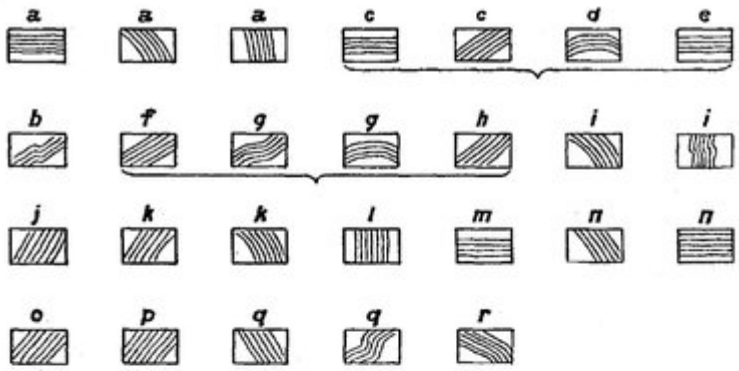


Fig. 77.—Diagram to show the varying inclination of the "rodding" in the dykes of the Broadford and Sleat districts. Explanation in the text. *Del.* C. T. C.

a. Trachyte. Allt Mòr, about two miles S.E. of Drochaid Lusa. In amygdules also.
b. Trachyte. Burn about a mile W. of the top of An Sgulan, Kinloch.
c. Trachyte. Allt Cùl Airidh Lagain, nearly three-quarters of a mile above the road.
d. Trachyte. Allt Réidhe Ghlais, nearly three-quarters of a mile above the road. In amygdules also.
e. Trachyte. Rather more than half a mile S.E. of Broadford Bridge.
f. Trachyte. Allt Cùl Airidh Lagain. Nearly a third of a mile below the road. In amygdules also.
g. Trachyte. Allt à Choin, about 200 yards slightly E. of N. of Kinloch. In amygdules also.
h. Trachyte. Near the foot of Allt Lochan Sgeir, near Kinloch. In amygdules also.
i. Felsite. Burn E. of Cnoc na Cubhaige, Broadford.
j. Felsite. Burn about half a mile slightly E. of S. of Cnoc na Cubhaige.
k. Trachyte. About two-thirds of a mile E.N.E. of Ben Suardal.
l. Trachyte. Coast, about 200 yards E.N.E. of Arduameacan, Loch na Dal. In amygdules also.
m. Acid Pitchstone. Allt Duisdale, nearly 1500 yards above the road. In amygdules also.
n. Dyke of doubtful character, with oligoclase, hornblende, and biotite [6855]. Rather more than half a mile S. of Cnoc a' Chàise Mor, Knock. In amygdules also.
o. Basaltic: S.G. 2.87. Rudha Dubh Ard, near Ord.
p. Basaltic. Coast about 330 yards N.E. of Inver Aulavaig.
q. Trachyte. Coast, nearly half a mile S.S.E. of Ostaig House. In amygdules also.
r. Trachyte. Nearly a mile E.S.E. of Meall Buidhe (S.W. of Armadale). In amygdules also.

(Figure 77) Diagram to show the varying inclination of the "rodding" in the dykes of the Broadford and Sleat districts. Explanation in the text. Del. C. T. C. a. Trachyte. Allt Mòr, about two miles S.E. of Drochaid Lusa. In amygdules also. b. Trachyte. Burn about a mile W. of the top of An Sgulan, Kinloch. c. Trachyte. Allt Cùl Airidh Lagain, nearly three-quarters of a mile above the road. d. Trachyte. Allt Réidhe Ghlais, nearly three-quarters of a mile above the road. In amygdules also. e. Trachyte. Rather more than half a mile S.E. of Broadford Bridge. f. Trachyte. Allt Cùl Airidh Lagain. Nearly a third of a mile below the road. In amygdules also. g. Trachyte. Allt a Choin, about 200 yards slightly E. of N. of Kinloch. In amygdules also. h. Trachyte. Near the foot of Allt Lochan Sgeir, near Kinloch. In amygdules also. i. Felsite. Burn E. of Cnoc na Cubhaige, Broadford. j. Felsite. Burn about half a mile slightly E. of S. of Cnoc na Cubhaige. k. Trachyte. About two-thirds of a mile E.N.E. of Ben Suardal. 1. Trachyte. Coast, about 200 yards E.N.E. of Ardnameacan, Loch na Dal. In amygdules also. m. Acid Pitchstone. Allt Duisdale, nearly 1500 yards above the road. In amygdules also. n. Dyke of doubtful character, with oligoclase, hornblende, and biotite (S6855) [NG 672 083]. Rather more than half a mile S. of Cnoc a' Chaìse Mòr, Knock. In amygdules also. o. Basaltic: S.G. 2.87. Rudha Dubh Ard, near Ord. p. Basaltic. Coast about 330 yards N.E. of Inver Aulavaig. q. Trachyte. Coast, nearly half a mile S.S.E. of Ostlig House. In amygdules also. r. Trachyte. Nearly a mile E.S.E. of Meall Buidhe (S.W. of Armadale). In amygdules also.

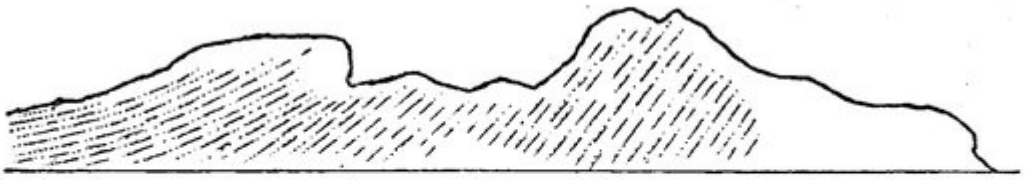
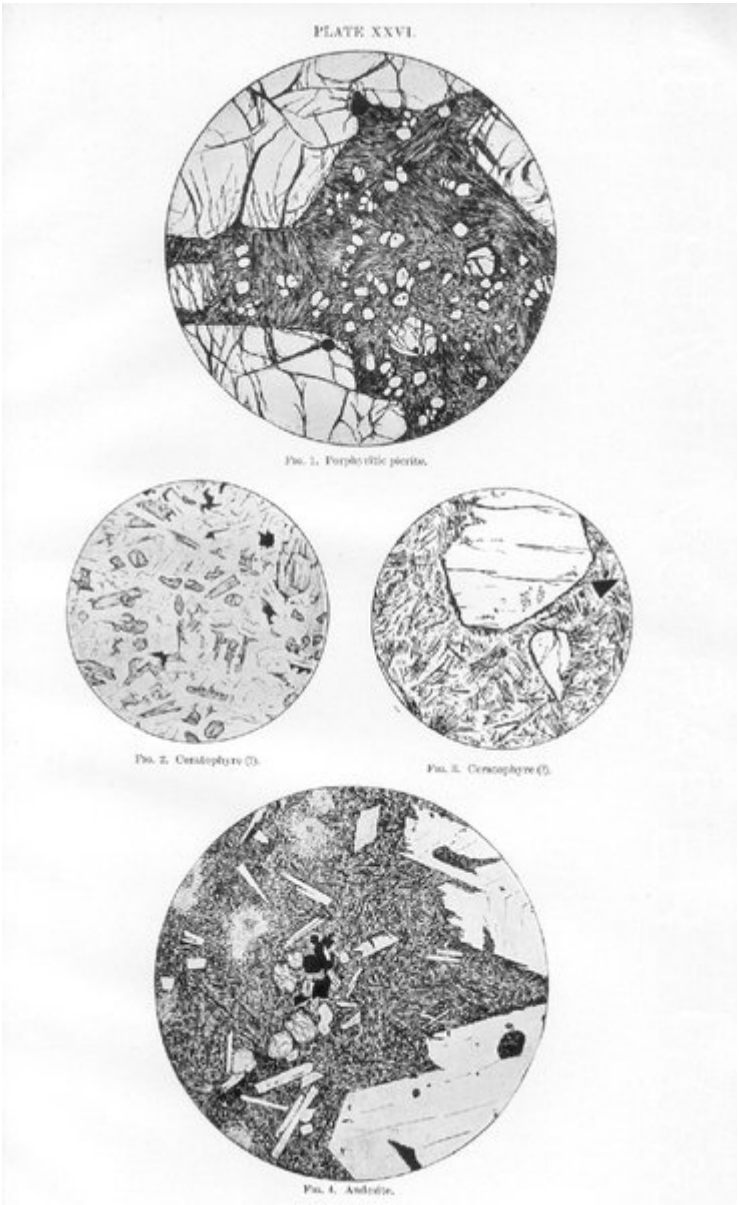


FIG. 78.—Dyke with "rodded" structure, near the river and foot-path, E. of Coire-chatachan, near Broadford. The figure shows the southerly face of the dyke as exposed, with the rodding, the inclination of which to the horizon changes in a length of five yards from 8° to 52°.

(Figure 78) Dyke with "rodded" structure, near the river and foot-path, E. of Coire-chatachan, near Broadford. The figure shows the southerly face of the dyke as exposed, w-ith the rodding, the inclination of which to the horizon changes in a length of five yards from 8° to 52°.



(Plate 26) Fig. 1. (S9980) [NG 427 141] × 32. Porphyritic Picrite, sill S. of Leac nan Faoileann, I. of Soay. The porphyritic elements are olivine and picotite. These recur also in a second generation, but the bulk of the ground-mass is of slender rods of felspar with sub-parallel arrangement and interstitial augite, the structure recalling that of some variolitic basalts. See p. 380. Fig. 2. (S7370) [NG 585 105] × 20. Ceratophyre (?), large dyke W. of Loch Gauscavaig, near Tarskavaig, Sleat: showing an aggregate of crystals of alkali-felspar with small crystals of augite and grains of magnetite. See p. 397. Fig. 3, (S6851) [NG 610 045] × 20. Ceratophyre (?), dyke nearly ■ mile N. by W. of Cnoc an Sgùmain, Armadale:

showing phenocrysts of crypto-perthite in a ground-mass composed of an aggregate of crystals of alkali-felspar penetrated by very numerous needles of augite. See p. 397. Fig. 4. (S3201) [NG 615 165] × 30. Glassy Augite-Andesite, dyke on shore of Loch Eishort, W. of Boreraig: showing phenocrysts of felspar, augite, and magnetite in a ground-mass composed of clear glass crowded with crystallitic growths, largely in the form of minute rectangular gratings. See p. 401.