Field guide to the I. G. S. post-symposium tour, August 2008

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1 Preamble

The tour will involve some mild overland walking in possibly wet fields and hillsides. A little climbing over gates and at least one barbed wire fence will be necessary (but not obligatory). Waterproof boots are recommended, and as the weather is changeable, rain gear should be brought, and a warm pullover. Bring also swimwear and towel, as there will be several opportunities to swim (and the water *may* be warm). Insect spray may be useful, as midges, mosquitoes and sandflies may be out and about, and can be very irritating.

Etymology

Two of the features we shall see on the tour, drumlins and eskers, both take their names from Irish words. *Druim* is an Irish word meaning hill or ridge, and the suffix *-lin* indicates small, thus a small hill or ridge. Apparently the term was coined in 1833.

The Irish word *eiscir* also means a ridge, esker is the anglicisation.

2 Itinerary

OS references are to Ordnance Survey maps (see OS in reference list).

23 August, 2008

8.30 Bus leaves university from the Stables.

10.30 Coffee at The Poppy Seed, Clarinbridge. Leave 11.

11.30 Galway crystal factory.

12.30 Derryloney drumlin, Barna. (McCabe 2008, pp. 75–77). Picnic lunch (alt: An Crúiscin Lán, Spiddal). Swim. Leave 2.30.

3.30 Coral beach, OS 44, grid 91.3/23. Leave at 4.

5 Kylemore Abbey. Leave at 6.

6 Tullywee delta. Leave at 7.

Check in to B and B's. Bus to Pangur Ban restaurant, Letterfrack, dinner at 8.30.

24 August, 2008

8.30 To Leenane, ice contact Gilbert-type deltas. Leave 10.

11 Glaciomarine spread at Askillaun, Louisburgh (McCabe 2008, pp. 220, 251).

1.30 Lunch in Wyatt's Hotel, Westport.

3 Drumindoo drumlin, Westport. OS 31, grid 03/85.

4 Unnamed drumlin section south of Rassakeeran, Clew Bay, OS 31, grid 95.2/89.2.

5 Claggan drumlin, Clew Bay. OS 31, grid 94/89.2.

6 Check in to accommodation, clean up, pints.

7.30–8.30 Boat trip, Clew Bay.

9 Dinner in Sol Rio, Bridge St., Westport.

25 August, 2008

8.30 Leave Westport.

9 Collagh esker section before Swinford. OS 32, grid 33.9/96.6

10 Cloonaghboy esker section beyond Swinford. OS 32, grid 40.9/00.6

11.30 Castletown: house on esker. OS 39, grid reference 44.3/57.8. Picnic lunch.

1 p.m. Leave for Shannon (to arrive 3.30).

3 Guide

From Limerick we drive north towards Galway, passing through the Gort drumlin field. We will stop at the Poppy Seed, next to Paddy Burke's Oyster Bar, for a cup of coffee. Clarenbridge is home to an Oyster festival, which runs every year in September, and based round Paddy Burke's pub. The festival started in 1954, and celebrates the opening of the oyster season.

Galway crystal factory

On the outskirts of Galway we stop briefly at the Galway crystal factory. Lead crystal is a particularly Irish product, with Waterford crystal being perhaps the best known example. It was an English glassmaker, George Ravenscroft, who in 1676 discovered that the addition of lead oxide to glass makes the final product clearer as well as heavier, and numerous glass crystal manufacturers have been set up since then. The first of these was the Tyrone crystal factory in 1771, and the famous Waterford crystal company was founded in 1951.

The polishing of glass after it is cut is an interesting process, presented as a problem at the industrial study group meeting in Limerick in January 2008. A mixture of hydrofluoric and sulphuric acid polishes the cut by etching the lead oxide and silica. Of interest is how and at what rate this reaction process is able to smooth the cut surface, which is initially rough (and thus opaque) at a ten micron scale.

The geology of Galway

The following is adapted from Feely (2002).

> Galway is built on a geological mosaic of metamorphic, igneous and sedimentary rocks which are covered by a veneer of Quaternary deposits. The distribution of rock types in the region is due to a geological divide that splits the eastern and western regions of County Galway. The bedrock of southern Connemara, west of Galway, is made of igneous rocks that formed between 400 and 470 Ma, whilst sedimentary rocks, mostly Carboniferous limestones around 350 Ma, extend eastwards, forming the bedrock of the Irish Midlands.
>
> The oldest metamorphic rocks are coincidentally found beneath the oldest part of Galway city. These are amphibolite and granite gneiss that were formed out of gabbro and granite that had formed about 470 $\pm$ 5 million years ago. Other manifestations of this metamorphism are the quartzite peaks of the Twelve Bens which contain intricate multicoloured layers of the renowned Connemara marble. The marble occurs as discontinuous exposures for about 30 km in an east-west direction along the southern flank of the Twelve Bens. It is an ideal ornamental and decorative stone and has been popular for jewellery making and ornamental stonework. It is exported worldwide and fine examples can be seen decorating the floor of Galway cathedral in the city centre.
>
> The bedrock along the northern shoreline of Galway Bay is predominantly granite. Several varieties exist in the region and range in colour from pink to dark grey reflecting varying proportions of the three minerals, feldspar, quartz and mica that make up the rock. All the varieties are collectively known as Galway granite which formed around 400 Ma. Westwards towards Salthill the bedrock geology changes from amphibolite and gneiss to the granite, and outcrops can be observed aroud the beaches at Salthill, Silver Strand and Spiddal.
>
> Eastwards of Galway city the bedrock changes from amphibolite and gneiss to Carboniferous limestone, which is the youngest of the three bedrock types in the region. It formed early on in the Carboniferous period ($\sim$ 350 Ma) when Ireland was situated in a subtropical position. During this time, this part of Ireland was surrounded by subtropical seas that were abundant in marine life, a setting akin to the Great Barrier Reef off the west coast of Australia. It was in this type of environment where the limestones of the Galway region formed and they are consequently rich in marine fossils.

Derryloney drumlin

Passing through Galway, we drive through the well-to-do suburb of Salthill, turning off at Barna towards the Silver Strand (OS 45, grid 25.2/22.8). We visit the exposed

Figure 1: The Derryloney drumlin at Barna, Co. Galway.

section of the Derryloney drumlin (figure 1), one of a group of just three drumlins in this part of Galway Bay.

According to McCabe (2008, pp. 75–77),

> Four major, largely unconformable, facies are present in the main exposure at Derryloney. The base of the section consists of laminated and massive mud grading up into muddy diamict containing pods of pebbles and isolated cobbles. Occasional channels cutting the mud are in-filled with stratified diamict. This facies is overlain by low-angle, planar cross-stratified gravel filling channels eroded into the muddy diamict. Abrupt textural changes are common with massive and laminated sand, which contain a range of soft sediment deformation structures. The gravel is overlain by stacked beds of massive diamict separated by thin sandy stringers. All of the stratified facies are overlain by a carapace of massive diamict across the entire section.

Overleaf we reproduce McCabe's interpretation of the stratigraphy of the Derryloney drumlin.

Gaeltacht

We drive along the coast towards Spiddal. This part of the country is a *Gaeltacht* area, meaning a part of the country where Irish is the predominant language, or at

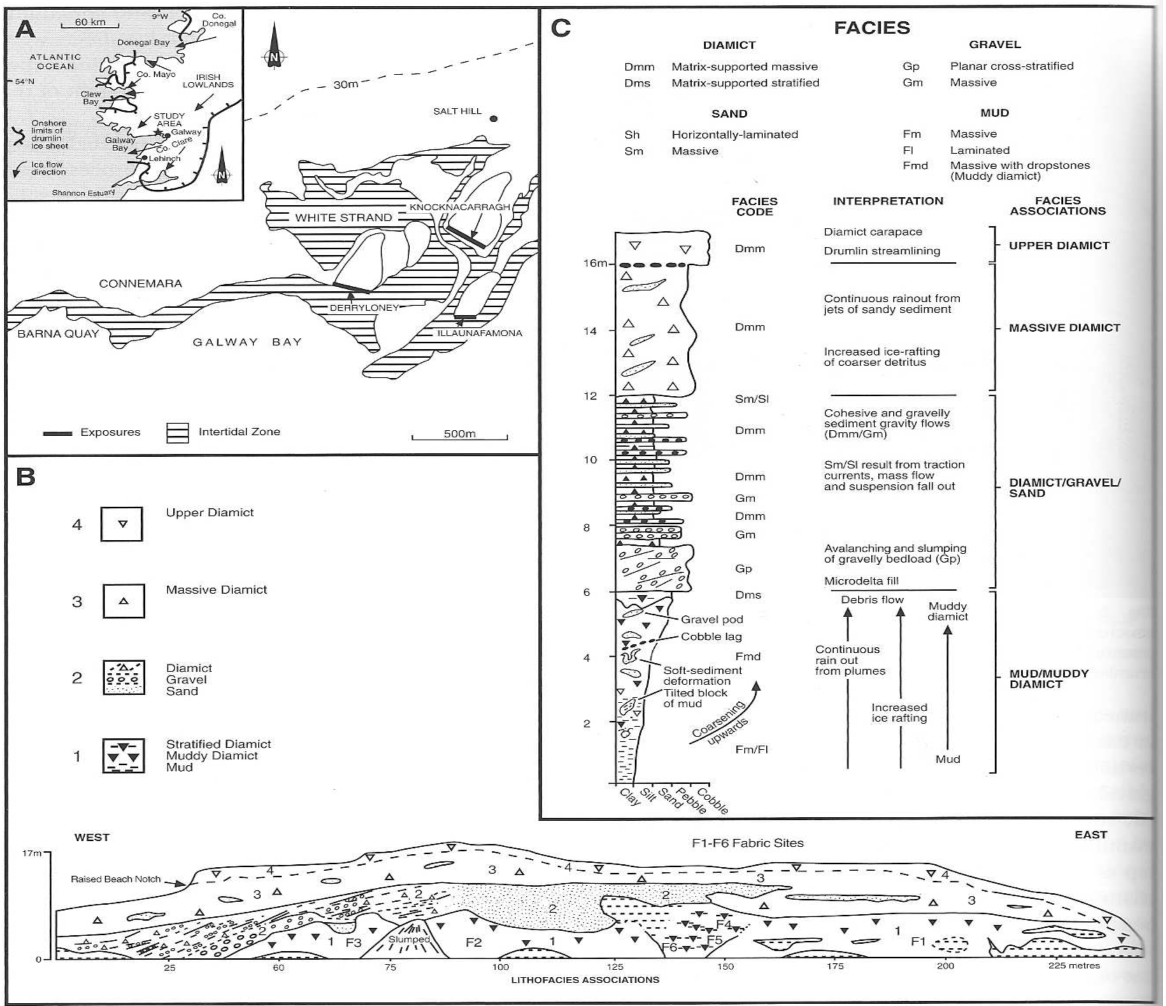

Fig. 5.19a Location of the Barna group of Drumlins and general ice flows (after McCabe and Dardis, 1989)
Fig. 5.19b Stratigraphy and geometry of lithofacies associations in the Derryloney drumlin, Galway Bay
Fig. 5.19c Generalised facies log from the central part of the Derryloney drumlin, Galway Bay (after McCabe and Dardis, 1989). Facies code is from Eyles et al., 1983. *By kind permission of SEPM (Society for Sedimentary Geology).*

Figure 2: Marshall McCabe's interpretation of the Derryloney drumlin, from page 76 of his book (McCabe 2008).

least is commonly spoken. The Gaeltacht was established by the Irish Government in 1926, soon after the country became independent of Britain. At that time, many parts of West Cork, Kerry, Clare, Galway, Mayo and Donegal qualified, but the decline of the Irish language has left only a few regions today where Irish is predominant. One such region is in Donegal, the other principal one is that west of Spiddal, through which we drive.

Maerl beach

We proceed along the R336, and if there is time, we will turn off at Casla on to the R343 through Carraroe. This is the other main centre of the Galway Gaeltacht (apart from Spiddal). We follow the road down to a 'coral' beach at OS 44, grid 91.3/23. Maerl beaches consist of the cast-up remains of coralline algae, and are found in parts of the west of Ireland. The 'corals' are in fact the remains of seaweeds which form detached, rock-like growths in the sub-tidal zone. The cast-up material is coarse at the bottom of the beach, and increases in fineness as one goes towards the high tide mark. The upper shore material is very white and forms a beautiful beach. It is possible to swim here (but you will need to be quick).

We return to the R336, driving north to Maam Cross, then west to Recess, then north along a beautiful road between the Twelve Bens and the Maam Turk mountains. At Recess there is a marble quarry. The green Connemara marble is mined in this region, and examples can be bought in the various craft shops which dot the countryside.

As we drive past Lough Inagh, the Twelve Bens are to the left across the lake with the Maam Turks to the right. The rounded summits, arêtes, hanging valleys and corries are classic signs of glacial erosion and these mountains are typical examples of how ice eroded the Irish uplands.

Lazy beds

On the road past Lough Inagh, 'lazy beds' can be seen. These are relict furrows used in growing potatoes in the nineteenth century, before the great famine of 1846–1851, in which a million Irish men and women died of starvation.

In the 1800s the industrial revolution only happened in the northeast and so the Irish largely depended on agriculture. In 1841 there were eight million people in the country, of which two thirds depended on agriculture, and in particular the potato, because it could be grown in almost any soil, had a very high yield, and was very nutritious. Between 1845 and 1848 the potato crop failed because of an unknown disease referred to as the 'blight', which caused the potatoes to rot in the ground. The result was a widespread famine which was the most tragic and significant event in Irish history, and one of the worst human disasters of the nineteenth century. By 1851, the population of Ireland had been reduced by more than two million due to starvation, disease and emigration to Britain and North America.

The following description of lazy beds is from Percival (1995, pp. 37–38):

The system of cultivation in general use called for the construction of ridges, known as 'lazy beds' to prejudiced observers. The technique varied in detail from one part of the country to another, but the basic principles were always the same. Instead of breaking the ground and digging deep, as an English gardener might do, the Irish cottier cut parallel lines through the turf, some three or four feet apart, and piled the space between the lines with lime and manure which he had collected throughout the year. Close to the sea, he would also make use of sea sand, with its admixture of lime-rich shells, and seaweed, especially the heavy kelp from the low-water line.

Beginning at the outer edge, he then sliced underneath the turf and turned it over, grass-side down, so that there was a kind of fertilizer sandwich between two layers of turf. He would turn both sides towards the middle to form a ridge, with shallow trenches on either side. With a small sharp tool called a spud, he would make holes at regular intervals through the upturned sods of turf and plant the seed potatoes into the filling of the sandwich. He finished the ridge by piling on earth from the trenches on either side, thereby raising the whole bed a foot or two above the surrounding soil. This method gave excellent drainage on wet soils and ensured that the seed potatoes came into direct contact both with the manure and the fertile interface between the two layers of turf. It was an extremely laborious and highly ingenious form of horticulture, thoroughly understood and practised by Irish men and women for centuries, which English observers usually failed utterly to comprehend.

Modern archaeologists have now demonstrated that ridges of this kind had been used in Ireland to grow grain for at least 5000 years.

Kylemore Abbey

We turn left on the N59, and drive past Kylemore Lough on the right towards Kylemore Abbey, which we will visit. Kylemore Abbey is a Benedictine monastery founded in 1920 on the grounds of Kylemore Castle. The abbey was founded when Benedictine nuns fled Belgium in World War I. The house was built between 1863 and 1868 as a private home for a wealthy politician, Mitchell Henry, sometime MP for Galway County.

Tullywee Bridge

Just past Kylemore Abbey, we turn right over Tullywee Bridge to get a panoramic view (figure 3) of the Tullywee delta (McCabe 2008, p. 256). This is either a Gilbert-type delta or a subaqueous fan. Thomas and Chiverrell (2006) describe it as follows:

> ...the Kylemore valley forms an open-ended glacial trough running between Tullywee Bridge and the eastern end of Kylemore Lough. Much of the western valley floor is occupied by a large flat-topped drift surface at

Figure 3: The Tullywee delta. In the foreground can be seen the lobes of the delta. In the middle distance is the section that we will also visit.

> c 45m IOD, cut through and partially entrenched by the Dawros River. Much of the surface, especially on the southern side, is diversified by a complex system of anastomosing and partly braided esker ridges, up to 15 m high, mostly running parallel to the length of the valley. To the west of Tullywee Bridge the drift surface terminates abruptly along the edge of a steep, cross-valley bluff and is fronted by a series of lower terrace surfaces at 35 and 40 m IOD.

Thomas and Chiverrell interpret the lobate ridges as subaqueous fans emerging from subglacial channels at the ice margin, when sea level was at a level of ca. 65 m OD.

From our vantage point overlooking the delta, we return to the main road, and will visit the quarry visible in figure 3. The sandy foreground is covered with large, rhubarb-like plants. If anyone knows what these are, please let us know!

Leenane

On Sunday morning, we drive east towards Leenane, where we will inspect two raised river deltas. These are also described by Thomas and Chiverrell (2006). They lie in a valley to the south east, where a glacier flowed down towards Killary Harbour, which is a glacial trough (now a fjord) some 7 km long flowing directly into the Atlantic.

According to McCabe (2008, p. 253 f.),

> At Leenaun the small valley leading southeastwards from the southern margin of Killary Harbour is choked with sand and gravel associated with a halt in ice-marginal retreat. A major feature in the valley consists of a terrace surface at 78 m IOD which ends in a cross-valley moraine fed by eskers along the valley. Sections in the terrace show that basal till passes upwards into 1.5 m of parallel laminated sand and clay containing lonestones termed basin floor sediment and 10 m of large-scale, planar gravelly foresets dipping 15°–20° to the northwest. The terrace surface is underlain by thin (< 1 m), flat-lying beds of pebble gravel . . . the main part of the foresets formed during progradation of a Gilbert-type delta fed by esker tunnels from the southeast . . . the sequences are consistent with subaqueous sedimentation built downvalley from a grounded ice sheet margin. The sediments aggradated in water with a minimum surface at least 35–40 m IOD.

The Field

Leenane was the location for 'The Field', a 1990 film starring Richard Harris, based on a play by John B. Keane, in which a tenant farmer Bull McCabe (Harris) leases a field from a wealthy widow, which after years of labour he has transformed into a lush pasture. But when the widow seeks to sell the field to an American, McCabe is outraged, and in a climactic scene, he kills the American; this latter scene was shot at Aasleagh Falls, which we pass on our way north out of Leenane. As we drive west along the north side of Killary Harbour, the ruined cottage which was used as McCabe's residence can be seen on the hillside above Leenane, with hummocky moraine above it. The last residents left in 1982, but the property (with 35 acres of land) was on the market in 2004, for 225,000 euros.

Askillaun

We drive west, passing a large landslip on the right. The road then turns north along the Doo Lough pass, between the Mweelrea Mountains on the left (817 m) and the Sheeffry Hills on the right (761 m). The road brings us towards Louisburgh. We proceed straight across at the crossroads, along a small road, then turn right towards a farmhouse, from which we walk down to the shore at the coastal section of Askillaun subaqueous spread (OS 30, grid 77.2/81.4).

The following is taken from McCabe (2008, p. 251):

> Originally Hanvey (1988) and Warren (1992) mapped drift ridges along the southern margin of Clew Bay as drumlins which implies that they were carved by ice flowing west onto the continental shelf. However, drift ridges that exist in the area round Old Head and Askillaun are not typical drumlins because they have been carved from a sediment spread and are bounded by scars of meltwater erosion, their internal structure is stratified

> and undisturbed, they are intimately related to adjacent spreads of stratified diamict recording sub-aqueous deposition, they do not form either a linear group or a swarm and they show no obvious relationship either to regional ice flow or to the composite bedforms at the head of the bay. The internal geometry of the large sections along the coast is very similar, recording similar depositional settings. At Askillaun, the exposure consists mainly (75%) of stacked sheets of diamict that dip consistently westwards at $\sim 5°$. Although diamict beds (1–2 m thick) are massive they contain numerous sandy wisps, laminated beds, outsized clasts (< 1.5 m across) and in some cases coarse-tail grading patterns. Individual beds are traceable for tens of metres along section. The crude stratification of the diamicts is emphasised by lenses of pebble gravel a few metres in length and more discrete erosional channel margins up to 5 m across infilled with stratified gravel. At intervals in the succession laminated muds up to 0.5 m thick contain small pebbles and extend for 2–4 m. The most noticeable characteristic feature of the succession are the laterally discontinuous (4–20 m) boulder and cobble lines, one clast thick, that occur at vertical intervals of 3–5 m. The upper clast surfaces are striated, abraded and flattened and although the clast lines dip gently west some lines are wavy to irregular. Sediment transitions are common between gravel and diamict end members. The westward dips are primary and unrelated to glaciotectonics, suggesting progressive sediment release and buildup from an ice margin immediately to the east pinned on the rock ridges around Louisburgh.
>
> Because sediments are up to 45 m thick it is difficult to generate and accommodate this thickness either subglacially or beneath a debris deficient ice shelf . . . The presence of striated boulder lines strongly suggests that the ice periodically readvanced locally over the growing sediment pile possibly on a seasonal basis . . . Therefore it is likely that the sequences are glaciomarine and associated with high relative sea level in excess of 45m OD.

Clew Bay

From Askillaun, we proceed back to the main road, turn left through Louisburgh and head towards Westport, where we will have lunch in the Wyatt Hotel. The road goes along the south side of Clew Bay and provides a first view of the marvellous drumlins which punctuate the bay. Clew Bay is said to have 365 islands, and these islands are in fact the exposed parts of a drumlin swarm, formed when the ice sheet flowed west into Clew Bay.

On the right rises the mass of Croagh Patrick (762 m), a holy mountain where St. Patrick, the patron saint of Ireland, is said to have fasted for forty days in 441 A. D. There is evidence of occupation dating back to the stone age, including a hill fort at the summit, and a dry stone oratory on the mountain has been dated to between 430

Figure 4: Drumlins in Clew Bay, view from The Quays pub, Westport Harbour.

and 890. Each July, on the last Sunday of the month, a pilgrimage is made by some 25,000 people; the path to the summit is clearly visible from the road below.

Drumindoo

The first drumlin we visit is at Drumindoo (OS 31, grid 03/85). We climb over a gate and walk up through a rather wet field to the peak at 116 m, where there is a cairn, and an impressive view of the surrounding area.

South Rassakeeran

From Drumindoo, we drive back towards Westport, then turn right along the Western Way, then left past Corratowick. This takes us along the 2 km long ridge of the Slaugar drumlin (or ribbed moraine, depending on your point of view), at the end of which we drop abruptly to join the N59. The road then bends round to the right along the base of the drumlin. We follow the road north and then turn left at the cross roads at grid 98/89.2 towards Rassakeeran on the right. On the left side of the road, opposite the 42 m Rassakeeran drumlin, is a 29 m drumlin, where we can see a section (grid 95.2/89.2). The remains of a stone age ring fort are visible on the east of the drumlin (indeed, many of these drumlins have ruined ring forts at their summits, for obvious reasons).

Figure 5: Subglacial till in the south Rassakeeran drumlin.

Claggan

A kilometre further on, we turn right towards the Clew Bay golf club, from where we walk up to the Claggan drumlin (grid 94/89.2). The peak of this drumlin is accessed by climbing over a double barbed wire fence. At 53 m, it offers a spectacular view of the drumlins in the bay. There is a ring fort at the top.

Eskers

Eskers were perhaps first described by Richard Prior, an Irish observer, in 1699, but it is not until two hundred years later that Kinahan (1864) tried to interpret esker patterns in terms of water flows over an Ireland which was an archipelago of islands, this concept deriving from the biblical interpretation which prevailed in the early nineteenth century. Subsequent research on Irish eskers is based on the seminal paper of Sollas (1896), which established the concept of an esker as the cast of parts of a subglacial drainage system.

According to McCabe (2008),

> In Ireland the main esker systems are generally regarded as sinuous ridges of stratified sands and gravels, up to 100 km long, recording meltwater drainage of the ice sheet during final deglaciation of the lowlands... Although

Figure 6: View to the west over Clew Bay from above the Clew Bay golf course. Clare Island (461 m) can be seen in the distance. The ice sheet was grounded there when it advanced on to the continental shelf.

> eskers may form by subglacial water flow at the base of active ice, formation of the actual arborescent network of drainage channels must predate the final sedimentation events which constitute the final esker ridge. The channels follow hydraulic-potential lows on the glacier bed and trend normally in the same direction as the ice-surface slope because the latter largely controls hydraulic equipotentials . . . Commonly, eskers have steep sides, single crestlines and typically are a few tens of metres in height. McDonald and Vincent (1972) suggest that sedimentation is built up over time from the channel floor upwards as successive conduits are created by melting of subjacent ice walls. . .
>
> The eskers which form within long R-tunnels are generally recognised by the presence of sinuous almost continuous ridges extending across country for kilometres. Many sectors of the two great esker systems of Ireland have sectors of this type in the central midlands and on the plains of Mayo (figure 7). Both systems are developed across Carboniferous limestones and not crystalline bedrock with the variable till cover tending to be thin. . .
>
> Ridges formed by sequential deposition near to or at the ice margin from a common tunnel can resemble a string of beads recording diachronous events as the ice margin recedes. Individual beads can be conical, elon-

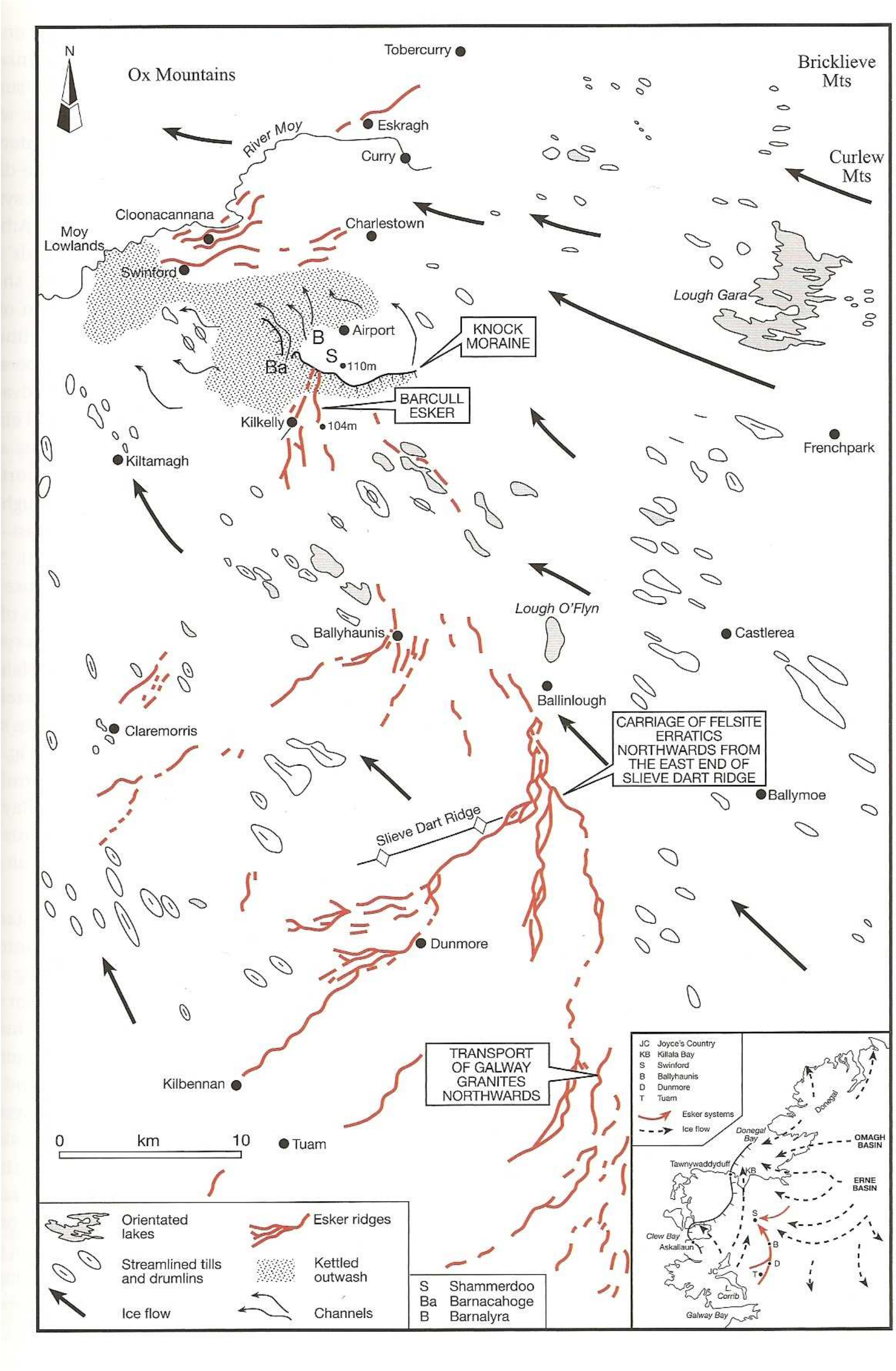

Figure 7: The Connaught esker system, reproduced from figure 8.5 of McCabe (2008, p. 159). The eskers we will stop at are between Swinford and Charlestown (top left) and north of Tuam (towards bottom left).

gate or mesa-shaped ... Generally these forms are regarded as diachronous along the depositional system with conspicuous steep-sided ridges or cones separated by topographic lows depicting successive, ice-contact depocentres at a receding ice-sheet margin...

Not all beaded eskers are necessarily associated with diachronous deposition at successive tunnel mouths. Some R-channels with variable cross-sections comprising restricted and narrow tunnel sectors linking broader, more open cavities can result in a beaded morphology because in order to maintain water flow along the system, water must flow faster in the narrower reaches. Therefore, erosion is more likely to dominate in the narrower reaches during full pipe-flow, and deposition where flow expansion occurs in lower energy, broad cavities. It is also recognised that elongated esker systems can either alternate with meltwater channels along a slope, or their paths can be preserved up a reverse slope...

Although esker ridges often provide spectacular landscape elements they may provide insights into the nature and patterns of deglaciation ... Eskers provide information on patterns, phases and ages of deglaciation, positions of former ice sheet margins, whether or not the ice was active or stagnant, the subglacial flux of sediments, combinations of processes operating along ice sheet margins, shapes of former subglacial conduits, the general slope of the ice surface and hydraulic gradients and whether or not the ice margin ended in standing water. Each of the major esker systems recognised in Ireland [is] uniquely situated both in a topographic and stratigraphic sense to provide some answers to these parameters of ice sheet history.

According to McCabe, the Connaught system of eskers dates from around 15,000 BP, when the ice flowing towards the north west withdrew. Two major ice flows coalesced to form the glacier flowing into Killala Bay. Two major esker patterns were formed, called the Charlestown–Swinford and Tuam–Kilkelly systems. The main ridges of the Swinford system are up to 4 km in length, 10 to 15 m high, 30 to 50 m across, and have steep sides. Exposures consist of edge-rounded boulders set in a finer gravelly matrix, indicating high energy flows in closed conduits. The ridges terminate in the west at Swinford where they are fronted by kettled spreads of gravelly outwash.

The larger Tuam system occurs on slightly higher ground ($\sim$ 100 m) east of the plains of Mayo. The height of the system rises from 40 m to 100 m OD from south to north. The change in orientation suggests a time-transgressive evolution. Most ridge segments are of 3 to 5 km long, composed of coarse boulder gravel, indicating typical channel fills, although there are also some beaded portions containing rippled sands, suggesting sediment accumulation within feeder channels into deltas deposited in standing water.

Cloonaghboy esker, Swinford

We leave Westport and drive east on the N5 towards Castlebar. Shortly before Swinford (OS 32, grid 33.9/96.6) we will stop (if there is time) to look at a quarried section

Figure 8: Cross-bedded sands below gravel, Cloonaghboy esker.

of the Collagh esker. From there we proceed past Swinford to view the Cloonaghboy esker (OS 32, grid 40.9/00.6). This is a very nice section with easy access from the road, and stratified sands and gravels can be seen (figure 8).

Castletown esker, Tuam

From Swinford we drive to Charlestown and then proceed south on the N17 towards Tuam. Shortly before Tuam, we will stop at Castletown esker, and have a picnic lunch there. The esker is situated across a field from the Tuam road, and is distinguished by the fact that is is punctuated by the ruin of a (perhaps eighteenth century) house, which apparently used the material from the esker in its construction. Thereafter we drive directly back to Shannon and Limerick.

Acknowledgements

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