MATERIALS FOR A CENSUS OF DEVONIAN GRANITES AND FELSITES.

BY R. N. WORTH, F.G.S.

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I do not think that this paper requires any justification, but should it be deemed otherwise, such may possibly be found in the remarks of Sir Archibald Geikie in his recent Presidential Address to the Geological Society of London, on the igneous activities of Devonshire, in which he comments on the great quantity of work there remains to be done by way of investigation in this county. One cannot help feeling, however, that had a tithe of the official attention been given to the West of England that Scotland has received, the balance of interest and information might have been more evenly held. At the same time, while it is quite natural that the Scottish Directors of the Geological Survey should see that Scotland is not forgotten, it is equally natural that Devonian geologists should be inspired by a similar spirit.

The chief object of this contribution is to give some idea of the extent of variation in the granites and felsites of the county, a point to which very little attention seems to have been paid, either officially or independently. Years of geological work on Dartmoor and its borders have made me fairly familiar with the range of that variation; and the bulk of the present paper consists of a descriptive list of specimens of granites and felsites which I have, with very few exceptions, collected, and all of which I have seen. I do not think it possible to suggest any condition or gradation of granitic or felsitic material in composition, structure, colour, or metamorphism, that is not represented, or that is not linked by intermediate phases to all the rest. What we attempt to distinguish as separate rocks in this connection are, in fact, nothing more than passing stages. Their con-

dition and appearance will vary with their history, but at bottom they are essentially one and the same, and nowhere in the whole series can any hard and fast line be drawn.

The best method of forming such a collection as is here described is to hunt the beds of the Dartmoor streams, the alluvia of their valleys, or the piles of material left by the ancient tin-workers, which are simply detrital matter in another form. For all practical purposes, in this connection, the river beds on Dartmoor may be regarded as out-door museums of the rocks of the valleys through which they run; and thence one may obtain specimens of felsitic dykes which would probably escape even careful search; for while the courses of the rivers form to a large extent rough sections of the country—where they traverse rocky channels—there are many points at which they pass over alluvial deposits by which the rocks are masked. But it may fairly be assumed that at some time or other the loose material of the river beds has been derived from some points of the watershed higher up their courses; and that, in such an estimate of Dartmoor petrology as the present, is practically all we wish to know. The difficulty of tracing dykes *in situ* over a wide extent of moorland country, when they are not merely a few feet but often a few inches only in breadth, is all but insuperable—how difficult I have practically learnt from my own utter inability, after repeated efforts, to trace the block of Trowlesworthite which I found several years since on Trowlesworthy Tor, to its origin, though within fairly narrow limits it is perfectly certain where that origin must be.

The description given by De la Beche of the Dartmoor granite is, in a general view, as good as could be framed:[1]

"The granite of Dartmoor is, as a whole, a coarse-grained mixture of quartz, felspar, and mica, the latter sometimes white, at others black, the two micas occasionally occurring in the same mass. It is very frequently porphyritic from the presence of large crystals of felspar, and here and there schorlaceous, but the latter character is chiefly confined to the outskirts, where the Dartmoor granite adjoins the slates. . . . The schorl not unfrequently occurs in radiating nests, of variable size and abundance. A complete passage may generally be traced between the compound of schorl and quartz, usually termed schorl rock, and the ordinary granite. The mica usually disappears as the schorl begins to be abundant, but sometimes, though not very commonly beyond limited areas, the granite rock is a mixture of mica, schorl, felspar,

[1] *Report on the Geology of Cornwall, Devon, and W. Somerset*, 157, 158.

and quartz, in nearly equal proportions. After the absence of mica, the next mineral which usually disappears is the felspar, leaving the compound a mixture of schorl and quartz. . . . Even the compound of quartz, felspar, and mica would seem more variable towards the outskirts of the mass than in the interior, and schorlaceous veins and veins of fine granite appear more frequent under such circumstances."

Generally speaking, De la Beche also notices the very variable character of the Devon and Cornwall granites; and incidentally describes many varieties of elvans or felsites; recording some of the changes that take place in short distances in elvan dykes themselves, alike in colour and in structure: as for example when he says of some of the West Cornwall elvans that they sometimes acquire a more granitic structure in the central parts of the dyke. He remarks:[2]

"They may be considered as mere granite dykes, the chemical composition of which bears great analogy to that of the chief granitic masses in the vicinity of which they occur, the mineral structure considerably depending on the conditions for cooling to which they have been exposed."

It was hardly possible when De la Beche wrote to have more clearly indicated the general conditions of the problem. Many years ago the late Mr. Godwin-Austen suggested that the granites and granitic rocks of Devon were of three periods—the ordinary porphyritic granite of Dartmoor, the schorlaceous granite, and the elvans; and for a long period that opinion was generally held. At length it was recognised that the schorlaceous varieties were the product of alteration in the mineral structure of the original rock, and that while subsequent in form they were not really later in origin. The periods were thus reduced to two—that of the formation of the granite, and that of the formation of the elvans or felsites, which are clearly more recent than the mass of the granite, since they intersect it in common with the adjacent rocks. And this view has generally been accepted up to the present day.

As the result of my own investigations I was led in 1888 to suggest that in Dartmoor we had the base of a volcanic region, which at some point or points reached the surface definitely as a volcano, but the superstructure of which had been denuded. I suggested also that in the elvans or felsites, we had a series of rocks intermediate between the plutonic granites, and the sub-aerial lavas which formed part of that superstructure.

[2] *Op. cit.* 184, 185.

The question was then put, and naturally: If Dartmoor was a volcano, where are its volcanic rocks? It is, I think, a sufficient answer to point out that the amount of denudation to which Dartmoor has been exposed would naturally remove this class of rocks, in laying bare the basal granite. As a matter of fact, however, felsitic fragments do occur here and there on Dartmoor, which show flow structure and approximate very nearly to eruptive rocks; and alike in South and North Devon, (as in detritus at Cattedown[3] and among the porphyritic pebbles of Rockham Bay[4]) example of andesites and volcanic grits are found, associated with ordinary granites and felsites, which cannot be traced in Devon *in situ*, but which such a volcano as that suggested would naturally yield.

Still further light was thrown upon the subject by an inquiry into the origin of the igneous fragments in the breccias at the base of the Trias of South Devon, and specially along the coast from Teignmouth to Exminster. It was found that these consisted:—of granites precisely resembling those of Dartmoor; schorlaceous rocks of various kinds, to all appearance of similar origin; a wide variety of felsites, mostly indistinguishable from Dartmoor elvans, while others had a strongly marked rhyolitic or andesitic character; and a number of more or less felspathic traps, ranging from andesites to basalts, most of them closely resembling *in situ* traps of the Exeter, Crediton, and Tiverton areas.[5]

Thus sundry gaps between the plutonic granites and their volcanic representatives were filled. Morever it was noteworthy that the granites were much less frequently represented than the felsites and andesites and their allies, which is precisely what we should expect to find at such a comparatively early stage of denudation as that which supplied the Dartmoor materials to these breccias.

A further step was taken when a boss of the Cawsand felspathic trap at Withnoe was found to pass in the course of a few feet from "a rhyolitic pitchstone to a trachytic quartz felsite[6]" that is, from a rock which would unhesitatingly be pronounced volcanic, to one which would unhesitatingly be accepted as a felsite or elvan—a rock that is known to pass absolutely and certainly into granite.

[3] *Trans. Devon Assoc.* xxi. 77–80.

[4] *Ibid.* xxiii. 400–406.

[5] See "The Igneous Constituents of the Triassic Breccias and Conglomerates of South Devon." *Quar. Jour. Geo. Soc.* xlvi. 69–83.

[6] See "Additional Notes on the Cornish Trias." *Trans. Roy. Corn. Geo. Soc.* 1891, 338–346.

Since then Mr. Ussher has observed in the vicinity of the Trias of Thurlestone a dyke of quartz-porphyry (Horswell Quarry, North Milton) or elvan, which with equal certainty passes into an andesite. In fact we seem to be getting this sort of evidence on all hands.

The list given will, I think, show in its wide variety and close and intimate gradation that our granites, felsites, and andesites, are not distinct species, but changing conditions—rather pathological than physical—of a common original.

What I have to suggest therefore is this: that instead of our granites and felsites being of three periods as Mr. Godwin-Austen held; or of two periods as we have been accustomed to hold of late; that they with the felspathic traps of Central and East Devon—are really of one. I do not of course mean that they are absolutely contemporaneous, but that they are part of one and the same great series of igneous activities. That the elvans and felsites are later than the granites is clear, because they traverse them; but this may have happened at any period subsequent to consolidation, and need not infer any great range in time. What is equally to the purpose is the fact, hitherto too much overlooked, that porphyritic felsites traverse some of the felspathic traps, and must so far therefore be subsequent to them. I have found fragments in the red-rock breccias, showing junctions between porphyritic felsite and andesite; and examples occur *in situ*.[7]

There is no doubt that the granite of Dartmoor is later than the surrounding Carboniferous rocks, because it sends veins into them. It is evident also that the granites, the felsites, and the felspathic traps are earlier than the red-rock breccias, because their fragments are found therein.

In my paper on the "Igneous Constituents of the Triassic Breccias,"[8] I concluded

"That the elevation of Dartmoor and the associated igneous phenomena, which have been commonly regarded as post-Carboniferous and pre-Triassic, may in all probability be assigned to narrower limits, and be regarded as not earlier than Permian times, and possibly as occupying the Permio-Triassic interval, continuing into the earlier stages of the Trias. Certainly if the eruptions of the 'felspathic traps' of Devon and their associated elvans are related to the great Dartmoor movement (and, as we have seen, these traps are in part of Triassic date), we cannot well give the origin of that movement a higher than Permian antiquity."

[7] There are dykes of quartz-porphyry in a cliff quarry of andesite near Withnoe, noted and described by Mr. Bernard Hobson, F.G.S.—*Quar. Jour. Geo. Soc.* xlviii. 500.

[8] *Op. cit. Quar. Jour. Geo. Soc.*

There seems now, however, to be a growing consensus of opinion that these breccias are Permian. If this should prove so, it will only be needful that the conclusion be modified by restriction; when we should have to assign the great series of Devonian igneous rocks which have the granites at one end and the andesites at the other, to a period between the Lower Carboniferous and the Permian (to some extent inclusive).

It seems a question whether the "gabbros" in the Tavistock and Mary Tavy district, and some at least of our intrusive dolerites, may not be connected with a still earlier period of the same range of igneous activities, but I cannot deal with that now.

The list which follows is arranged alphabetically under the names of places—the only method that seemed to answer the purpose in view. When no definite localities are given it may be assumed that the examples occur either in beds of streams or alluvial deposits. The descriptions are purposely (and necessarily, seeing that over 400 varieties are dealt with) simple and macroscopic. Granite is used in its ordinary acceptation; felsite for all rocks with a felsitic matrix; pegmatite for quartz-felspar rocks; greisen for quartz-mica-; luxulyanite for felspar-schorl-; micas generally are described by their colour, and no attempt is made to discriminate between the felspars. The main object has been to give the general composition and physical characters in a plain and succinct form; and to this other details have been subordinated. Finally it must be borne in mind that the list is one of *rocks*, not *localities*, and does not profess to be exhaustive.

Avon Valley (Black Tor).—Bluish-grey: close-textured, but developing modified porphyritic characters, both felspathic and quartzose, with a sprinkling of schorl, evidently replacing mica.

Avon Valley (Black Tor).—Pinkish-brown: differs from the last almost wholly in colour, but is somewhat less disposed to the porphyritic phase.

Avon Valley (near Whiteaburrow).—Reddish-brown: fine even-grained slightly schorlaceous pegmatite.

Avon Valley (ditto).—Pink, weathering to cream: fine-grained pegmatite, with porphyritic quartz blebs, occasional porphyritic felspars, and frequent stellate aggregations of schorl.

Avon Valley (ditto).—Reddish-brown: fine even-grained granite with black mica, and occasional porphyritic felspars of a lighter hue; some schorl, occasionally segregated and, less frequently, pseudomorphic.

Avon Valley (near Ryders Rings).—Dark-red to reddish-grey: this rock has little resemblance to ordinary granite, the base consisting of a granular aggregate of quartz and ferruginous matter, with occasional flecks of white mica; but it contains porphyritic crystals of felspar and quartz. Some of the ferruginous material has decayed and left the texture of the rock open; probably it replaces an iron mica.

Avon Valley.—Brownish-red: even-grained schorlaceous pegmatite, with veins.

Avon Valley.—Grey, creamy: finely-granular pegmatitic base, with occasional blebs of quartz and porphyritic felspars, and here and there a nest of schorl, or a little needle that may replace mica.

Avon Valley.—Red-brown: massive jaspideous quartz-porphyry.

Avon Valley.—Red-grey: coarse-textured but compact granite, with red felspars, many well-twinned, black and white micas, and schorl.

Avon Valley.—Dark red-brown: uneven-textured, compact granite, with black mica and rich Indian-red felspars.

Auswell Rock.—Grey and brown: a somewhat open-textured (having small irregular cavities) sub-crystalline quartzose rock.

Bel Tor.—Pale red: crystalline schorlaceous granite; small content of mica, but schorl generally present and developed in prismatic aggregates.

Bickleigh Vale *(in situ)*.—Warm-buff: compact felsite, saccharoid grain with an occasional small pyramid of quartz.

Blackett (near Wrangaton).—Buff: loose-textured medium-grained granite with abundant black mica.

Blackett.—Warm-grey: *(a)* sub-granular felsite approaching an earthy texture, with small porphyritic granules of quartz and needles of schorl; *(b)* coarser and less compact variety; *(c)* chalky-weathering ditto.

Blackett.—Buff: fine-grained granitic matrix with partly kaolinised felspar, porphyritic quartz and a little black mica and schorl; associated with pegmatite of similar texture, and large porphyritic felspars.

Blackett, (near)—Creamy-pink: sub-crystalline felspathic rock with casual schorl and porphyritic characters; the felspathic base is graphically mottled red and cream.

Bovey Tracey—Grey; a fine grained felsitic pegmatite, in parts rather porcellanous: the felspar largely kaolinised.

Brattor (near Bridestowe)—Pale red: a coarse schorlaceous pegmatite; felspar largely predominating; crystalline forms both in quartz and felspar; some of the latter patched greenish-grey.

Brattor—Red: moderately coarse-textured pegmatite, with porphyritic blebs of quartz and occasional nests of black mica.

Brazen Tor (Mary Tavy)—Pink : fine granular pegmatite.

Cann (on the Plym)—Cream colour : very finely-granular elvan with occasional distinct quartz and white mica ; calcite and pyrites developed on joint faces. This is *in situ* in Cann Quarry, and like others of its class is really an aplite.

Cattedown detritus, found in 1887–1888 on the northern slope of Cattedown, 60 to 70 feet above datum, in pebbles ranging from 3½ lbs. in weight to a quarter ounce and under. Contains *inter alia :* cream-coloured granular felsite : red-brown porphyritic felsite, with blebs of quartz and imperfect felspar crystals ; schorlaceous pegmatite ; fine-grained granitoid rock with black mica and porphyritic quartz : coarse-grained rock of similar type but more nearly approaching granite. Among their associates were pebbles of volcanic grit, and hypersthene- and augite-andesite, not now found in the county *in situ ;* and the first of the three quite novel and unique.

Chagford—Red : fine even-textured sub-crystalline schorlaceous pegmatite.

Chagford—Brown : medium-texture crystalline granular pegmatite.

Chagford—Dark grey : fine-grained aggregate of black mica and quartz, forming segregation in granite (called "pigs' eggs" in West Cornwall.)

Chagford—Pink and black : a well developed luxulyanite with a little quartz and some ferruginous decomposition products.

Clazywell Pool (Meavy Valley) near—Red and dark grey : junction of a red pegmatite, in which the felspar base is curiously speckled with more or less rounded granules of quartz and schorl associated with a porphyritic felspar ; and a grey chiefly quartzose pegmatite thickly sprinkled with minute specks of schorl ; there is a pinkish intermediate tinge.

Clazywell (ditto)—Grey : fine-granular mixture of felspar and quartz sprinkled with fine needles of schorl ; a little mica.

Collard Tor (near)—Red, weathering to pale pink : vitreous felsite weathering to earthy, with a few small granules and pyramidal crystals of quartz (the disappearance of some of which have left cavities) and light patches where crystallisation has begun in the felspathic base.

Colwell (Egg Buckland)—Brownish-grey : finely-granular felsite, with occasional small bleb of quartz or fleck of white mica ; interpenetrated by dendritic markings from some of the joint faces. This is another exposure of the Cann elvan.

Cornwood—Bright red : massive and sub-crystalline felspathic base, with a little quartz and casual schorl.

Cornwood—Pink : schorlaceous pegmatite, rather coarse texture, with porphyritic development of quartz.

Cornwood—Greenish-grey: schorlaceous greisen with extreme development of mica, a little kaolin.

Cosdon Beacon (near summit)—Darkish grey: chiefly a fine-textured granite with abundant black mica, a slight porphyritic tendency; schorl in segregative crystalline nests, in the centre of somewhat coarser aggregates of quartz and felspar, with ferruginous staining, from which the mica has disappeared.

Cosdon Beacon (near Sticklepath)—Dull crimson: vitreous felstone, mainly a massive felspar with a little free quartz, and schorl casually disseminated and in strings; weathers to a whitish chalky crust.

Dart (East, near Dartmeet)—Reddish-brown: fine-grained schorlaceous pegmatite with porphyritic felspars.

Dart (ditto)—Coarsely-granular mixture of quartz, schorl, felspar; the latter occasionally crystalline and partially kaolinised.

Dart (ditto)—Red: mainly massive felspar with quartz and schorl.

Dart (ditto)—Light brown: fine-textured granular schorlaceous pegmatite.

Dart (ditto)—Brownish-grey: fine-grained granite, with black mica very closely and evenly distributed in minute black specks.

Dart (ditto)—Pinkish-grey: a crystalline pegmatite of fairly even texture with a few porphyritic felspars and plates of black mica.

Dart (ditto)—Grey: an even-textured pegmatite weathering red-brown; a little schorl, mica casual and scarce.

Dart (ditto).—Cream-colour: schorlaceous pegmatite; moderate grain.

Dart (ditto).—Dull pink: matrix felspar and schorl with abundant irregularity; porphyritic quartz.

Dartmeet (East Dart).—Grey: porphyritic felsite with very fine even-textured granular base of quartz, felspar, and black mica; porphyritic quartz in blebs and corroded grains; well-formed kaolinised crystals of felspar; black mica in hexagonal plates.

Dartmeet.—Red to grey: jaspideous vein in granite, containing fragments of quartz and felspar and some mica.

Dartmoor (locality unknown).—Varied rich red and black: one of the most distinctive of the Dartmoor rocks, unfortunately not found *in situ*; mainly felspar and schorl with a smaller content of quartz: felspar red, of various shades, occasionally striped and mottled—some massive, other part crystalline, the crystals ranging to over an inch in length, a little kaolinization; schorl, mostly massive.

Dartmoor (locality unknown)—Dark reddish-grey: a fine-grained quartzose and schorlaceous granite with interstitial ferruginous matter.

Devil's Bridge (near Princetown).—White: mainly crystalline-granular felspar and quartz, studded with little prisms of schorl; mica casual.

Ditsworthy, near (Plym Valley).—Red: vitreous and granular felsite developing porphyritic felspars and quartz; a little schorl; a cavity from which a felspar crystal has disappeared contains acicular schorl (achroite) and fluor spar.

Ditsworthy.—Pale-red: giant granite, massive felspar with quartz and white mica; occasional felspar crystals.

Ditsworthy.—Red: schorlaceous pegmatite with porphyritic felspars.

Ditsworthy.—Dull buff: schorlaceous pegmatite, mainly felspathic, the peculiarity of which is that the schorl to a large extent outlines and isolates the irregular felspar granules.

Ditsworthy.—Dark red: a coarse irregular aggregate, mainly of felspar, quartz, and mica; the two former porphyritic, and the latter the predominant mineral in what may be regarded as a fine-grained interstitial granite; quartz small in quantity; felspar predominant; some of the felspar crystals over an inch in length; mica both black and white.

Ditsworthy.—Dark reddish-brown: less porphyritic variety of above; basal granite more defined and quartzose.

Ditsworthy.—Dull red: this would be taken for a compact red felsite, with veins of quartz and schorl and an occasional sprinkling of the last mineral; its occurrence in the field, however, shows it to be simply a highly altered slate; fused by the granite and almost wholly reconstituted. A similar rock occurs opposite the Dewerstone at Shaugh. They are mentioned here to show both the extent to which alteration may be carried, and the possible origin of some of the felsitic material.

Erme Valley (near Harford).—Junction of red pegmatite containing porphyritic felspars and quartz blebs, with dark grey schorlite, including pink porphyritic felspars. The felspar of the base in the one is apparently replaced by the schorl of the other.

Erme Valley (above Harford).—Cream: partially kaolinized felspar; irregular quartz; schorl; a little black mica.

Erme Valley (ditto).—Pale pink: slightly schorlaceous pegmatite.

Erme Valley (ditto).—Pink: a somewhat coarse-textured granular-crystalline pegmatite with a small quantity of schorl.

Eylesborough (on Plym).—Pinkish-grey: coarse mixture of quartz and felspar with little schorl; felspars—some pale and kaolinised, others fresh and bright pink.

Eylesborough—Light red: coarse sub-crystalline schorlaceous pegmatite with quartz-veins and occasional porphyritic felspars.

Eylesborough—Pale red: irregular-texture granular-crystalline granite with well-twinned felspars.

Eylesborough—Grey: coarse schorlaceous pegmatite; the felspar mostly kaolinised.

Eylesborough—Cream: even-textured granular-crystalline schorlaceous granite.

Eylesborough—Reddish-brown: coarse-textured compact granite with black mica, a little schorl; mainly quartzose.

Eylesborough—Reddish-brown: another coarse compact granite, with less schorl, but mainly felspathic.

Eylesborough—Yellowish-brown: fine sub-crystalline granite, rather granular in the main, with schorl clusters, and a little vivianite (some of these Eylesborough examples are from the mine workings.)

Golden Dagger (near Postbridge)—Pinkish-grey: sub-crystalline originally: now the felspar is largely kaolinised; and the rock mainly consists of quartz crystals and granules and a little black mica in a loose-textured felspathic base; there is also a fair quantity of white mica.

Great Tor (Tavy Cleave)—Light red: fairly even-granular pegmatite, forming junction with schorlite containing a little felspar.

Great Tor—Red: a very coarse—indeed "giant"—pegmatite.

Great Tor—Reddish-grey: coarse and irregular crystalline schorlaceous pegmatite; schorl in prismatic aggregates; little nests of perfect quartz crystals.

Grenofen (Walkham Valley)—Greenish-grey: sub-crystalline base with occasional felsitic matter; some black mica and a little hornblende and pyrites; abundant porphyritic red felspars: an elvan, only distinguished from granite by the presence of a modicum of unchanged felsitic material.

Grenofen—Grey: another variety of preceding, differing mainly in colour, but mica more aggregated.

Greylake Cove (south of mouth of Yealm)—Red: fine-textured schorlaceous pegmatite.

Greylake Cove—Red: vitreous felsite, with porphyritic quartz blebs.

Greylake Cove—Dark reddish-brown: a vitreous felsite developing crystalline tendencies, with a few quartz blebs. The more crystalline portions of the felspar are a brighter red than the massive.

Greylake Cove—Yellow: a somewhat earthy-textured pegmatite, with a little schorl.

Greylake Cove—Pale brown: vitreous felsite developing crystalline tendencies, with quartz blebs and a little mica.

Greylake Cove.—Buff: sub-crystalline; somewhat earthy mainly felspathic matrix, with mica, quartz, and felspar, all slightly porphyritic; apparently an elvan which has developed crystalline tendencies.

Greylake Cove—Pale red: a finely-granular mainly felspathic pegmatite with a patch of schorl. (These Greylake examples were evidently brought down by the Yealm, but there are none such on the Yealm beaches.

Hanger Down (Cornwood)—Red-brown: compact sub-crystalline granite with a little mica.

Hangershell (near Harford)—Grey-drab: fine-grained granitic matrix with abundant black mica—some in nests—containing numerous large porphyritic felspars, and some quartz masses; in parts radiated folia of schorl.

Harford (hill east of)—Pink of various shades, to grey: even-textured highly-compact granular-crystalline schorlaceous granite, with muscovite and a pale green talcose mica—probably gilbertite for the most part, but ranging more closely to talc.

Harford (near village, on Erme)—Pinkish-grey: fine granular pegmatite, with schorl in nests and very minutely disseminated through base.

Harford (ditto)—Mottled dark grey and pink mainly: an irregular mixture of rocks rather than an individual; the dark grey parts chiefly quartz and schorl; the pink fine granular pegmatite; quartz also occurs in patches and veins; and all three components mingle with each other and vary the complex. A curious example of the changes in these rocks within a small space.

Harford.—White base: quartz, traversed in every direction by long isolated prisms of schorl.

Harford, junction—Comfused mixture of quartz and felspar, both developing crystalline forms but the quartz most distinctly.

Harford—Pink: an earthy decaying felsite with light patches representing sometime porphyritic felspars; some quartz, and a few cavities containing acicular schorl.

Harford—Pale-pink: pegmatite, mainly felspar with veins and granular aggregates of quartz; close texture; some of the felspar passes into yellow decomposition products.

Hemerdon, near (Plympton)—Warm-grey: a quartzose elvan developing porphyritic patches of quartz sprinkled with mica.

Hen Tor (Plym Valley)—Creamy-grey: porcellanous texture at first sight, but really very finely granular, a little fine schorl; a felsite between the vitreous and the earthy stages.

Hen Tor—Warm-grey: a fine even-textured schorlaceous pegmatite; the schorl chiefly acicular and the materials very regularly distributed.

Hen Tor—Dark red, weathering creamy-grey: a massive sub-vitreous felsite dotted with clear quartz.

Hen Tor—Dull pale red: a somewhat similar rock but containing schorl in specks and small sub-parallel veins, giving it a banded aspect.

Hen Tor—Pink and black: felspathic base, mainly massive but developing crystalline features, with more or less nodular patches of felted schorl, which stand out from the body of the rock on a weathered surface.

Hen Tor—Pale reddish-grey: felspathic rock, hornstone texture, with fine dark wavy bands; from a junction and may in fact represent much altered slate, but the felspathic character of the base is very distinct.

Hen Tor—Pink: semi-vitreous felspathic base changing to chalky texture; small crystals of felspar, flecks of mica, granules of quartz, and needles of schorl disseminated throughout.

Hey Tor—Warm-grey: a well charactered granite with very large porphyritic felspars; something like the Cornish Lamorna.

Hexworthy—Pale red and black—capel of the tin lode at Hexworthy mine; mainly a coarse sub-crystalline schorlaceous pegmatite, plus some cassiterite; shows inclination to be porphyritic.

Hexworthy—Pale pink: what may be described as a banded schorlaceous granite next a rich tin lode, save that mica, if once present, is now wanting: the first band is a luxulyanite, pink massive crystalline felspar with schorl; next comes a band of schorlite, quartz and schorl; then a more irregular mixture of quartz, schorl, felspar, and cassiterite; then a band at parts almost wholly quartz, at others less frequently felspar; finally, the lode, which consists wholly of quartz and cassiterite, the latter predominating, granular, but with many brilliant crystals in cavities —rosin and sparable.

Hexworthy—Red: vein of earthy compact felspar, coated with quartz.

Hoe Fissure (detritus)—White: uneven-texture granite; mainly white felspar, sub-crystalline, with a much smaller quantity of quartz; both white and black micas; occasional nests of finer grained and more evenly distributed material.

Ivybridge (Erme valley above viaduct)—Pinkish-red to grey: semi-schistose or platy; moderate grained, rather loose-textured aggregate of felspar (partly kaolinized) and quartz, both occasionally porphyritic, with black and white mica.

Ivybridge (ditto)—Red-brown: moderately even-textured sub-crystalline granite with black mica and large porphyritic felspars. Some of the joint faces coated with fluor.

Ivybridge (Erme valley above viaduct).—Yellowish-grey : medium-granular granite, with black mica, some porphyritic quartz and felspar.

Ivybridge (ditto)—Brownish-red : a junction rock : small-grained schorlaceous pegmatite.

Ivybridge (ditto)—Grey and yellow-grey : junction between a fine-grained white granite with here and there a minute speck of white mica and schorl ; and a coarser and looser-textured yellow schorlaceous granite, with light mica.

Jump—Greenish-grey weathering brown : a granular quartzose micaceous elvan ; cut in road in laying water pipes.

Kingsett (Meavy valley)—Grey-buff passing into reddish-brown : a very fine-grained and evenly-textured pegmatite, with a little schorl.

Kingsett—Red : a fine-grained even-textured luxulyanite ; red granular felspars with evenly distributed schorl ; occasionally a porphyritic felspar ; a little quartz.

Laira, pebble in bed of, at railway bridge foundations—Grey : coarse sub-crystalline granite with white mica and little schorl.

Laira (ditto)—Pink : slightly porphyritic granite with white mica, and a quantity of fine-granular felspathic matter and quartz, forming a kind of pegmatitic base.

Laira, (ditto)—Warm-grey : essentially a schorlaceous greisen ; quartz and acicular schorl with an abundance of golden mica ; parent rock not known on the moor.

Laira, (ditto)—Grey-brown : greisen with abundant mica.

Langcombe (Plym valley)—Grey-buff : fine close-textured felsitic base with minute differentiated blebs of quartz and felspar, more or less crystalline but wholly kaolinised. Some of this matter has weathered away on the outer surface and left minute cavities ; there are light stripes suggesting lines of flow.

Leather Tor (Meavy Valley)—Grey : a coarse variety of Devil's Bridge.

Leather Tor—Greenish-grey : a greisen with abundant gilbertite.

Leather Tor—Pink : moderate-granular texture ; chiefly felspar and quartz with a little schorl and white mica.

Leather Tor—Pale red : a somewhat coarse granite with a little mica, and rather less schorl.

Leather Tor—Yellowish-grey : an even-grained quartzose granite, with a small quantity of white mica and schorl, but for which it would rather be a granular quartzose pegmatite.

Leather Tor—Grey : moderately even-grained schorlaceous granite, with a little black mica and porphyritic felspars.

Lee Moor (Torry Valley)—Grey : compact and heavy granular quartz-felsite, with mica and occasional cavities.

Lee Moor—Bluish-grey : compact porcellanous felsite with veins of coarser texture containing porphyritic quartz blebs and a little mica ; flow structure well marked.

Lee Moor—Black and white : a mixture of white felspar, partially crystalline and masses of acicular schorl—a white luxulyanite, the difference between this and the typical luxulyanite being essentially in the colour of the felspars.

Lee Moor—Grey : a volcanic breccia, showing flow structure in a felsitic matrix. The included materials are mainly quartzose and broken felspars, but there are fragments of volcanic rocks, some of which resemble examples in the volcanic grit of Cattedown.

Lee Moor, junction—Yellowish-brown : uneven-textured porphyritic granite with abundant black mica.

Lee Moor—Bluish-grey : an earthy-textured trachytic felspathic rock with schorlaceous veins and patches.

Lee Moor—Warm-brown : compact crystalline quartzose granite with abundant white and black mica, and a little schorl. (These Lee Moor examples are largely from detritus—surface or associated with the china clay workings.)

Lophill (Tavy)—Cream : a very fine non-porphyritic granular felsite.

Lundy Island—White : rather coarse sub-crystalline mixture of felspar and quartz, and white mica largely in nests—felspar predominant, and occasionally kaolinised.

Lundy—White : ditto, quartz more prominent.

Lundy—White : ditto, platy or pseudo-schistose structure.

Lundy—Dull cream : moderately-fine granular-textured granite, with black and white micas.

Lundy—Grey : a saccharoid-granular quartzose base containing porphyritic felspars and quartz blebs, and a little mica.

Lundy.—White : coarse irregular texture, generally crystalline ; white felspar in bulk, with quartz generally in blebs and granules, but some with definitely crystalline form ; bronzy mica. The most noticeable feature here is the presence of a little fluor zoning kaolinised felspars. We have thus fluor associated with granite at each end of the county as well as on Dartmoor, for it occurs on joint faces in the granite of Gunnislake.

Lustleigh.—Grey : porphyritic granite ; base chiefly fine-grained granite with black and bronze micas ; needles of schorl in some of the porphyritic felspars.

Lustleigh.—Grey : porphyritic granite much resembling preceding, but porphyritic felspars not so prominent, and black mica more so.

Lustleigh.—Banded rock: schorl, felspar, and quartz respectively predominating in bands.

Lustleigh (Foxworthy).—Cream-colour: fine-grained pegmatite with small needles of schorl.

Lustleigh (Foxworthy).—Red: coarse-textured pegmatite, mainly felspar with a little schorl, and nests of schorl and quartz.

Lustleigh (Foxworthy).—Aggregates of schorl and quartz in loose-textured pegmatitic felspathic matrix.

Lustleigh.—Grey: fairly even grain with porphyritic white felspars; black mica in fair quantity.

Lyd Valley.—Orange: finely-granular quartz mainly. Query whether quartzite or quartz-felsite.

Lyd Valley.—Pale pink: medium-textured semi-granular pegmatite with thinly distributed schorl.

Manaton.—Red and grey: granular pegmatite with nests and strings and specks of schorl; much of the matrix is so even and round grained as to recal the oolitic aspect.

Meavy Church.—Warm-buff, used in some of the old work and probably local; an open-textured earthy ferruginous elvan, with a little differentiated quartz. Would be commonly called a frestone.

Meavy Valley (the examples which follow are all above Meavy village).—Pale pink: granular-crystalline aggregate of felspar and quartz—the latter plentiful, with white and black micas and a little schorl.

Meavy Valley.—Red: a granular luxulyanite with the schorl in irregular strings and patches; occasionally a small porphyritic felspar of lighter tint and a quartz crystal.

Meavy Valley.—Quartzose rock, seamed and lined by schorl with occasional patches of kaolinised felspar. Not a granite now, but some of the schorl indicates the former presence of mica.

Meavy Valley.—White: moderate and fairly-even grain; white felspars considerably predominating over quartz; black mica.

Meavy Valley.—Grey: a fairly even-textured granite, mainly composed of white felspar and black mica, the latter very prominent.

Meavy Valley.—Cream: granular-textured, mainly felspar with a little white mica—a micaceous pegmatite rather than a granite.

Meavy Valley.—Brownish-yellow: mainly felspar with schorl in strings and patches, and quartz.

Meavy Valley.—Dark grey: base fine-felted schorlite, schorl predominant, with pseudomorphs of quartz after felspar.

Meavy Valley.—Pale brown: fine even-textured granular granite, with white mica.

Meavy Valley.—Rose : an even-textured granular pegmatite.

Meavy Valley—Buff-grey, weathering on exterior to dark Indian-red : very fine felsitic granular base, with blebs and crystals of quartz, occasional development of felspathic forms, and numerous cavities whence crystals of quartz and felspar have disappeared—most of them are empty, others contain a lining of fine ferruginous matter or small quartz crystals ; some of those in the weathered portion, which is stained with iron, are wholly filled with ferruginous material, others contain well-charactered linings of black hematite. This is probably part of a narrow intrusive vein, not seen *in situ*.

Meldon (West Okement).—Brown : mainly a granular mixture of felspar and quartz with a little schorl.

Meldon.—White : an example of the so-called granulite, in junction with a pale-pink irregular coarse-textured granite. The granulite mainly quartz with a little mica, and an occasional decayed felspar ; also crystals of green tourmaline. The granite chiefly characterised by the presence of both white and pink felspars, the latter mostly decayed, white mica and green tourmaline prominent. It is essentially a coarser granulite, plus essential instead of accidental felspar. Topaz occurs in this rock.

Merrivale Bridge.—Greenish-grey : a compact felsite with earthy base containing well-formed transparent prisms of quartz ; well individualised, and unique on the Moor.

[One of the nearest approaches to this rock is a felsite from South Caradon in Cornwall, but that is remarkable for containing well-formed perfect crystals both of quartz and felspar, with mica, pyrites, and schorl—the most perfectly differentiated compact felsite I know.]

Merrivale Bridge.—Bright red luxulyanite. Epidote occurs on some joint faces in this locality.

Milton Coombe (Buckland Monachorum.)—Leaden-grey : compact vitreous quartz-felsite, with occasional developments of porphyritic felspar and a moderate quantity of black mica.

Milton Coombe.—Drab : felsite with compact sub-granular base, and very regular development in distribution and size of quartz and felspar crystals, the latter mostly kaolinised.

Morwell Down.—Dark grey : a compact felsite with sub-vitreous base and plentiful porphyritic felspars of various sizes—cream to pink—some fresh, but the most part kaolinised ; occasional porphyritic mica and less prominent quartz.

Morwell Down.—Brown : semi-vitreous, with felspar, quartz, and mica porphyritically developed ; seems to have andesitic affinities ; apparently a continuation of the Grenofen elvan, which in the Shillamill tunnel of the South-Western line becomes essentially a loose-textured decomposed granite.

Morwell Down.—Brownish-grey: a coarse open-textured griesen, with a quasi-scorified look.

North Hessary Tor.—Light drab: moderately-fine-grained granular granite, mainly felspar and quartz, with black mica; quartz blebs and some kaolinization; schorl in patches.

North Hessary Tor.—Reddish-brown: earthy felspathic vein in quartz-schorl rock; contains irregularly distributed quartz, partly crystalline.

North Hessary Tor.—Red: coarse but regularly-textured granite, mainly felspar with black and occasionally light brown mica; much of the felspar crystalline.

Nuns Mine.—Light pink; sub-crystalline pegmatite with veins and nests of schorl—a few scales of greenish talc; some interstitial kaolinisation.

Okement (West).—Pinkish-grey: felspathic rock developing quartz and mica—rather rough texture.

Okement (East).—Creamy-grey: medium-grained granite with porphyritic quartz; mica well developed in plates and nests; acicular aggregates of schorl.

Okement (East).—Grey: quartz granules with schorl; a little felspathic matter.

Peek Hill (Walkhampton).—Dark rose-red: fine-granular mixture of felspar and schorl, with occasional light porphyritic felspars; some of the schorl acicular.

Peek Hill.—Brownish-yellow: mainly even-textured granular mixture of felspar and quartz, in which the components are casually prominent rather than porphyritic, with black mica, often in good hexagonal plates; encloses schorlaceous nests, partly granular and partly acicular.

Peek Hill.—Yellowish-grey: heavy compact fairly even-grained porphyritic granite, with black mica and schorl.

Peek Hill.—Red and black: felspar, schorl, yellow-lustred investing mica; nearly all finely granular.

Pew Tor (Whitchurch).—White: a coarse large-textured granite with black mica and schorl—a typical "outer edge" variety.

Plaster Town (Whitchurch).—Brownish-yellow: medium-textured pegmatite—quartz blebs in sub-crystalline felspathic matrix, in veins penetrating Carboniferous slate.

Plym Valley (Cadover).—Pink: massive vitreous felsite weathering dull, with little nests of schorl weathering into nodules.

Plym Valley (Cadover).—Yellowish-grey: granular aggregate of quartz, semi-kaolinized felspar, and pale mica, with disseminated schorl.

Plym Valley (Cadover).—Pale pink-grey: massive sub-crystalline felsite with schorl and a little porphyritic quartz.

Plym Valley (Cadover).—Cream: earthy-weathering felsite with porphyritic blebs and crystals of quartz, crystalline fragments of felspar, and a little schorl.

Plym Valley (Cadover).—Pinkish-grey: coarsely sub-crystalline schorlaceous pegmatite, with schorlaceous veins. (The five preceeding are from the bed of the Plym at Cadover Bridge.)

Plym Valley.—Dull cream: oolitic-granular felsite, compact, with no differentiation visible to the naked eye.

Plym Valley.—Dark purplish-brown and light-pink: the base has a fine cindery look, which seems to represent decaying felted matter, probably schorl including some quartz; the lighter parts are decaying porphyritic felspars. Requires further examination.

Plym Valley.—Dull puce: a compact porcellanous felsite, dotted with needles and small aggregates of schorl.

Plym Valley.—Orange: coarse-crystalline granite, mainly felspar, weathering orange from pink: a small quantity of white and black micas, a little schorl.

Plym Valley.—Reddish-brown and black: the matrix is composed of small felspar crystals closely compacted in a base of quartz and schorl; and in this are contained a number of large porphyritic felspar crystals. It may be called therefore a porphyritic-felspar-schorlite.

Plym Valley.—Grey; fine-textured granular felsite, base mainly quartzose; with occasional quartz blebs and imperfect felspar crystals, and cavities whence others have disappeard.

Plym Valley.—Deep red: body of rock massive felspar; quartz about half as plentiful; schorl scattered throughout.

Plym Valley.—Drab: porcellaneous felsite with flow structure and a little schorl; some elongated vesicles.

Plym Valley.—Grey: a schorlaceous greisen, with yellow and red scaly mica aggregates, verging on talcose. (These nine are from the bed of the Plym at various points above Cadover Bridge.)

Princetown.—Warm-brown: this consists of large felspar crystals and quartz crystals and masses distributed porphyritically through a smaller quantity of fine sub-porphyritic granite with abundant black mica in well-formed plates.

Portledge (Bideford Bay).—Warm-brown: a vein of granitoid material in the Trias discovered by Mr. T. M. Hall. It differs in no essential character from the elvanitic rock of Withnoe elsewhere described, only carrying the chain a link further.

Ringmore (Meavy).—Pale pink: fine granular felsite with little mica and schorl, porphyritic felspars and quartz blebs.

Rivalton (Langtree).—Brown: from felsite boulder, fine saccharoid texture.

Roborough Rock (Buckland Monachorum).—Greenish-grey: finely granular felsite approaching the vitreous, with some quartz differentiation.

Roborough Down (ditto).—Greenish-grey; compact sub-vitreous base, with small pyramidal quartz crystals, and cavities from which they have disappeared, the latter occasionally lined with a greenish-yellowish crust. Weathers earthy and ferruginous. Largely used for building in the Middle Ages.

Rockham Bay (Morthoe).—The granitic and felsitic pebbles of this spot include: Yellowish-brown granite; greenish-grey schorlaceous granite; massive red-brown felsite or vitrophyre; purplish-red compact felsite; red-brown felspar porphyry; warm-brown felspar porphyry; greenish-brown felspar porphyry with zoned felspars; brown-grey granular compact felspar porphyry; brown-red compact quartz-felspar porphyry, with varying crystal contents; greenish felspar porphyry, compact, but with granular aspect; greenish-grey felspar porphyry with orange porphyritic felspars; brownish felspar porphyry with dark-brown mottlings. I may note here also the occurrence of hypersthene-augite-andesite.

Saddleborough (Shaugh).—Dark grey: the base of this rock is a fine-textured schorlite containing numerous small porphyritic crystals of pink felspar, some well formed and largely kaolinised; there are a few porphyritic quartz blebs.

Saddleborough.—Dark grey and pink: a similar rock, forming a junction with an earthy schorlaceous felsite.

Saddleborough.—Dark grey: a third variety in which the base is much coarser, owing to the development of the quartz.

Saddleborough.—Cream: coarse texture; earthy felspar containing porphyritic quartz, some sub-crystalline; and a little schorl.

Saddleborough.—Light greenish-grey: a coarse uneven-textured greisen, with mica in nests, and needles and patches of schorl.

Saddleborough.—Black and white: a rough felted schorlaceous base, with decayed white porphyritic felspars, and an occasional quartz bleb.

Saunton boulder.—Pale red: a somewhat irregular mixture of felspar, quartz, and greenish-black micaceous matter in patches and strings, closely resembling the mica in the more massive portions of the Eddystone gneiss. In fact the rock seems much more like an imperfect gneiss than any local granite with which I am acquainted.

Shaugh.—Pale brown: finely oolitic-granular pegmatite with occasional mica.

Shaugh.—Pale brown, or brownish-grey: saccharoid-textured felsite with a few cavities whence quartz crystals have disappeared.

Shaugh.—Reddish: irregular texture; chiefly pegmatitic, with occasional distribution of white mica; the felspar contains needles and clusters of schorl.

Shaugh.—Cream: granite at junction with schist; saccharoid earthy texture with porphyritic quartz, traversed by granular-quartzose vein containing fine schorl.

Shaugh.—Flesh colour: well-charactered rather coarse granite with white mica and a little schorl.

Shaugh.—Pale pink: duplicated vein in slate; one half a pegmatite, felspar predominant; the other more quartzose and containing mica.

Shaugh.—Dull grey: granite next micaceous schist; felspar crystals largely developed, with fine insterstitial granitic matter, mica predominating over the quartz.

Shavercomb, Plym Valley.—Pale dull pink; an irregular pegmatite with porphyritic felspar and quartz, and casual schorl; base mainly felspar.

Shavercomb.—Reddish-grey: massive heavy quartzose rock with ferruginous matter.

Shavercomb, junction rock penetrating highly-altered slate.—Dull flesh colour: really a coarse luxulyanite, mainly composed of pink felspar and black schorl, with irregularly distributed quartz. The slate has been changed for the most part into a greenish-grey felsite thickly spotted with schorl.

Shell Top.—Grey: coarse schorlaceous pegmatite, partially kaolinised, with quartz veins.

Shell Top.—Light red-brown: coarse and irregularly-textured granite with black mica.

Shillamill (Tavy valley, below Tavistock.)—Colour varying with position from warm-buff through shades of brown and cream colour to plain grey and greenish-grey: an elvan, granitoid and porphyritic in the centre of the dyke, thence ranging on either side through more even-grained and felspathic examples to a marked quartzose form. Different examples from this one dyke may be taken to represent half a dozen different felsites; but they all pass into each other, the differences being mainly dependant on the physical character of the ground mass. Felspar and quartz are both at times porphyritically developed; mica occurs disseminated and in clusters: there is chlorite and apparently a little hornblende.

Slapton Sands (among beach pebbles).—Red-brown: vitreous felsite, with white patches and imperfect crystals of felspar; a little quartz and scaly mica aggregates.

Slapton Sands.—Dark greenish-grey: vitreous felsite, with white porphyritic felspars, fairly crystallized; some quartz, rather more than in last example.

Slapton Sands.—Pinkish-brown: compact felsitic rock, originally vitreous, now tending to earthy degeneration, with some development of quartz, decayed felspars, and black mica. Has all the appearance of one of the so-called Triassic lavas—"felspathic traps."

Slapton Sands.—Grey: vitreous felsite developing small crystals of felspar, blebs of quartz, and numerous nests and plates of black mica.

Slapton Sands.—Red and grey: a red schorlaceous pegmatite veined by quartz and schorl.

South Milton, Horswell.—Reddish-brown: a quartz-porphyry passing into andesite, base mainly felspathic, with porphyritic quartz blebs, and an occasional felspar crystal.

St. Bude.—Pale-brown: a massive felspathic rock developing felspar crystals of fair size, many of them twinned, and containing spiculæ which the late Mr. John Prideaux described as needles of schorl—more probably, however, they are hornblende, but they are all decayed and no sufficiently fresh specimen for determination has occurred. The relations of this rock to its neighbours are not clear—*i.e.* whether it is an independent boss or an extreme phase of a neighbouring doleritic dyke.

Stolliford.—Pink: regular granular texture, generally with nests and strings of scaly mica and occasional quartz crystals.

Stone Tor, Chagford.—Grey: a granular-crystalline granite, with an approach toward porphyritic characters in the felspars; black mica in flecks and nests.

Tavy Valley.—Red: close-textured even-granular pegmatite, with a little schorl.

Tavy Valley.—Pinkish-red: granular pegmatite with irregularly distributed schorl.

Tavy Valley.—Brown: a deep-brown vitreous base mainly quartzose with an abundance of irregular and crystalline porphyritic quartz—one example zoned, and a little felspar.

Tavy Valley—Red: sub-crystalline schorlaceous pegmatite, with occasional porphyritic felspars, and veins of quartz and schorl. (These four examples are from bed of Tavy above Horndon.)

Bed of Tavy (pebble Beerferrers railway bridge foundations.)—Grey; compact sub-vitreous felsite, developing crystals of felspar, quartz, mica, and apparently hornblende.

Bed of Tavy, (ditto.)—Pebble, reddish-brown in centre, dark grey outside; a close textured, sub-crystalline slightly porphyritic granite, also apparently contains a little hornblende.

Bed of Tavy (pebble Beerferrers railway bridge foundations).—Warm-brown: an uneven-textured granite, some parts much finer grained than others, with small white porphyritic felspars; both white and black mica, the latter in larger plates.

Teign Valley.—Brownish-grey: this is a gneissose rock from a boulder in the river bed near Newton—query if local. It is distinctly foliated, with black mica, and much of the quartz in pale yellow crystalline bands.

Torry Valley.—Red and black: red felspar in a sub-crystalline base of quartz and schorl; the felspar crystals are small and do not vary greatly in size.

Trowlesworthy Tor, (Plym Valley.)—Red, black, and violet: not seen *in situ*; this is the rock which has been called trowlesworthite; it is mainly composed of red felspar, black schorl, and violet fluor spar.

Trowlesworthy.—Red and warm-grey: junction between a somewhat coarse sub-crystalline schorlaceous granite and a fine-grained vein, the latter in part porphyritic and traversed near the junction by five dark stripes approximately parallel to the undulations of the junction and each other, caused by the impersistent deposition or segregation of fine schorlaceous matter. There is a stronger schorlaceous vein in the granite corresponding.

Trowlesworthy.—Bright red: a pegmatite in which the felspar largely predominates over the quartz, and schorl is not prominent; some of the felspar shews well-developed crystallization, and there is an occasional patch from which the colour seems to have been discharged.

Trowlesworthy.—Red and black: matrix of felted and acicular schorl enclosing red felspars, occasionally fairly crystalline in form.

Trowlesworthy.—Dull red: granular schorlaceous pegmatite, fine texture; the base mainly felspar, in which quartz granules and fine schorl are generally distributed.

Trowlesworthy.—Red: a schorlaceous pegmatite; felspar mostly massive, with irregularly distributed quartz; not much schorl.

Trowlesworthy—Red: a coarse but even-textured schorlaceous granite with both white and black micas.

Two Bridges (West Dart).—Pink: a fine-grained pegmatite thickly sprinkled with schorl.

Two Bridges.—Warm-brown: fine even-textured granular pegmatite, with a small quantity of schorl.

Two Bridges (West Dart).—Pink: the mass of this rock is a beautiful flesh-coloured sub-crystalline felspar, with a small quantity of schorl in patches and pseudomorphic forms.

Ugborough Beacon.—Grey: granular-crystalline granite with a little schorl; yellow talcose mica.

Ugborough Beacon.—Speckled black and light pink: a schorlite with porphyritic quartz and small crystals of pink felspar, and occasional large well-formed crystals of the latter, ranging to an inch and a half in length; the felspars are mostly kaolinized and the disappearance of some has left cavities—others are replaced by an undefined greenish-yellow saccharoid material.

Ugborough Beacon.—Yellowish-brown: a saccharoid highly quartzose elvan, with irregular development of massive quartz, and partial cavities containing quartz needles.

Ugborough Beacon.—Pink weathering to a lighter shade: massive vitreous felsite developing quartz and felspar porphyritically, with aggregates and needles of schorl; vein an inch wide.

Ugborough Beacon.—Cream: granular earthy felsite with quartz blebs, and ill-defined small red felspars.

Ugborough Beacon.—Pinkish-cream: contact compact quartzose felsite developing quartz blebs, with well-formed needles of schorl.

Walkham Valley.—Warm-grey: a granular felsitic rock mainly composed of quartz and mica, with porphyritic felspars; might almost be called a porphyritic griesen.

Walkhampton.—Grey: a very fine and even-textured schorlaceous pegmatite.

Walkhampton.—Pink: felspathic pegmatite with arborescent schorl.

Walkhampton—Red: an even-textured schorlaceous felsite with a tendency to porphyritic development of felspar and quartz.

Whitleigh (Tamerton Foliott)—old building, possibly from a local elvan.—Bluish-grey: compact sub-vitreous matrix with frequent quartz crystals and blebs and the cavities from which they have disappeared—the latter most common; also porphyritic felspar; some of the cavities contain ferruginous matter, others are lined with fine scaly micaceous or talcose material; there is a slender prism of what is probably schorl but may be hornblende, and in one of the cavities some very delicate acicular matter. No doubt, if not identical, this is essentially the same as the Roborough elvan, so largely used in the Middle Ages in the Plymouth district as a free stone.

Whitleigh (ditto).—Warm-grey: felsite with compact base, and a few quartz blebs and crystals, with frequent cavities whence quartz and felspar crystals have disappeared—many of these contain red and yellow ochreous matter.

Widdecombe-in-the-Moor.—Red: coarse felspathic pegmatite, with crystalline felspars.

Wigford (Meavy).—Grey with a greenish cast: a griesen, composed of nearly equal quantities of white mica and quartz; the texture somewhat open.

Wigford Down (Meavy).—Pale brown: felsite, developing quartz porphyritically, with fine open semi-honeycomb texture; some of the cavities are caused by the disappearance of crystalline matter, others resemble minute vesicles; base mainly quartzose, saccharoid texture.

Winford (Meavy Valley).—Red: massive felspar, passing at times into crystalline condition; contains a little schorl, less quartz, and a casual fleck of mica.

Winford.—Orange-brown: fine even grain with porphyritic felspars, generally of a buff colour lighter than base, some however darker and of a pale red; occasional porphyritic quartz; abundant black mica.

Winford.—Red: massive felspar, sub-crystalline, with some fair-sized plates of black mica.

Yannadon (Meavy).—Brown-grey: a schorlaceous greisen.

Yannadon.—Pinkish-grey: an irregular mixture of felspar, quartz, and earthy schorl.

Yannadon.—Pink and black: a fine-textured luxulyanite with porphyritic quartz.

Yannadon—Grey: porphyritic schorlaceous granite with black and bronze micas; base moderately coarse crystalline-granular with slight porphyritic development of quartz blebs; some of the porphyritic felspars of considerable size; some ferruginous matter.

Yealm Head (near).—Dark grey with light porphyritic felspars. The base of this rock is compact and may be described as sub-vitreous, in parts apparently inclined to be vesicular. The porphyritic felspars are abundant, varying considerably in size and fairly well formed; they are chiefly cream-coloured and opaque, of ordinary type, but glassy varieties are also present. Porphyritic quartz in blebs is present in quantity. There is a little black mica. The rock appears to contain patches of more definitely granitic matter. It is highly interesting from the number of characters combined.

Yes Tor.—Pale-red: uneven-textured slightly porphyritic granite with black mica; rather coarsely granular.

Yes Tor.—Dull-drab: much like preceding, but mica more prominent and less porphyritic felspar.

Yes Tor (from clitter)—Brownish-grey: crystalline-granular texture, casually recalling the aspect of a coarse sandstone; chief constituent felspar, with a fair amount of quartz, and a few flecks of mica; schorl chiefly in nests, in which either quartz or felspar are commonly more definitely developed.

The following is a list of the granites, felsites, and porphyritic rock fragments identified by me in the red breccias of Teignmouth, Dawlish, Exminster, Crediton, and Heavitree, the bulk of which are certainly, and the whole of which are probably, of kindred and Dartmoor origin.

Coarse-grained granite with porphyritic felspars, partly kaolinized, differs from ordinary coarse-grained Dartmoor granite only in its reddish colour.

Fine-grained schorlaceous granite, probably from a small vein or boss. Exminster.

Pegmatite, apparently vein: quartz with some well crystallized felspar. Teignmouth.

Quartz-felspar vein, with decayed mica and kaolinized felspar. Exminster.

Reddish quartz-felspar rock. Teignmouth.

Reddish-grey glassy quartz-felsite. Teignmouth.

Grey spherulitic felsite, with porphyritic quartz, slightly vesicular. Teignmouth.

Grey quartzose rock of trachytic aspect, semi-porous texture; base appears like an open granular felsite; contains remains of decayed porphyritic felspars, quartz blebs, and little nests of black mica. Teignmouth.

Dark-red rock, presenting much the same general characters. Teignmouth.

Reddish-grey granular open-textured rock, with blebs of quartz, mica-nests, and felspar-cavities lined and partly filled with kaolin; some red iron-oxide in irregular cavities. Teignmouth.

Grey granular rock of trachytic aspect, with some porosity; cavities with remains of kaolinized felspars; decayed mica; a little differentiated quartz. Teignmouth.

Pinkish-brown felsite, rough texture, slightly vesicular; porphyritic felspars; fluxion-structure indicated. Teignmouth.

Somewhat similar rock with quartz-blebs; cavities with kaolinized matter; some white mica; porous rather than vesicular. Teignmouth.

Yellowish-brown quartz-porphyry, loose-textured subvesicular base with quartz-blebs and developing felspars in part kaolinized; matrix very porous in parts, yet heavy; a little mica. Dawlish.

Greenish rhyolite or liparite with compact base, and large cavities elongated in direction of flow; occurs in wall at Teignmouth and is no doubt from conglomerate.

Finely-vesicular rhyolitic rock with compact semivitreous green-grey base; porphyritic quartz and felspar, the latter partly kaolinized; nests of mica; shows distinct fluxion-structure. Teignmouth.

Earthy-textured red and grey felsite with porphyritic felspars, nests of mica, and vesicles partially filled with kaolin. Teignmouth.

Red felsite with porphyritic quartz and felspar, quartz predominating. Torbay.

Vesicular felsite ("horny" base) with porphyritic quartz, mica, and felspar; full of irregular cavities.

Red porphyritic felsite with quartz, kaolinized felspar, a little mica; somewhat open-textured. Torbay.

Reddish coarse-grained porous variety, with mica more prominent; shows flow-structure.

Compact red felsite with porphyritic quartz, felspar, and mica. Heavitree.

Pinkish-grey felsite, subvitreous base, with porphyritic quartz and felspar, the latter partly kaolinized; has a decidedly rhyolitic look. Heavitree.

Granular red felsite, porphyritic quartz and felspar; some decayed mica. Heavitree.

Pinkish crystalline-granular felsite with porphyritic quartz and felspar; small flakes of mica. Crediton.

Porphyritic red and white quartz-and-felspar rock, apparently a vein in felspathic trap. Crediton.

Grey-green finely-granular felsite, with porphyritic quartz, kaolinized felspar and some decayed mica. Crediton.

Fine-grained crystalline-granular felsitic rock. Exminster.

Reddish-grey quartzose felsite. Exminster.

Dull brown porphyritic rock, felsitic base with kaolinized porphyritic felspars, murchisonite, quartz, and mica; closely allied to the so-called red "porphyritic trap" more or less characteristic of the breccias and conglomerates from Torbay to the Crediton valley—a deep red porphyritic rock varying to red-brown and purplish-brown; compact felsitic base with porphyritic quartz and felspar, some kaolinized, some murchisonite—occasionally but not invariably some mica. This is really a porphyritic elvan traversing alike granites and felspathic traps.

Red sub-vitreous felsite, with porphyritic quartz and felspar and some mica. Exminster.

Pink fine-grained felsite, with occasional differentiation of quartz and felspar. Heavitree.

Granular schorlaceous pegmatite. Exminster, Teignmouth.

Reddish compact felsite with blebs of quartz, a little mica, and schorl pseudomorphous after felspar, and in spots. Exminster.

Variety of same rock, with somewhat granular texture, porphyritic quartz, decayed felspars, and veined with schorl. Exminster.

Felsite with mica-aggregates. Exminster.

Granular greyish-drab felsite, with acicular schorl. Exminster.

Fine-grained reddish felsite, with porphyritic quartz and felspar, base sprinkled with black specks. Exminster.

Red felspar and schorl-rock. Exminster.

Quartzo-felspathic rock with blebs of quartz, large porphyritic felspars, and schorl. Teignmouth.

Base black schorl and quartz, with porphyritic quartz and felspars (kaolinized); a little mica. Teignmouth.

Porphyritic vein-stone, with Murchisonite, decayed felspars and schorl. Exminster. (Possibly associated with andesite.)

Fine-grained grey felsitic rock, with quartz-blebs, porphyritic felspars, kaolinized felspar-granules, fine mica, and acicular schorl. Exminster.

Grey granular felsite, with quartz, mica, and schorl. Exminster.

Quartz-felspar-schorl rock. Heavitree.

Schorlaceous felsite. Red compact base with small porphyritic felspars, quartz-blebs, mica, and patches of blue radiating schorl. Teignmouth.

Reddish felsite with dots and nests of schorl, bluish-grey and radiating, radial structure also in ground-mass. Teignmouth.

Schorlaceous felstone, with more prominent porphyritic felspars, nests of schorl-needles, and some porphyritic quartz. Teignmouth.

Schorlaceous felsite ranging from fairly compact to granular; long felspar-crystals, quartz-blebs, decayed mica-clusters, light spotty schorl. Teignmouth.

Rock with an andesitic rather than a felsitic look, but containing occasional needles of schorl. Teignmouth.

Slightly amygdaloidal andesite, granular base with quartz-blebs and porphyritic felspars. Suggests felsitic alliances, and present aspect may be in part due to alteration. Exminster.

Speckled variety, with blackish patches.

Felted andesitic porphyry, red-speckled, lined with white. Heavitree.

Schorl rock. Teignmouth, Exminster, Heavitree—almost universally distributed.

Schorl-vein-stones, some laminated. Exminster.

Felted schorl-rock, with porphyritic felspar. Exminster.

Schorl-felspar-rock with scoriaceous aspect. Teignmouth.

Reddish-brown altered brecciated rock, with schorl-crystals.

Veined schorl- and quartz-rock.

To the foregoing may be added the description of a few Cornish granites and elvans, some because they are on the borders of the two counties and therefore can hardly be excluded from survey; others for special purposes of comparison. The Withnoe example, for instance, has most important bearing on the general question of origin and structure.

Gunnislake.—Grey: irregular-textured granite, felspar largely predominating, white mica.

Gunnislake.—Light greenish-grey: a somewhat open-textured greisen with gilbertite.

Mount Edgcumbe (exact locality unknown).—Red: apparently a syenitic vein, mainly reddish felspar, with a little quartz and a small but marked proportion of hornblende.

Luxulyan.—In this locality were raised not only the well-known luxulyanite of which the Duke of Wellington's sarcophagus is made, but the magnificent porphyritic felsites with which Mr. Treffry built the "porphyry hall" at Place, Fowey. Among some of the most characteristic of these are a variety with a rich red-brown base thickly sprinkled with small cream-coloured felspar crystals and quartz blebs; a luxulyanite in which the felspar is red instead of pink; and pink, red, and drab porphyritic felsites in general structure resembling the brown, but with the addition of schorl. The best idea of the variety of the granites and felsites of this part of Cornwall will be gained by a visit to the "porphyry hall," or an examination of the inlaid table in the mineral grotto at Menabilly, near Par.

St. Just.—There is a very remarkable variety of granitic rocks in the St. Just district, for examples of which I was indebted some years since to my lamented friend the late Mr. T. Cornish, of Penzance, a man of science of whom his birth-place—Tavistock—may well be proud. They mostly came from St. Just United. The specimens include: luxulyanite—pink felspar, black schorl, and quartz; a coarse grained granite, with olive-grey felspars, very prominent nests and plates of black mica and a little quartz; a coarse variety of luxulyanite, in which the felspar is thickly charged with schorl; a chloritic granite sprinkled with beautiful crystals of deep purple fluor, containing also a little chalcopyrite and iron oxide; and another fluoriferous rock, consisting almost wholly of pink crystalline felspar, scaly granular mica, and brilliant fluor crystals.

South Caradon.—Dull light green: coarse-textured granite, pale orange felspars, white mica, and an abundance of chlorite—a well-marked chloritic granite.

South Caradon.—Bright green: an irregular textured granite, with pinkish felspars, in which the quartz and felspars appear charged with copper.

South Caradon.—Red and grey: a coarse semi-crystalline granite with dark red, mainly decayed, felspars; the bulk of the rest of the rock is mica, granular and in part platy.

South Caradon.—Light brown: a felsite with a generally developed imperfectly crystallised matrix.

Wild Duck (Redruth).—Creamy-grey: this is a well known building elvan in Cornwall, with granular texture, easily mistaken on a casual glance for a sandstone or an oolite; which an elvan at Newham near Truro, has frequently been.

Scilly.—Deep red: mainly composed of felspar with micaceous strings and patches and acicular cavities.

St. Stephens.—Light cream colour: chiefly quartz and kaolinized felspar with a general granular structure, associated with gilberlite—the china stone of Cornwall.

Withnoe.—This is a small detached exposure of the andesite of Cawsand Bay, which was always included in Devonshire until recent legislation transferred it to Cornwall. Scientific research can, however, hardly be expected to be bound by purely legislative convenience; and the phenomena presented by this rock have a very important bearing upon the question in hand. The chief feature here is the occurrence of a slightly porphyritic Indian-red pitchstone (including felspar, occasionally in imperfect crystals, a little quartz in blebs, black mica in flecks and occasional crystalline plates) with distinct flow structure, which in the space of ten or a dozen feet passes by devitrification and increased porphyrization into a light-grey rough open-textured trachytic felsite—in parts more than half crystalline; with abundant black mica, quartz in large corroded blebs and grains showing occasional approach to crystalline form, felspar strongly developed with good crystals numerous, several twinned after the ordinary local granitic type. The volcanic origin is clear, and yet this is essentially an ordinary variety of quartz-felsite or elvan.

POSTSCRIPT.

Erme Mouth, coves east of. I am indebted to Mr. W. A. E. Ussher, F.G.S., for calling my attention to the granitic and porphyritic pebbles on the beaches east of Erme Mouth, where they are very plentiful. All noted either absolutely identical with or akin to Dartmoor types, with some rather exceptional forms. They are chiefly felsitic rather than granitic, with several examples of the schorlaceous varieties. The leading varieties include:

Red-brown felsite with vitreous matrix developing imperfect crystals of dark-red felspar, and blebs of quartz; schorl in flecks and patches.

Dull pinkish-brown felsite, with sub-vitreous matrix developing small porphyritic felspars and quartz—some of the former well crystallized; schorl fairly disseminated.

Dull red felsite, with sub-vitreous matrix, and irregular development of felspar and quartz; fairly disseminated schorl; some of the felspars show twinning.

Pinkish-red pegmatite with patches of schorl; crystalline-granular texture; felspar dull and partly kaolinised. In another example the base is mainly felspar of a more massive kind; and the schorl is less frequent, in small rounded radiates.

Yellowish-red pegmatite, some of the quartz blebs yellowish, somewhat earthy matrix; there are several varieties of this rock, one a distinct orange.

Pinkish felsite, finely-granular earthy base with porphyritic felspars and quartz blebs, and small circular nests of schorl.

Cream-white felsite with compact sub-granular base (conchoidal fracture) enclosing small imperfectly developed felspar crystals, quartz granules and schorl needles.

Very finely-granular schorlaceous pegmatite, light red, evidently once a fine-grained granite, of a type which also occurs, containing in addition to the schorl a little black mica, and some porphyritic quartz and felspar.

Light red schorlaceous granite, granular texture with a few porphyritic felspars; some of the matrix felspars bright red.

Irregular textured and veined schorlaceous pegmatite, pale red.

Well-charactered pegmatite, chiefly granular, with a few porphyritic felspars, some twinned, and quartz masses. Smaller felspar crystals bright red, contrasting strongly with the schorl; some of the larger felspars zoned with red—a very pretty rock.

Warm-brown porphyritic granite, glassy-granular matrix, black mica.

Coarse-textured schorlaceous granite, verging on greisen, abundance of white mica, felspathic matter kaolinised; another example is distinctly a griesen, in part.

There are various examples of schorlite, two containing porphyritic felspars, and a highly altered junction rock—a granular gneissose micaceous schist with development of schorl along the original lines of bedding.