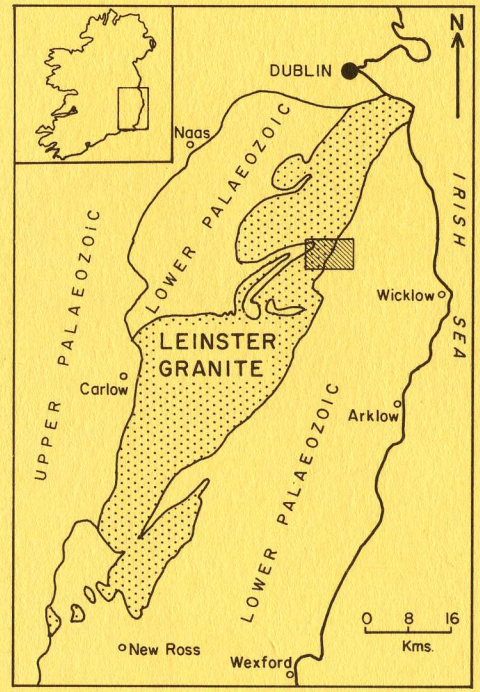
IRISH GEOLOGICAL ASSOCIATION

FIELD GUIDE SERIES
No. 1

THE LEINSTER GRANITE IN GLENDASAN, Co. WICKLOW

By P. S. Kennan



START: Glendasan Grid Ref. T125,968 on Ordnance Survey Half Inch to One Mile (1:126720) Map No. 16.

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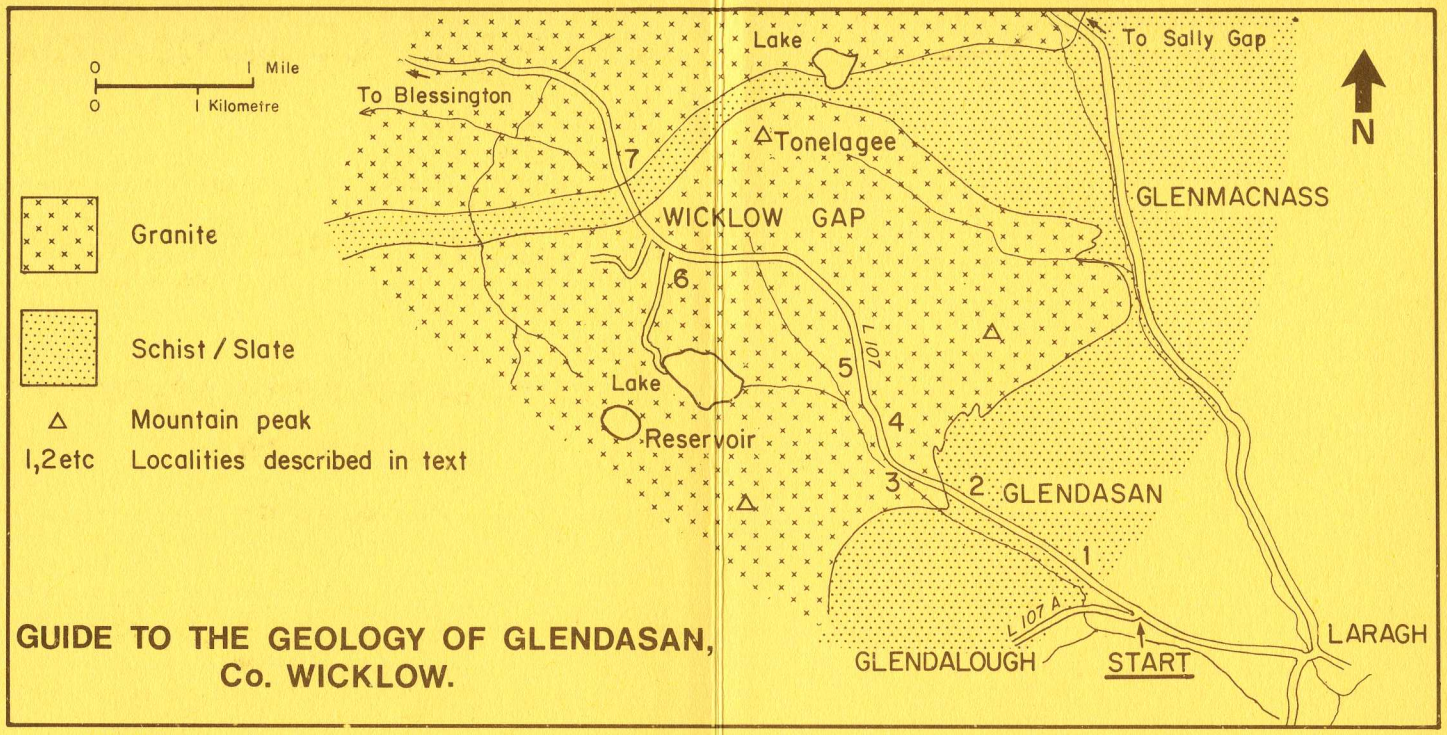


GUIDE TO THE GEOLOGY OF GLENDASAN, Co. WICKLOW.

START

GLENDALOUGH-GLENDASAN ROAD FORK AT T125968. Travel northwest on road no. L107 sign-posted to Blessington and Wicklow Gap.

TIME – Allow 2½ hours using a car between stops.

STOP 1. (at 0.55 miles/0.89 km after sharp right-hand bend; park in entrance to forest track)

At the entrance to the track on the right is an outcrop of *schist*, a metamorphic rock similar to *slate*. Slate and schist are both metamorphic rocks that exhibit *cleavage* or *schistosity*, i.e. an ability to split along very closely spaced parallel surfaces. A roofing slate is a perfect example. The cleavage/schistosity reflects the parallel alignment of sheet-like minerals (micas) due to pressure or stress acting during metamorphism. This stress is also reflected in the *folds* present, e.g. beside the left-side gate post a short way along the track; the rock is obviously contorted. The stress with the resulting cleavage/schistosity is related to the forceful intrustion of the nearby granite. The brown stain coating many surfaces here and elsewhere and which disguises the grey-blue colour of the schist is due to the formation of *limonite*. Rainwater reacting with small quantities of iron minerals present is the cause. Note also the common occurrence of white quartz veins.

A five minute walk up the forestry track – keeping right of all junctions – leads to a fine view of Glendalough, with its lakes and monastic ruins.

STOP 2. (at 1.7 miles/2.74 km; park on right side where road broadens)

The Leinster Granite is exposed in the grey crags on the right and white tip heaps of waste rock mark the sites of old mines. Walk back down the road for 360 yds/m to outcrops of *aureole* rocks and trace the junction by eye up the slope on the far side of the valley.

STOP 3. (at 1.9 miles/3.06 km; park on the corner beside river)

The valley of Glendasan, extending to the southeast, is a typical glaciated valley with its steep sides and U-shaped form. [redacted]. Glendalough, Glenmacnass and Glenmalure are other local examples of valleys that, by their appearance, speak of the movement of glaciers along them in the relatively recent past.

Along the banks and in the bed of the river, the minerals and texture of granite may be seen on water-smoothed surfaces. Note the grey, glassy *quartz*, the white or yellowish *feldspar* and the black *biotite* (mica). Veins of biotite-free granite contrast with the rest; these veins fill cracks that formed shortly after the granite became solid.

The ruins are a reminder of the mining activity in this area during the last century.

STOP 4. (at 2.15 miles/3.45 km)

A track on the right leads to a nearby tip heap. Note the rotten-looking limonite-stained granite. Examine the rock fragments lying around. In those that are composed of white quartz, you may easily find grey shiny *galena*, a lead ore, brown shiny *sphalerite*, an ore of zinc and green *malachite*, a mineral resulting from the alteration of other copper minerals. The fluids from which the ores were formed also caused the granite rotting; the hard granite of Stop 3 is here largely altered to clay.

STOP 5. (at 2.75 miles/4.42 km; park on left side)

On the sky-line to the left is the man-made dam enclosing the upper lake of Turlough Hill pump-storage station. Turbines deep underground are driven by water from this lake which is then stored in the lower lake, Lough Nahanagan, hidden from view. The Lough and the steep cliffs behind were sculpted by ice.

STOP 6. (at 4.35 miles/7.0 km; park in picnic area car park)

Walk back and down the private (E.S.B.) road towards Lough Nahanagan or, alternatively, walk up the second private road to the west of the picnic site and at the first sharp bend move left to look over the lake. The bowl in which the ice accumulated and out of which it moved down the valley is clearly seen. The lake is dammed by a *moraine*, unconsolidated rock boulders and clay deposited by melting ice during the Quaternary Period.

STOP 7. (at 5.15 miles/8.29 km; park on the right towards the end of the road cutting)

It should be easy to recognise the grey granite in the road cutting and contrast it with the limonite-stained schist a little back up the hill. The granite contact with the schist is clearly seen. The granite probably looks different from that seen earlier; it looks smeared out. Many granites are deformed in this way near their margins during intrusion. The schist is very similar to that seen earlier. The expert will recognise the minerals garnet, stauralite and andalusite – new metamorphic minerals resulting from the arrival of nearby hot granite. It is hard to imagine that these schists were originally mud and sand.

Looking to the west, you should be able to trace the screen of schist (shown on the map) separating two separate granites across the far hillside. The grey granite contrasts with the grass-covered schist.

There is a pleasant picnic site at 6.15 miles/ 9.9 km and from there you are 1.6 miles/2.57 km from the entrance to the Glenbride Youth Hostel.

GRANITE

Granite is a common rock. It is used widely to make kerbstones, window sills or in piers, tombstones or stone walls. The Leinster Granite which forms the Wicklow Hills is the largest exposed granite body in Britain and Ireland.

Granite is essentially a granular mixture of three minerals. These are *mica, feldspar* and *quartz*. The mica occurs as thin flakes of black *biotite* mica or as silvery *muscovite* mica. The feldspar is usually white or it may have a reddish tint. The quartz is typically grey and glass-like in appearance. All are easily recognised on freshly broken surfaces.

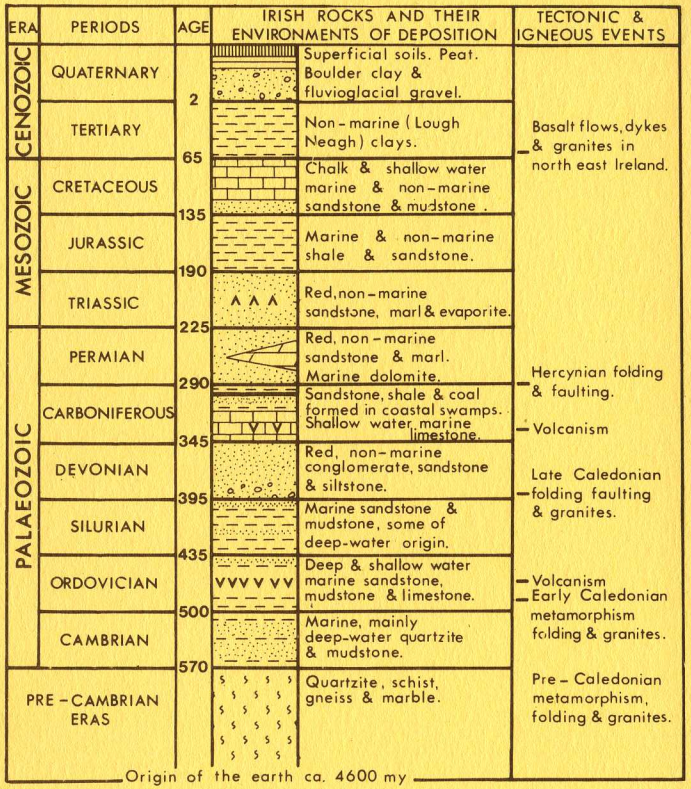
The constituent minerals grew as crystals in cooling granitic *magma*, hot liquid material formed by melting of rock at some depth, some tens of kilometres below the earth's surface. Magma which reaches the earth's surface is erupted as volcanic lava. However, granite magma, unlike lava, does not reach the earth's surface; its journey upward from its source deep in the crust ends a few kilometres below the surface. It cools and crystallises slowly because it is insulated and surrounded by other rocks – hence the coarse texture. Wherever they form all magmatic rocks are termed *igneous* rocks.

As the granite cools, the heat lost passes into the enclosing rocks which, as a result, are reconstituted. With new minerals forming at the expense of older ones, these rocks become *metamorphic rocks* forming a zone or *aureole* around the newly emplaced granite. In Leinster the aureole is about one kilometre wide. Only very much later – millions of years later – do the surface processes of weathering and erosion expose the now cold granite and its surrounding metamorphic aureole to view.

The Leinster Granite was emplaced some 405 million years ago. It brought with it fluids rich in lead, zinc, tungsten and other useful elements. These gave rise to the small mineral deposits that were mined in Glendasan and elsewhere in Wicklow during the last century and which are of particular research interest at present. Meanwhile, white tip heaps of waste material stand as mute reminders of a past industry.

GEOLOGICAL HISTORY OF IRELAND

Ages are quoted in millions of years (my). Permian to Tertiary rocks are restricted to northeast Ireland, but also occur widely offshore.



A RESPONSIBILITY

The user of this guide is strongly urged to take every care of the countryside and particularly areas described in this guide. Specimens should be collected with great care and only if they are going to have some continuing interest. Use a camera or a sketch-pad instead of a hammer and please leave all gates fastened, leave no litter and avoid damage to fences and hedges.

AN INVITATION

If you have enjoyed using this guide you may be interested to know that the Irish Geological Association organises many field excursions and lectures for its members every year. Many of these prove of interest to amateur geologists. Information about these events can be had by writing to the Association care of any University Geology Department or to the Geological Survey of Ireland, 14 Hume Street, Dublin 2.