Excursion 6 Kildonan gold

C. M. Rice

Purpose

To pan for gold at the site of the 1868–69 Gold Rush, to examine the Moine country rocks and especially the granite and quartz veins from which the gold may have been ultimately derived, and also, the glacial deposits which are the immediate source of the gold in the burns.

Access

If possible the excursion should begin in the Timespan Heritage Centre, beside the old bridge in Helmsdale. Timespan is open from Easter to October. Mon–Sat 10–5, Sun 12–5. At the centre the 'Goldrush Tour' can be hired. This is a handheld audiovisual GPS that will take you on a guided tour through the history of the goldrush. Gold panning equipment can be purchased or hired in Helmsdale at Strath Ullie Crafts by the harbour.

Leave Helmsdale by the A897 to Forsinard. The journey to Kildonan is about 9 miles and since it is a single track road about 20 minutes should be allowed (excluding stops). The minimum time to complete the excursion is half a day.

Permits to pan for gold are no longer required, but visitors are asked to place details of their visit in a box at the information point at Bailie an Or. Follow any instructions given in the information display. Panning is allowed only between the bridge at Bailie an Or [NC 912 214] and the wooden bridge at [NC 917 228] (Figure 6.1). Allow about 45 minutes to walk from the Bailie an Or to the wooden bridge. Digging into the banks is not permitted as it results in serious erosion. Other areas on the Estate may be visited for geological studies but the Factor must be informed of the intended route, especially during the shooting season (normally mid-August to mid-October).

Maps useful to this excursion are O.S. 1:25000 Sheet NC 82/92 and Geological Survey 1:63360 Sheet 109.

Advice on panning

Equipment should include gold pan, sieve (about 10 mm), shovel, bottle, horseshoe magnet, tweezers, long-handled narrow-headed spoon for crevicing, and wellingtons.

Select sites where the current velocity is significantly reduced, e.g., insides of bends, reduced gradient, around large boulders and natural riffles. Dig as deep as possible and attempt to reach bedrock. Potholes, especially beneath waterfalls, and rock crevices may also trap gold particles. Very fine gold can often be obtained by panning the sediment trapped by moss growing on the stream bed. Select areas of coarse sediment, i.e. about pebble size. This is because gold is a very dense material (about 8 times that of quartz) and is hydraulically equivalent to much larger but less dense particles.

Panning efficiency is a matter of skill and practice! Firstly remove the large material by hand or by sieving, but wash the coarse material thoroughly before discarding it from the pan. Use a swirling motion so that all material (sediment and water) in the pan is in motion. This will allow any gold and other heavy minerals to fall to the bottom. The light material is allowed to wash over the rim of the pan. A good guide as to the efficiency of your technique is the nature of the material remaining in your pan. At Kildonan it should consist of black iron oxides (magnetite and ilmenite), purple garnet and hopefully, small flakes of gold (Figure 6.2). False hope may be generated by the presence of minor iron pyrite (fools' gold!) and bronze-yellow flakes of biotite mica. The vast majority of the gold likely to be found is less than 1 mm in size. A lot of people try their luck at Kildonan, so you are likely to be panning material that has been looked at already; if you find nothing at one spot either move on or dig deeper.

Introduction

Alluvial gold, in the form of a nugget weighing more than half an ounce, was discovered in the Kildonan burn around 1840. However, it was not until 1868 that gold was found in quantity by a local man (R.N. Gilchrist) who had returned from the Australian goldfields. From 1868 to 1869 at least 3500 oz of gold (valued at about £2 million at present prices (.£550/oz)) was obtained from various burns, but the richest deposits were found in the Kildonan and Suisgill burns. This is a very small alluvial deposit by world standards; the Californian goldfields produced 42 million oz. The largest nugget came from the Suisgill burn and weighed 2 oz 17 grams. In 1870 the diggings were closed by the Duke of Sutherland following complaints from sporting and farming interests; the mud washed into the Helmsdale River was ruining the fishing.

Those interested in the historical aspects of the gold at Kildonan should read the booklet on *The Kildonan Gold Rush* by Jack Saxon. Contemporary reports of the gold diggings include Joass (1869); a long article (Anon, 1869a) in the *Illustrated London News* entitled "Something from 'the diggins' [sic!] in Sutherland", and another (Anon, 1869b) in the same publication entitled The gold-fields of Sutherlandshire'. The latter article has two fine engravings of the diggings (Figure 6.3), (Figure 6.4). The general geology of the area is described in Read (1931).

The source of the gold has inevitably attracted considerable interest and the ultimate source is probably granite and quartz veins cutting the Moine metasediments. Auriferous granite pebbles have been found (Joass, 1869) and gold has been panned from deeply altered (probably weathered) granite in Suisgill Burn [NC 904 269] (Dawson and Gallagher, 1965). The granite is considered to belong to the Strath Halladale migmatite complex, which contains both Older (late Precambrian) and Newer Granites (Pankhurst and Sutherland, 1982). Thus, there is considerable uncertainty over the age of the primary mineralisation. A further problem is that the distribution of gold seems to be unrelated to either the intensity of migmatisation or known Newer Granite activity (cE the nearby Helmsdale Granite). Systematic variations in the composition of the gold from localities in the area indicate a centre of mineralisation in the watershed of the Suisgill burn. Thus, the gold in Suisgill burn is more silver-rich than in the adjacent Kildonan and Kinbrace burns. Recently, an epithermal source has been proposed on the basis of the silver and tellurium content of the gold and the presence of inclusions of polymetallic Bi-sulphides in the gold (Chapman, 2007). Given the close proximity of the Devonian–basement unconformity, this might suggest a Devonian age for the mineralisation.

Subsequent weathering, erosion and both glacial and fluvial transport processes have affected the distribution and concentrations of the gold. The immediate source of the gold is morainic terraces bordering the streams, and especially the lowest part of these (Joass, 1869). Gold grades broadly increase according to the extent of reworking, from which it follows that the primary granite source may have been of low grade rather than a 'Bonanza' deposit. Strongly altered granite occurs in the upper reaches of the gold burns, especially Suisgill, and is probably caused by deep pre-glacial Tertiary weathering. This would have released gold grains from a relatively large volume of granite for natural beneficiation. Further upgrading would have occurred by reworking and concentration during melting and retreat of the Pleistocene ice sheet(s), and by recent fluvial action (Plant and Coleman, 1972), thus the present alluvial concentration represents the results of a multistage process. General information about the glacial history of the Scottish Highlands can be found in Boulton *et al.* (2002).

All of the key elements of the gold story outlined above, with the exception of the deeply altered granite, can be seen in this excursion.

Locality 1. [ND 026 155]

A visit to the Timespan Heritage Centre opposite the Bridge Hotel in Helmsdale is recommended. Here, apart from numerous interesting exhibits on the history and wildlife of the area, one exhibit is devoted to the Gold Rush and shows alluvial gold from the diggings as well as contemporary pictures and panning equipment.

Proceed up the Strath of Kildonan on the A897 towards locality 2. The Strath is a broad flat-bottomed glacial valley devoted to farming and salmon fishing. Grouse and deer are hunted in the adjacent hills. The hillsides are blanketed with drift and exposure is generally very poor. Cross sections of moraine can be examined at Kilphedir (by the bridge [NC 989 186] and about 100m west of Torrish Burn [NC 968 187]. Generally the drift is unstratified and consists of angular to rounded, mainly psammitic clasts of varying sizes set in a sand-clay matrix. At Torrish Burn a moraine contains a lens of

finely bedded sand surrounded and overlain by more typical unstratified drift. The sandy lens represents local fluvial reworking of morainic material. At Torrish Lodge a fine example of a tree-covered esker can be seen on the south side of the road, and in the distance on the southern side of the Strath there is a fine display of hummocky drift-covered ground.

Locality 2. Baile an Or [NC 912 214]

Many miners lived at Baile an Or (the town of gold) during the Gold Rush (Figure 6.3). Good examples of the country rocks, mainly Moine psammites, can be examined both by and below the bridge. These are pale brown flaggy siliceous rocks with thin pelite partings striking 333° and dipping at 45° to the east. In the area covered by this excursion the Moine rocks show little variation. They are predominently eastward dipping, grey, flaggy to medium-bedded psammites, with occasional thin pelitic bands, which have attained amphibolite facies metamorphism. Exposures are largely restricted to the edge of the burn. On the west side of the bridge the psammites are cut by veins (10 cm scale) of red leucogranite. Both are cut by thin (1 cm scale) quartz veins. Veins of both types are possible primary sources of gold, but do not attempt to find any. The chances of success are remote and it would cause unacceptable damage to the outcrop.

Walk upstream to locality 2, where gravel on both sides of the burn may be panned. Note two terraces on the east side of the burn. Gold has been obtained from the lower portion of such terraces, especially above bedrock.

Locality 3. [NC 911 216]

Here the burn makes a sharp turn and a large waterfall can be seen at the foot of a gorge. The marked change in gradient makes the gravels between localities 2 and 3 attractive targets. On the inside of the bend the burn cuts into and exposes the lower terrace, which is an unstratified mixture of rounded clasts set in a sandy matrix. The gravel bank at this point is a good place to pan.

To reach locality 4 climb the hill above locality 3 to a narrow path along the upper terrace. The path along the lower terrace leads to the waterfall and is slippery and dangerous. This path forks above the waterfall; take the upper path and then descend to the burn above the waterfall.

Locality 4. [NC 913 217]

Pan the large gravel bank on the east side of the burn. Bedrock is close to the surface here. The psammites strike 172° and dip 65° to the east. Retrace your steps up the side of the valley to the path and proceed to locality 5.

Locality 5. [NC 914 218]

The downstream end of this locality is marked by a small 2 m waterfall. At this point the psammites strike across the burn, forming a series of natural riffles. Sediment caught between the riffles can be panned. Look for sediment-filled crevices in the bedrock here. At the waterfall a good example of a massive quartz vein occurs striking across the burn. The psammites strike at 172° and dip about 30° to the east.

About 50 m upstream of the waterfall a small gravel bank close to the bedrock on the east side of the stream can be panned. At this point the burn is roughly parallel to the strike of the psammites. From locality 5 it is possible to walk beside the burn for the remaining part of the excursion.

Locality 6. [NC 916 219]

Here, the valley opens out above the gorge and a terrace is present. The psammites (strike 183°, dip 40° to the east) strike across the burn again, forming a series of riffles. From here to the sheepfold [917 221] gravel banks on both sides of the burn may be panned.

Locality 7. [NC 917 220]

The dip of the psammites varies from about 65° to vertical, probably due to small-scale folding. On the east side of the stream a small antiform occurs with an axial planar cleavage and apparently a sub-horizontal fold axis. The fold geometry is rather obscure due to faulting.

Locality 8. [NC 916 222]

About 90 m upstream of the sheepfold a small S fold crosses the burn. The fold axes plunge steeply to the north. From this point to locality 9 the burn runs through a fairly straight open valley with poor exposure and not many gravel banks are exposed at medium water levels in the burn.

Locality 9. [NC 916 225]

Here, the burn has cut into a terrace and exposed a 50 m section of closely fractured and disturbed psammites, pelites and thin granite and quartz veins, overlain by drift. A large gravel bank on the east side of the burn is worth panning.

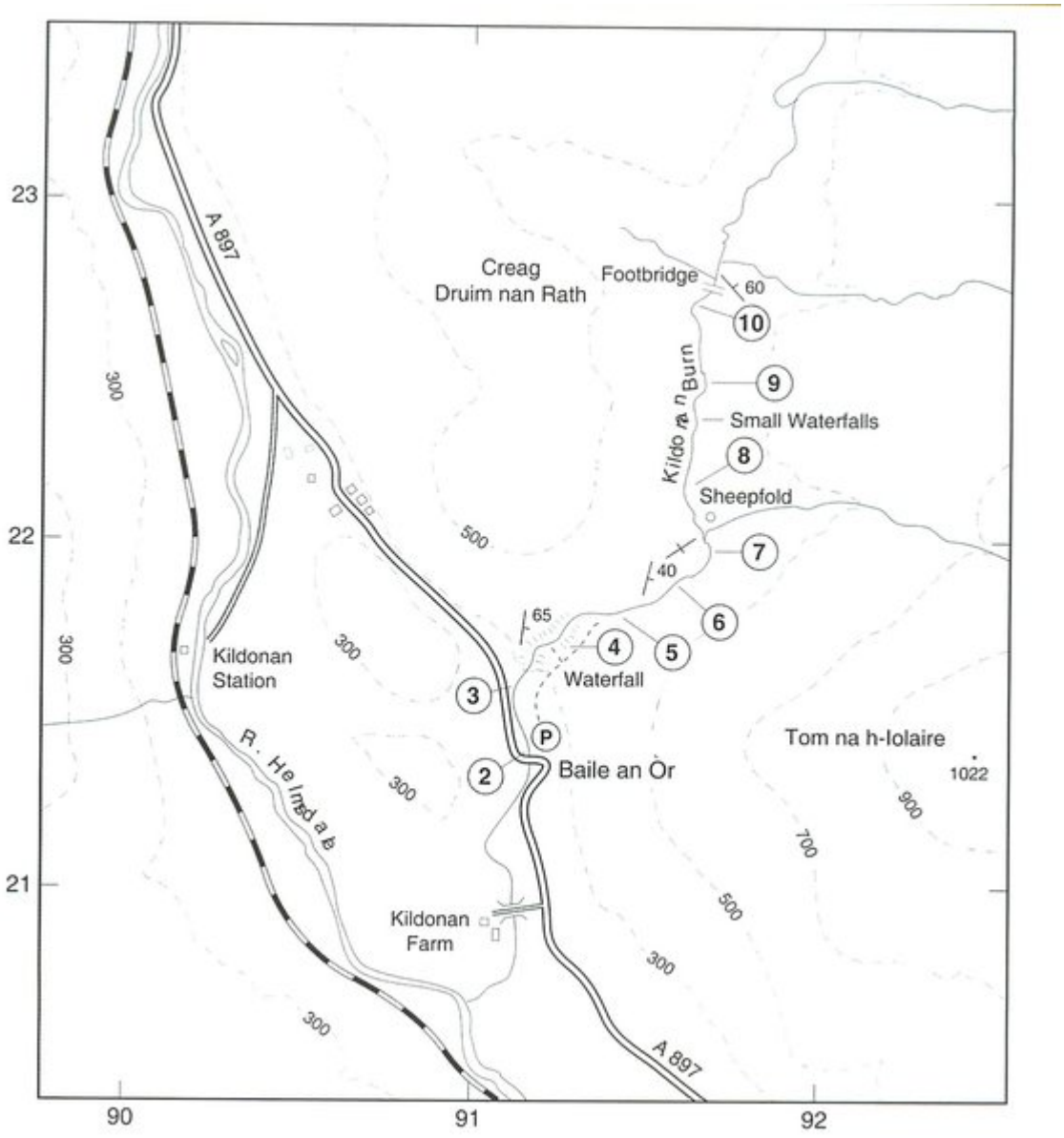
Fracturing is most intense in the central part of the exposure where two main directions can be recognised by displacements on a thin 5 cm granite vein crossing the face just above eye level. Possibly these fractures are axial planar cleavages to a conjugate fold. The structure cannot be fully resolved, due to the rock face being partially obscured by downwashing drift.

The structures seen at localities 7–9 suggest that the overall structure of the psammites is probably more complex than a set of eastward dipping beds.

Locality 10. [NC 916 227]

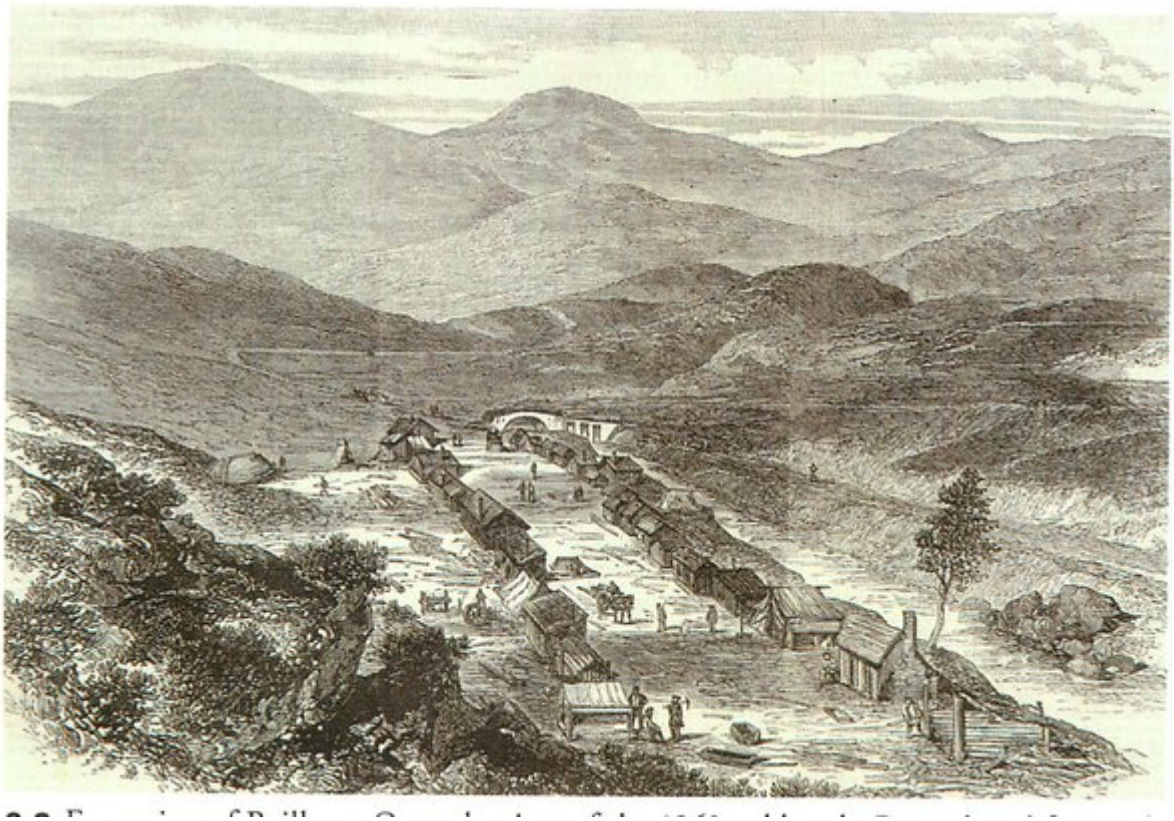
A large gravel bank on the inside of the bend may be panned. On the opposite bank the burn has cut into a terrace, exposing sandy drift. Psammites exposed about 40 m below the bridge are striking at 327° and dipping 60° to the east. Upstream from the wooden bridge two terraces can be easily distinguished.

Figures

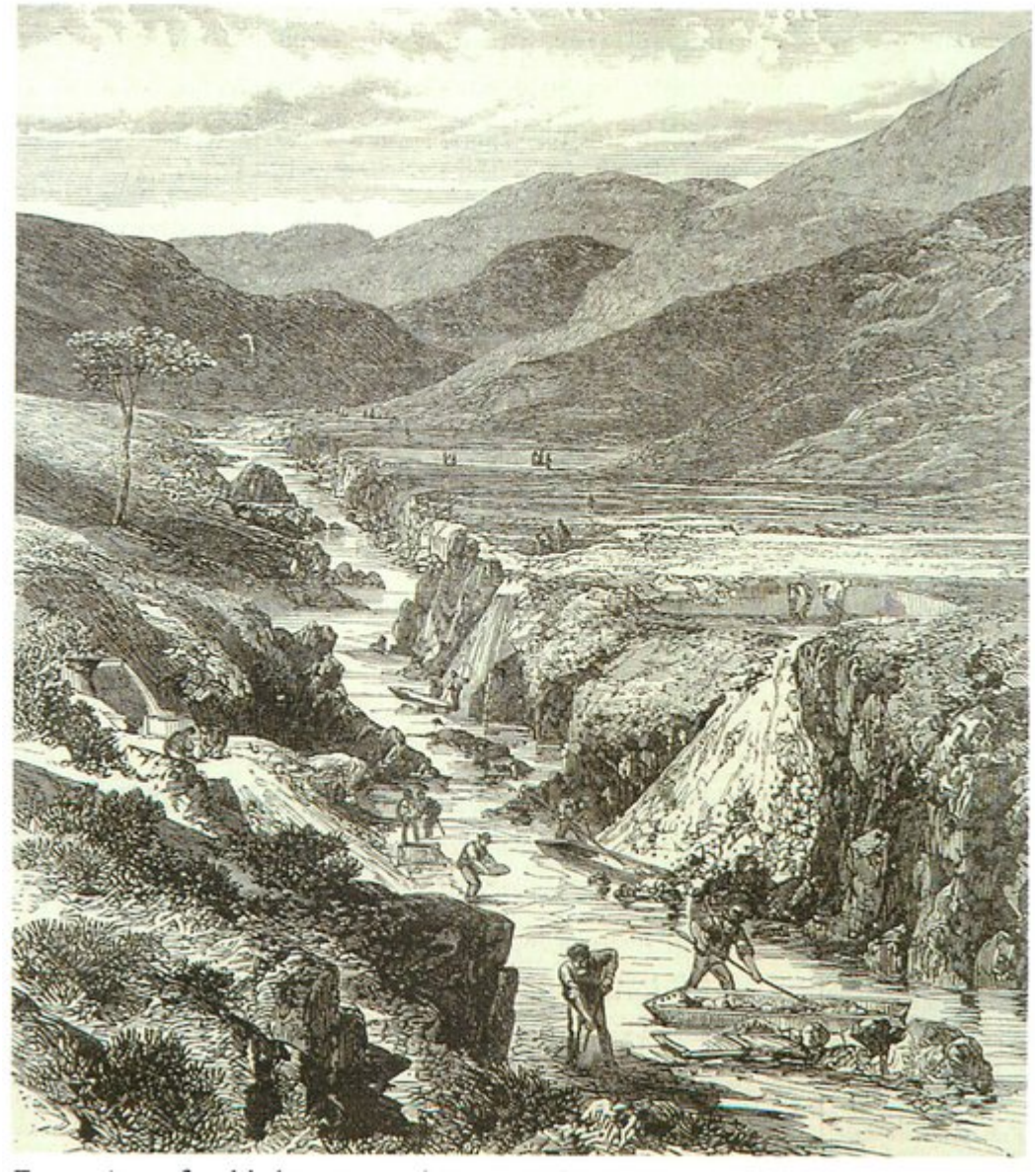


(Figure 6.1) Locality map of Kildonan Burn area.

(Figure 6.2) Typical flakes of alluvial gold up to 3 mm in size, and panned from gravel in the Kildonan Burn at Baille an Or.



(Figure 6.3) Engraving of Baille an Or at the time of the 1869 gold rush. Reproduced from The Illustrated London News, May 29, 1869.



(Figure 6.4) Engraving of gold diggers working at Kildonnan in 1869. Reproduced from The Illustrated London News, May 29, 1869.