

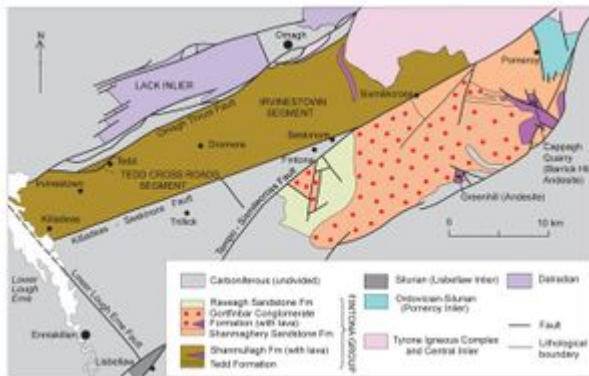
Devonian stratigraphy, Northern Ireland

From Earthwise

[Jump to navigation](#) [Jump to search](#)

Mitchell, W I (ed.). 2004. [The geology of Northern Ireland-our natural foundation](#). Geological Survey of Northern Ireland, Belfast.

Fintona Group



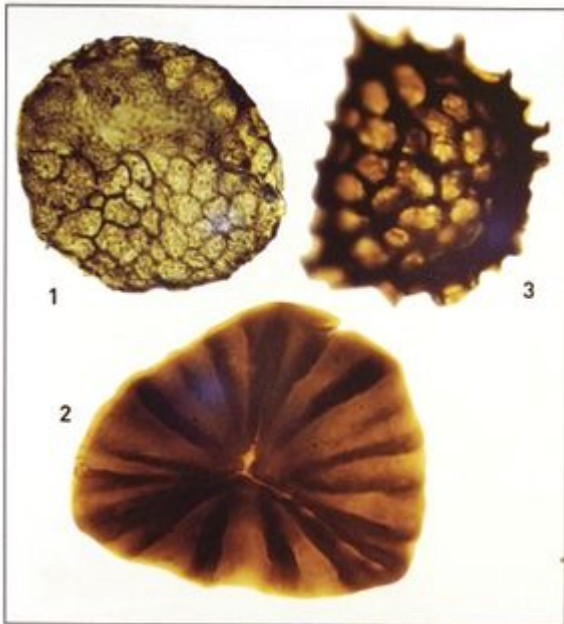
Geological setting of the Fintona Group.
(P947813)



The Shanmullagh Formation of the Fintona Group in the stratotype comprising about 10m of purple-brown, fine- to medium-grained feldspathic sandstone with mudstone clasts, ripples, laminae of coarse, angular quartz grains and thin layers of chocolate-brown mudstone. Disused quarry [H 250 604], Drumduff Townland, 2.4km NNE of Irvinestown, Co. Fermanagh.
(P947990)



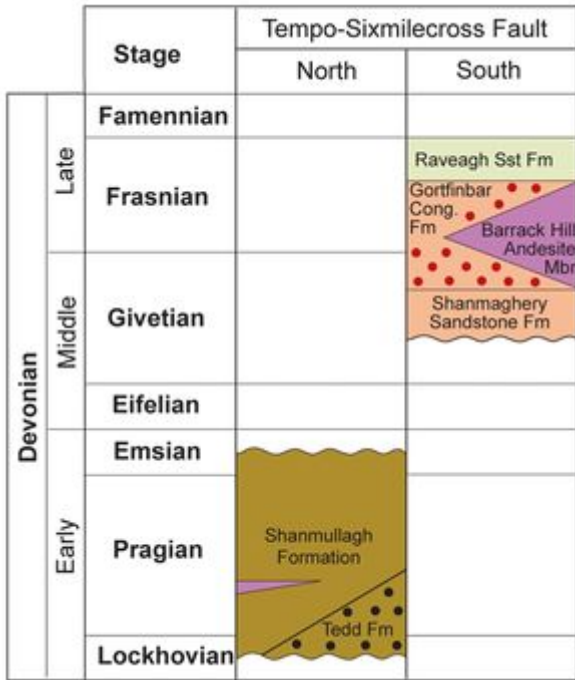
Roadside cutting in red beds of the Shanmullagh Formation consisting of grey to purplish brown, fine- to medium-grained sandstone, siltstone and thin mudstone with sandstone channel 9m wide and 23cm deep. North side of the A32 Irvinestown Road [H 348 627], 300m southwest of Dromore, Co. Tyrone. (Hammer 46cm long). (P947991)



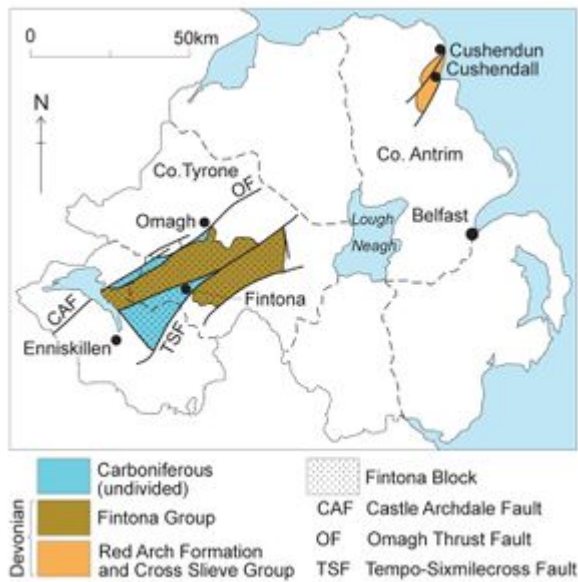
Fossils 1, 2 and 3 Early Devonian (latest Lockhovian-early late Emsian) miospores from the Shanmullagh Formation: 1 *Dictyotriletes* cf. *gorgoneus* (x 600) 2 *Emphanisporites rotatus* (x 630) 3 *Dictyotriletes emsiensis* (x 600) (P948071)

Formation	Member	Lithology
Ravvaugh Sandstone (350m)		Sandstone, reddish brown, fine-grained, silty, clay matrix; abundant ripple marks and desiccation cracks
Gortfinbar Conglomerate (2500m)	Greenhill Andesite Barrack Hill Andesite	Conglomerate, purplish brown; clasts boulder and pebble-sized; volcanoclastic; rare vein quartz, quartzite and greywacke; sandstone, coarse-grained Lava, trachyte or trachy-andesite, vesicular, flow-banded
Shanmullagh Sandstone (600m)		Sandstone, purplish brown, red and green stained, coarse-grained, calcareous, micaceous, fine upwards, with thin siltstone and mudstone intercalations; parallel, cross and ripple laminations and desiccation cracks Basal conglomerate with pebbles of vein quartz, quartzite, biotite granite, tuff, jasper and mica schist

The Fintona Group south of the Tempo-Sixmilecross Fault (10). (P947923)



Subdivisions and age of the Fintona Group in Northern Ireland. (P947922)



Distribution of Devonian and putative Devonian rocks in Northern Ireland. (P947812)



Proposed correlation of the Cross Slieve Group and Red Arch Formation in northeast Co. Antrim. (P947924)

Formation	Subdivision	Lithology	Palaeoenvironment
Cushendall (500m)		Conglomerate, and very coarse and pebbly sandstone, clasts almost exclusively of volcanic origin	Alluvial fans derived from southwest and south; possible aeolian influence
Ballyagan (160m)		Sandstone, pinkish brown, fine- to coarse-grained; cross stratified, thin mudstone intercalations	Braided rivers flowing to the east and northeast
Cushendun	Upper (290m)	Sandstone, coarse-grained, parallel and cross laminated, thin and mudstone, conglomerate layers one clast thick	Mid-fan braided stream deposits from non-erosive sheet flow; mudstone with desiccation cracks
	Lower (320m)	Conglomerate, laterally persistent beds, clast supported, very well rounded clasts, mainly of quartzite; sandstone is lentic, arenitic, thin mudstone intercalations	Conglomerate, proximal to mid-fan sheetflow deposits; sandstone deposited by braided streams, derived from northwest and west
	Basal breccia (5-10m)	Angular clasts of schist and vein quartz in coarse sand matrix	

Lithostratigraphy of the Cross Slieve Group (14). (P947925)



Cliff-forming conglomerates of the Cushendun Formation of the Cross Slieve Group. Cushendun Caves [D 252 325], 300m ESE of Cushendun, Co. Antrim. (P947992)



Detail of the conglomerate with clasts mainly of quartzite and pinkish red sandstone. (Hammer 46cm long). (P947993)



Interbedded sandstone and conglomerate of

the Cushendun Formation showing the predominance of quartzite pebbles and large cobbles. Coastal exposure [D 252 324], 120m southeast of Cave House and 500m southeast of Cushendun, Co. Antrim. (Hammer 46cm long). (P947994)



Boulder conglomerate and pebbly sandstone of Unit 1 of the Red Arch Formation. Coastal exposure [D 244 249], at the Lifeboat House slipway, 1km southeast of Cushendall, Co. Antrim. (Hammer 46cm long). (P947995)

	Unit	Thickness	Lithology	Palaeo-environment
Red Arch Formation	5	165m	Conglomerate and sandstone, fining upwards, laminated mudstone, calcrete nodules	Alluvial fan; streamflood to playa lake
	4	28m	Conglomerate, very thick beds	Alluvial fan; sheetflood
	3	60m	Conglomerate, thin and pebbly sandstone	Alluvial fan; streamflood with gravel bars
	2	c.20m	Conglomerate, small boulder to pebbles	Alluvial fan; sheetflood
	1	170m	Boulder conglomerate, pebbly sandstone	Alluvial fan; proximal sheetflood to braided stream

Lithostratigraphy of the Red Arch Formation (15). (P947926)

Fintona Block

Devonian strata in the Fintona Block ([P947813](#)) are assigned to the Fintona Group. North of the Tempo-Sixmilecross Fault the Fintona Block is divided into fault-bounded segments ^[1] with Devonian rocks confined to the Tedd Cross Roads Segment (Tedd Formation) and the Irvinestown Segment (Shanmullagh Formation). South of the Tempo-Sixmilecross Fault the Fintona Group comprises three formations ^[2].

Tedd Cross Roads segment

This fault-bounded lenticle ([P947813](#)) includes about 500 m of red beds of the Tedd Formation ^[3]. They consist in the lower part of fining-upwards, pebbly and coarse-grained sandstone, and in the top 200 m are thin, fine-grained sandstone, siltstone and reddish brown mudstone. Green mudstone (0.4 m thick), with assemblages of indeterminate palynomorphs, occurs at one locality in Cloghfin Townland [H 259 615].

Irvinestown segment

The lowest strata in the widespread Shanmullagh Formation ([P947813](#)) are brown, coarse-grained pebbly sandstone, thin purplish grey fine-grained sandstone and mudstone ^[4], ^[5]. However, much of the formation consists of massive purplish grey sandstone ([P947990](#)) and mudstone laminae with ripples and desiccation cracks. Sandstone also occurs in channels with dimensions varying from shallow washout structures ([P947991](#)) to features up to 2 m deep and is associated with sandy siltstone, reddish brown mudstone and palaeosols with calcrete nodules. Thin green mudstone contains palynomorphs.

Composition and age of the palynomorph assemblages

Green, colour-banded, mudstones contain palynomorphs and black phytoclast material. Miospores are dark brown and usually poorly preserved. The miospore assemblage includes *Acinosporites* cf. *apiculatus*, *Apiculiretusispora plicata*, *Dibolisporites* cf. *gibberosus*, *Dictyotriletes* cf. *gorgoneus* ([P948071](#)) Fossil 1, *Emphanisporites rotatus* (([P948071](#)) Fossil 2 and *Dictyotriletes emsiensis* ([P948071](#)) Fossil 3, a zonal taxon for the Pragian *Verrucosisporites polygonalis*-*Dictyotriletes emsiensis* Biozone ^[6], indicating a late Lockhovian to early late Emsian age. The absence of monolet spores and large spores with grapnel-tipped processes suggests a pre-late Emsian age ^[7].

South of the Tempo-Sixmilecross Fault

The Fintona Group hereabouts ([P947813](#)) is unfossiliferous and is divided into three formations about 3450m thick in total ([P947923](#)). Palaeocurrent data in the Shanmaghera Sandstone Formation ^[8] indicate bimodal current flow from the northeast, deriving clasts from the Tyrone Inlier ^[9], and from the southwest. Rounded clasts of andesitic volcanic rock in the Gortfinbar Conglomerate Formation were derived from the east by erosion of the Barrack Hill Andesite Member.

Ferro-magnesian minerals in the andesitic lavas are commonly altered to haematite and groundmass plagioclase is kaolinised or chloritised. Vesicles are commonly infilled with calcite, chlorite, quartz or iron oxide. The best exposure of the Barrack Hill Andesite Member ([P947813](#)) is in Cappagh quarry [H 696 674]. Radiometric dating of fresh lava (K-Ar whole-rock) records an extrusive event at 375±2Ma (Givetian to Frasnian), ([P947922](#)) and a date of 275±6Ma for reddish coloured lava which indicates an Early Permian resetting event induced by hydrothermal alteration during the Variscan Orogeny. The Raveagh Sandstone Formation is poorly exposed.

Cross Slieve Group and Red Arch Formation, Northeast Co. Antrim

The supposed Devonian rocks of northeast Co. Antrim ([P947812](#)) are assigned ([P947924](#)) to the Cross Slieve Group and the Red Arch Formation ^[10], ^[11]. However, because they are unfossiliferous and undated it is only certain that they were deposited sometime after the Dalradian and before the Middle Triassic ([P947924](#)).

The Cross Slieve Group consists of about 1300 m of red beds divided into three formations ([P947925](#)). The thin basal breccia that rests on the Dalradian is schist-rich but the conglomerates in the remainder of the Cushendun Formation have mostly well-rounded quartzite clasts and are exposed on the coast at Cushendun ([P947992](#)), ([P947993](#)). Southeast of Cave House [D 252 324] the conglomerate and coarse sandstone ([P947994](#)) is interbedded with laminae of green mudstone with desiccation cracks. The upper half of the formation is composed mainly of finer grained sandstone and mudstone with thin beds of conglomerate. The quartzite clasts are probably of polycyclic origin

and were derived from the northwest ^[12]. In contrast the sandstone matrix is a lithic arenite composed of single cycle detritus with minor quartz and abundant fragments of welded tuff, schist and quartzite. The Ballyagan Formation is exposed on the beach and in low cliffs at Port Obe [D 247 289]. North of Port Obe, the transition to the overlying Cushendall Formation is marked by the introduction of volcanoclastic conglomerate with clasts, up to 1m, of pilotaxitic andesite that was derived from contemporaneous lavas.

At Cushendall, the Cushendall Porphyry outcrops between the Cross Slieve Group and Red Arch Formation. The dacitic lava flows are younger than the Cross Slieve Group and did not contribute clasts to the Cushendall Formation ^[13]. At Limerick Point [D 244 278] sedimentary clasts in the base of the porphyry were incorporated during lava flow. Its contact with the Red Arch Formation at the Lifeboat House slipway [D 243 269] south of Cushendall is concealed and probably faulted.

The Red Arch Formation consists of 440m of unfossiliferous polymict conglomerate (P947995) and pebbly sandstone and is divided ^[14] into five units with two intra-formational unconformities (P947926). There is an angular discrepancy of 20° at the lower unconformity [D 244 268] which was considered by Wilson ^[15] to represent the base of the Triassic System in northeast Co. Antrim, hence his assignment of the succeeding rocks to the 'New Red Sandstone' (P947924). However, Simon ^[16] subsequently concluded that both unconformities were of minor importance, having probably developed on one alluvial fan, and regarded all of the Red Arch Formation as belonging to the 'Upper Old Red Sandstone' facies with a Late Devonian to early Carboniferous age. Later palaeomagnetic studies of sandstone from the Red Arch Formation have demonstrated a pole position consistent with a late Carboniferous-Early Permian age ^[17]. However, without supporting biostratigraphical evidence the true age of the Cross Slieve Group and Red Arch Formation will remain unknown.

References

1. ^[1] Mitchell, W I, and Owens, B. 1990. The geology of the western part of the Fintona Block, Northern Ireland-evolution of Carboniferous basins. *Geological Magazine*, 127, 407-26.
2. ^[1] Geological Survey of Northern Ireland 1979. Pomeroy, Northern Ireland Sheet 34. Solid Geology. 1:50 000. (Southampton: Ordnance Survey for the Geological Survey of Northern Ireland).
3. ^[1] Geological Survey of Northern Ireland, 1996. Omagh, Northern Ireland Sheet 33. Solid Geology. 1:50 000. (Keyworth, Nottingham: British Geological Survey).
4. ^[1] Geological Survey of Northern Ireland 1979. Pomeroy, Northern Ireland Sheet 34. Solid Geology. 1:50 000. (Southampton: Ordnance Survey for the Geological Survey of Northern Ireland).
5. ^[1] Geological Survey of Northern Ireland, 1996. Kesh, Northern Ireland Sheet 32. Solid Geology. 1:50 000. (Keyworth, Nottingham: British Geological Survey).
6. ^[1] Richardson, J B, and McGregor, D C. 1986. Silurian and Devonian spore zones of the Old Red Sandstone continent and adjacent regions. *Bulletin of the Geological Survey of Canada*, 364, 1-79.
7. ^[1] Stephenson, M H, and Mitchell, W I. 2002. Definitive new palynological evidence for the early Devonian age of the Fintona Group, Northern Ireland. *Irish Journal of Earth Sciences*, 20, 41-52.
8. ^[1] Simon, J B. 1984a. Sedimentation and tectonic setting of the Lower Old Red Sandstone of the Fintona and Curlew Mountain districts. *Irish Journal of Earth Sciences*, 6, 213-28.
9. ^[1] Geological Survey of Northern Ireland, 1995. Draperstown, Northern Ireland Sheet 26. Solid Geology. 1:50 000. (Keyworth, Nottingham: British Geological Survey).

10. Simon, J B. 1984b. Provenance and depositional history of the Lower Old Red Sandstone of northeast Antrim. *Irish Journal of Earth Sciences*, 6, 1-13.
11. Simon, J. B. 1984c. Sedimentation of a small complex alluvial fan of possible Upper Old Red Sandstone age, northeast County Antrim. *Irish Journal of Earth Sciences*, 6, 109-19.
12. Simon, J B. 1984b. Provenance and depositional history of the Lower Old Red Sandstone of northeast Antrim. *Irish Journal of Earth Sciences*, 6, 1-13.
13. Simon, J B. 1984b. Provenance and depositional history of the Lower Old Red Sandstone of northeast Antrim. *Irish Journal of Earth Sciences*, 6, 1-13.
14. Simon, J B. 1984c. Sedimentation of a small complex alluvial fan of possible Upper Old Red Sandstone age, northeast County Antrim. *Irish Journal of Earth Sciences*, 6, 109-19.
15. Wilson, H E. 1953. The petrography of the Old Red Sandstone rocks of the north of Ireland. *Proceedings of the Royal Irish Academy*, 55, 283-320.
16. Simon, J B. 1984c. Sedimentation of a small complex alluvial fan of possible Upper Old Red Sandstone age, northeast County Antrim. *Irish Journal of Earth Sciences*, 6, 109-19.
17. Turner, P, Shelton, R, Ruffell, A, and Pugh, J. 2000. Palaeomagnetic constraints on the age of the Red Arch Formation and associated sandstone dykes (Northern Ireland). *Journal of the Geological Society, London*, 157, 317-25.

Retrieved from

'http://earthwise.bgs.ac.uk/index.php?title=Devonian_stratigraphy,_Northern_Ireland&oldid=32555'
Category:

- [The geology of Northern Ireland](#)

Navigation menu

Personal tools

- Not logged in
- [Talk](#)
- [Contributions](#)
- [Log in](#)
- [Request account](#)

Namespaces

- [Page](#)
- [Discussion](#)

Variants

Views

- [Read](#)
- [Edit](#)
- [View history](#)
- [PDF Export](#)

□

More

Search

Navigation

- [Main page](#)
- [Recent changes](#)
- [Random page](#)
- [Help about MediaWiki](#)

Tools

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)
- [Cite this page](#)
- [Browse properties](#)

• This page was last modified on 25 September 2017, at 12:51.

- [Privacy policy](#)
- [About Earthwise](#)
- [Disclaimers](#)

