

A PRELIMINARY STUDY OF THE GEOMORPHOLOGY OF THE AILLWEE AREA, CENTRAL BURREN, CO. CLARE

By

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ABSTRACT

The area of the central Burren including Aillwee Hill and the Kilcorney-Carran closed depressions is characterised by a series of dry valleys and closed depressions, often with remnants of ancient phreatic caves preserved. These features may have been developed since Pliocene times by runoff from the former shale cover together with later modification by glacial and periglacial activity.

INTRODUCTION

Aillwee Hill forms part of the north-south ridge separating the Ballyvaughan valley to the west from the Turlough valley to the east. Aillwee Hill, altitude 305 m, is linked to Moneen Hill (235 m) to the north by a col. The general location of the area studied is shown in Figure 69.

The upland is bounded on its eastern, western and northwestern sides by steep, stepped slopes descending to the valley floors and coastal plain at 10-20 m I.O.D. To the south and southwest, in the direction of dip, the land slopes gently down to an altitude of c.90 m at Kilfenora some 11 km distant. At this point the limestone/shale boundary is located.

This area of the central Burren is composed entirely of Carboniferous Limestone, the nearest outcrop of the overlying shales being at Poulacapple Hill 6.5 km to the west. Bedrock is exposed at the surface over much of the area, ranging in form from fresh pavement with deep, wide grikes to degraded pavement rapidly being colonised by vegetation. Over part of the south of the area and in the valley floors a thick scrub occurs.

The dip of the strata is so low as to be very difficult to measure with any accuracy. Foot (1863) gives the dip as $1.5 - 2^\circ$ to the south, whilst measurements by the author gave values of between 1° and 4° at $190-200^\circ$ orientation. As elsewhere in NW Clare the best developed joint system is at 196° . There are cross joints at 94° and 45° that are locally important. Near the summit of Aillwee is an old lead and silver mine, the veins exploited running almost due east-west. The major bedding partings are commonly c.1.5 m apart with minor partings 0.5 m apart. All the limestone exposed at the surface is within the topmost 90-120 m of the Carboniferous Limestone sequence.

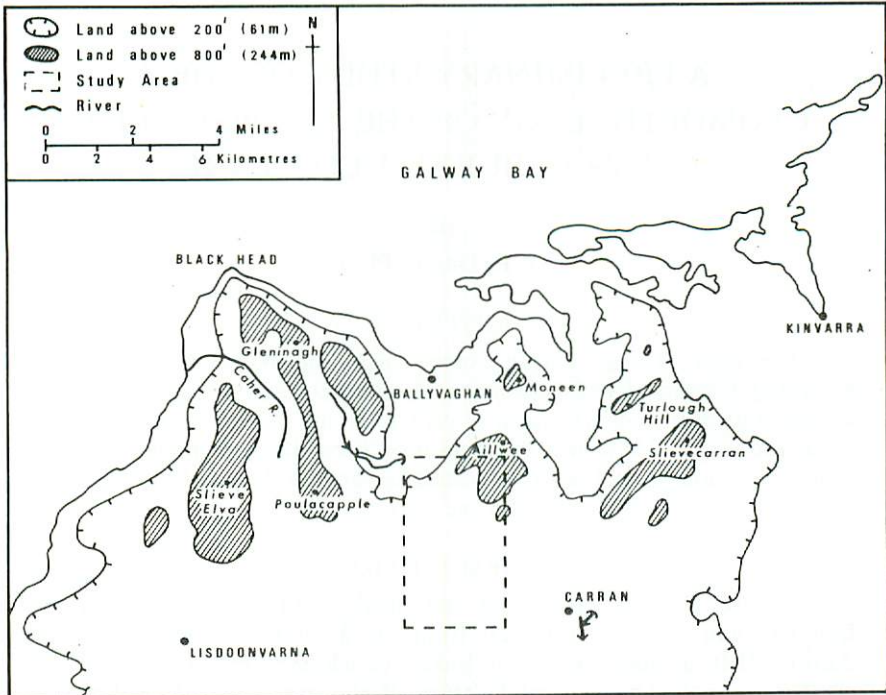


Fig. 69. The general location of the study area.

Based on Ordnance Survey of Ireland by permission of the Government (Permit No. 1939).

SURFACE FEATURES

The major surface features and the drainage of the area are shown in Fig. 70, whilst Fig. 71 is the key diagram for features referred to in the text by number or by letter.

The southern flank of the hill is dissected by a series of valleys or valley forms, converging on the large closed depression of Glensleade in the southwest. These features are on a scale not found elsewhere on the Burren. The most westerly valley (sequence 1-18) is in fact a chain of closed depressions separated by cols or flats and aligned at bearing 196° . Above 210 m I.O.D. no valley form is discernible but the line of hollows continues over the shoulder of the hill and down part of the northern flank in an uninterrupted sequence. Although the individual depressions vary considerably in their morphology they all appear to be developed along one major fracture zone.

A secondary group of depressions aligned at 060° (sequence 19-23) appears to be 'tributary' to the main line at an altitude of c.200 m. This smaller group lies within a broader ill-defined valley.

Valley A'-N is oriented at 030° and, particularly in its upper parts is almost a true valley having near vertical walls and a rectangular cross-section. Its upper end terminates in a small natural amphitheatre

but beyond this point it continues as a wide shallow valley running almost due east (O-R). This valley ends abruptly at the steep eastern flank of the mountain, its gradient being reversed near the flank. In its lower section valley A'-N becomes increasingly fragmented into individual closed depressions separated by low cols.

The third major valley (X-Z)—Ballymihil Valley—is confluent with valley A'-N at depression Z. This valley is oriented at 060° and is again almost a true valley. For long stretches it exhibits a gentle, uniform gradient.

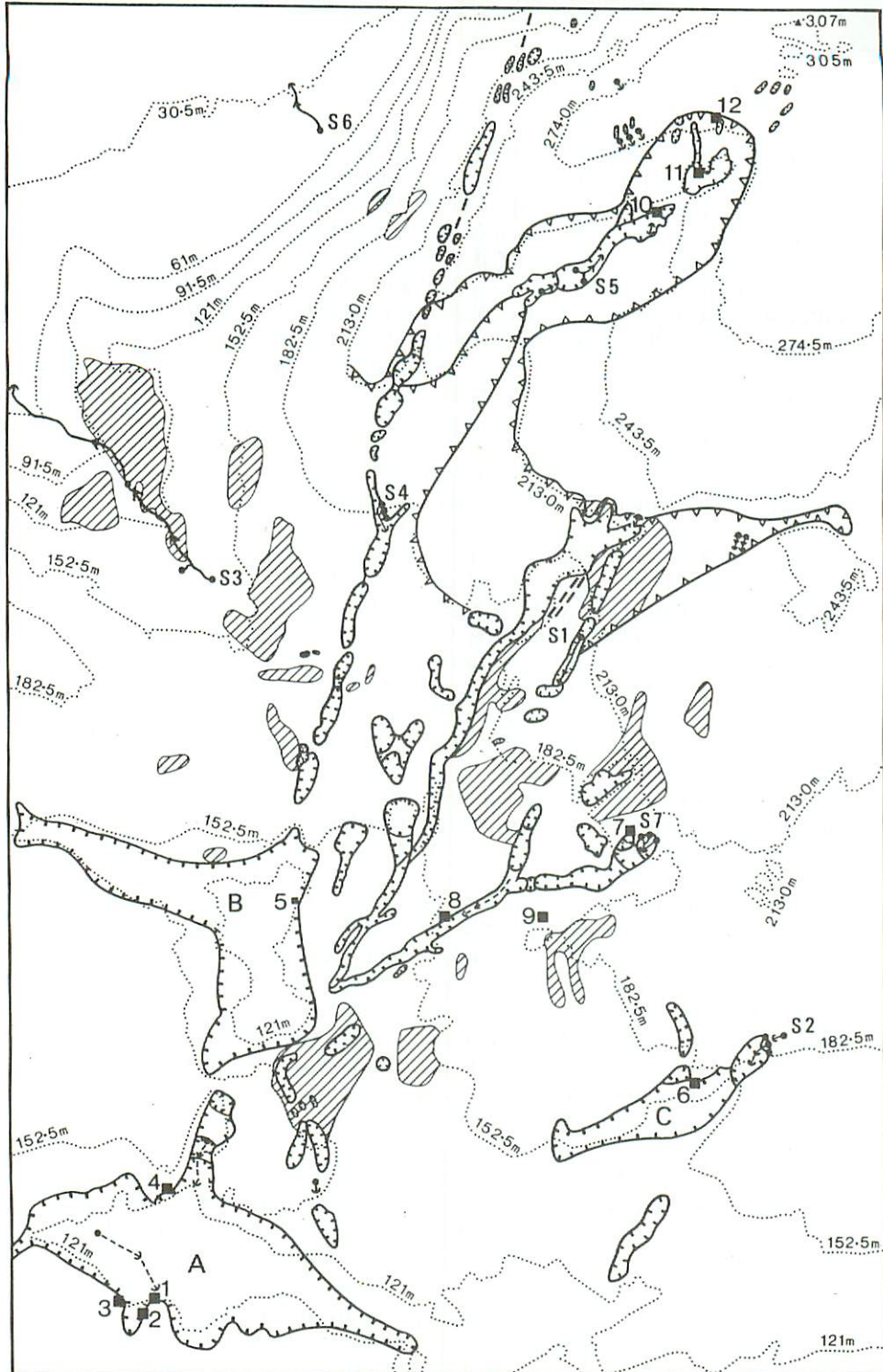
The three valley systems described converge on the large Glenslade depression and are separated from it only by low cols. Glenslade depression is some 30 m deep and consists of two parts—a north-south oriented section bounded by vertical cliffs on its northern and eastern sides and a longer valley running east-west and rising gently to the west. At its southern end the hollow rises in a series of broad steps to a low divide leading into Kilcorney Glebe, a well defined straight valley descending in steps to the main Kilcorney depression (Tratman 1968). This marks the southern limit of the valley/depression network although Kilcorney is itself tenuously linked to the large Caherconnell depression to the east.

The other large scale depression within the area is that of Poulawillin to the northeast of Kilcorney and aligned at $70-75^\circ$. The main feature is subdivided into several smaller hollows. Poulawillin may have been linked directly to the Kilcorney or Coherconnell depressions though there is no obvious valley or depression sequence linking them. There are many other isolated closed depressions and valley segments in this region but in most cases their relationship to the major valleys is evident. An exception to this is feature 34, an almost conical hollow some 9 m deep.

The broad, rather ill-defined larger scale valley system previously mentioned and shown in Fig. 71 is often delimited by nothing more than a scarp feature 3-15 m in height. Below an altitude of *c.* 200 m this system is no longer apparent. The main valleys converge on Glenslade depression and thence Kilcorney. Their orientation becomes progressively more east-west to the south and east of the hill. Also the valley form is more apparent in the easterly valleys than in the westerly, but in all cases the dislocation of the valley system into discrete closed depressions of greater or lesser magnitude is a noticeable feature.

THE CLOSED DEPRESSIONS

A. The westerly sequence (1-18). The lower part of this valley is fairly regular in form, varying in width between 20 and 50 m and in depth between 4 and 10 m. The walls are commonly cliffed in their upper parts with steep vegetated scree slopes below. Large angular boulders cover the floor. Individual depressions are separated by rocky cols usually only 1-2 m lower than the surrounding level. In depression 6 the infill is in excess of 1.5 m deep but elsewhere the regolith cover rarely exceeds 25-35 cm. Between depressions 1 and 6 the valley is straight. A slope of waterworn boulders leads up from the northern end of depression 6—a rise of 10 m—and at its head the valley forks,



- Contour lines in metres.
- Major valleys or scarps.
- Closed depression.
- Standing water.
- Intermittent stream.
- Rising.
- Sink.

- Major fracture line.
- Cave.
- Limestone pavement.

0 1/4 1/2 Mile
 0 1/4 1/2 kilometre



Fig. 70

Based on Ordnance Survey of Ireland with permission of the Government (Permit No. 1939).

The eastern branch becomes shallow and obscured by brush although it is almost certainly part of the depression sequence 24-19. The intervening ground is almost featureless. The western branch consists of a flat floored trench with bedrock floor. It is shallow (2 m) and 5 m wide at this point. A series of springs (S1) emerges from the eastern side of this trench the water sinking in the boulder slope leading down to depression 6. There are kamenitza and runnel forms developed on the floor of much of the trench suggesting that the valley is rarely occupied to its full width by the stream.

Above the springs the valley continues shallow and meandering to just short of depression 8 where there is an intermittent rising and sink. Above depression 8 the valley form is lost and the hollows are linked by flat or gently sloping areas.

Depressions 10, 12 and 13 are really one long feature some 12 m deep at its southern end and rising in steps to the north. In its northern headwall is a narrow notch leading upwards and this appears to be waterworn. Such a notch rather than a col is characteristic of depressions 13, 14 and 15. A series of smaller depressions runs on over the shoulder of the hill—depression 18 for example consists of a straight trough, 12 m wide, 6 m deep, running parallel to the hill scarp. These depressions resemble the depressions on the northwest flank of Slieve Elva. The sequence terminates abruptly at the steep northwest face of the hill.

Fig. 70. Geomorphological map of the Aillwee area.

Key:

Major depressions. A. Kilcorney B. Glensleade C. Poulawillin

Caves: 1. Kilcorney 1 (Cave of the Wild Horses).

2. Kilcorney 2.

3. Kilcorney 3.

4. Kilcorney 4.

5. Glensleade Cave.

6. Poulawillin

7. Ballymihil Cave.

8. Poul nabrone Cave.

9. Poulgorm Cave.

10. Aillwee Lower Cave.

11. Aillwee Upper Cave.

12. Aillwee Top Cave.

B. The Central Valley, (sequence A'-N). The lower part of this valley (depressions A' and B) is c.25 m wide and 15 m deep with a pronounced terrace feature, especially on the eastern side, some 8 m above the valley floor. Feature B terminates at its northern end in a large oval hollow with vertical headwall, and offset to the east is a col to depression F. Initially this is a shallow, broad groove (8 m deep, 20 m wide) but above the complex depression C/D/E the valley is 20 m deep and more V-shaped with a steep easterly wall and a gentler slope on the western side. Again there is a valley-within-a-valley form, the central

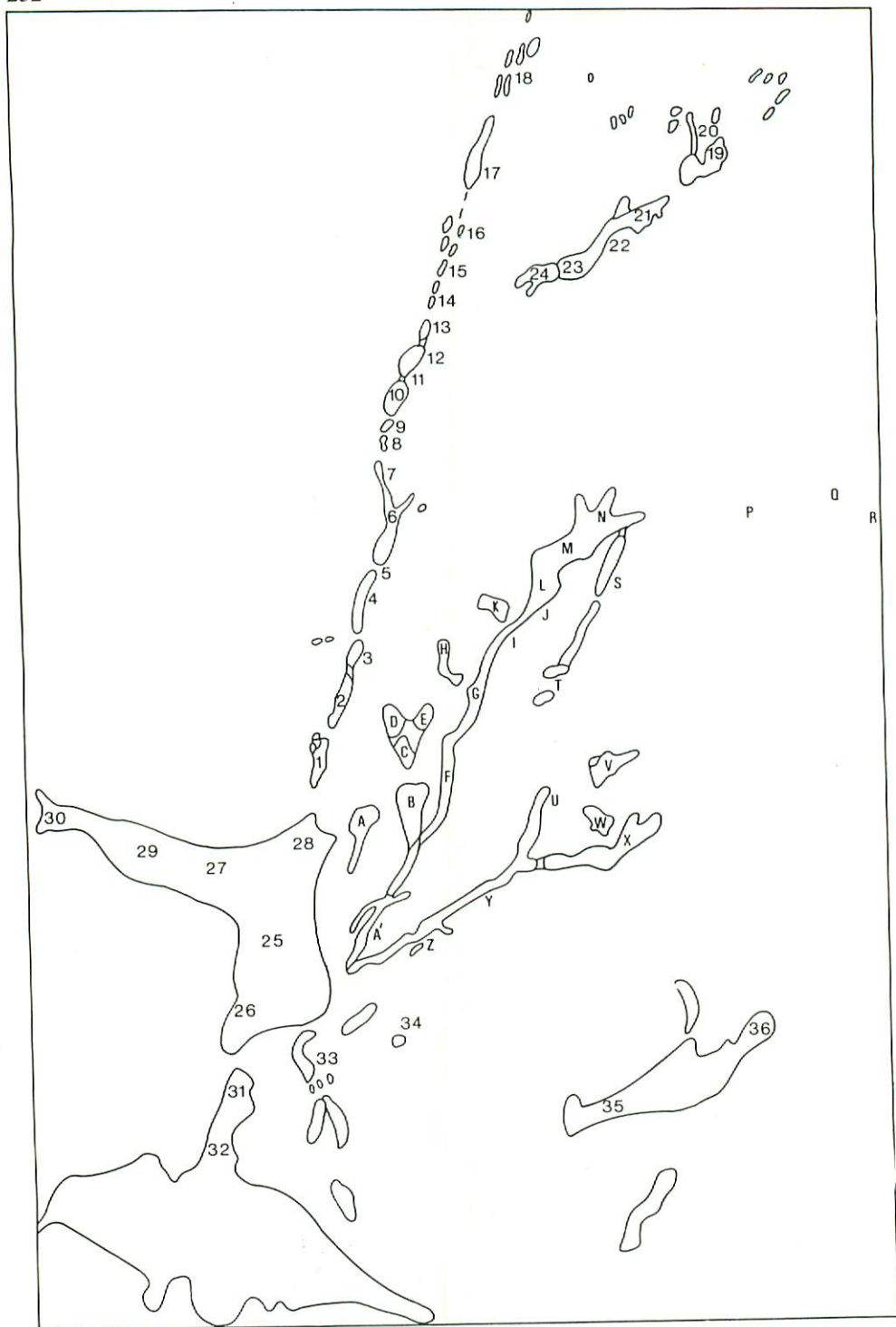


Fig. 71. Key to the features shown in Fig. 70 and referred to in the text. Based on Ordnance Survey of Ireland with permission of the Government (Permit No. 1939).

notch being 12 m deep. At K the valley becomes wide and there is a large bedrock mound at its junction with a subsidiary depression (Pl. 18). At M and N the valley is markedly asymmetrical with a vertical east wall 30 m high and a gentle stepped rise on the west flank. The valley ends in three alcoves each stepped some 4 m above the main valley floor and each ending in a vertical headwall. In the most westerly of the three is a small spring which sinks again within a few yards. Above the valley head is a scarp some 4 m high running to the northwest and east. The broad, shallow valley continues due east to the eastern scarp of the hill. In zone P are several tiny risings and sinks all oriented at 016° in the jointing. The area is of newly vegetated pavement. The end of this valley is directly opposite the large Poulavallan depression and the Glen of Clab on Gortaclare Hill to the east.

Depressions S and T run parallel to the upper part of the central valley and consist of a winding trough, followed in part by a medium sized stream which has cut a distinct notch 2 m deep and 3 m wide in the valley floor. The stream sinks just before the elongated east-west depression that terminates this sequence.

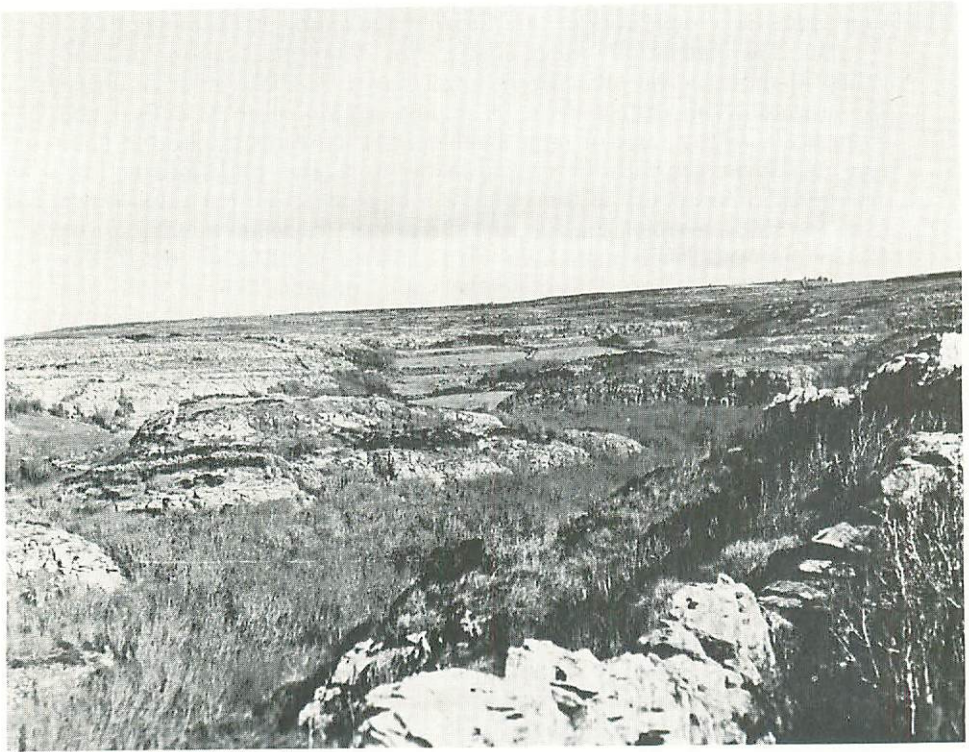


Plate 18. Central valley area J/K showing isolated rock dome in the flat-floored meandering dry valley. Photograph D. P. Drew.

C. The Upper Depressions (19-23). Depression 19 is one of the largest on the hill being some 30 m deep at its northern end and rising in steps to the southern wall 10 m high. A spur juts out across the centre of the depression and in it is located Aillwee Upper Cave (Pl. 19). A small tributary valley enters the main depression from the north at this point and the bedding observed in this gully is massive. To the north and east of the main hollow is a small scarp marking the headwall of a larger enclosing valley feature and beyond again is the almost horizontal summit plateau of Aillwee, broken only by shallow grooves excavated in the jointing. There are several small springs and sinks in this area.

Depression 21 is 15 m deep at its northern end rising to 6 m at its southern extremity. Aillwee Lower Cave is located in the west wall of this depression and there is a tiny seepage sinking at the lowest point of the hollow, probably derived from the cave itself. The continuation of this sequence is offset slightly to the southwest and consists of a well-defined trough floored with waterworn boulders. Two large springs (S5) emerge from its southern end and flow north (updip) to sink midway along the depression. This spring was formerly the site of a mill. To the southwest again is a shallow flat-floored depression (24) with a floor of pavement overlain in places by peat. Water can be heard just beneath the surface in several places. South of this feature the line of the depression sequence is only evident as a broad defile leading to depression 7.

D. The Ballymihil Valley (U-Z). This is the most nearly 'normal' valley of those in the area. In its lower part it is rectangular in cross-section and 15 m deep and in its middle section more V-shaped and 20 m deep, with a floor of large boulders. At its southern end the floor rises and it merges with the central valley in a large ill-defined hollow. The northern extremity of the valley is a large steep walled amphitheatre from the sides of which emerge several springs, the water sinking at the foot of the wall. Ballymihil Cave (7) is located in this cliff. Below this is a low col and steep descent to the valley proper 25-30 m deep and 30-40 m wide. In places there is a meandering stream trench which is active following wet weather.

E. Glensleade-Kilcorney-Poulawillin. Glensleade depression with an area of 1.5 km² again shows stepped slopes characteristic of many of the closed basins in the area—this stepping does not appear to be completely lithologically controlled as extensive flats are often developed above the main floor of the hollow, on occasions truncating the bedding. Similarly Kilcorney Glebe, the southerly continuation of Glensleade, descends in three steps each of c.10 m to the level of the Kilcorney basin. There are low rock ridges running across the valley at the head of each step. In Kilcorney Glebe the bedrock is rarely more than 25 cm below the surface except in the lower drift-covered part of the valley. Typically the east wall is steeper than the west—the lower part consisting of grassed over scree and the upper part forming a vertical cliff of which the top 6 m is frost shattered and the bottom 2 m relatively smooth. This may perhaps indicate a net loss of weathered material from the valley. At c.100 m O.D. the Kilcorney depression proper is the lowest point in the valley system. To the east of the



Plate 19. (a) and (b). Aillwee Upper Cave. Photographs D. P. Drew.

Glensleade-Kilcorney area is a complex of depressions up to 15 m in depth interlinked by a series of small gulleys and hollows. There is no obvious continuation of this line into Kilcorney.

Poulawillin is also a major closed basin ranging in depth from 35 m in its central portion to 15 m elsewhere. At its eastern end is a step of 15 m up to a pavement area and the vertical headwall of the hollow. A major tributary valley to the depression hangs some 15 m above the floor in the centre of the depression and opposite this feature a large rock rib extends north-south across the hollow breached only by a narrow notch. The bare limestone exposed on this rib shows features resembling glacial smoothing and has developed extensive karren forms.

HYDROLOGY

There are numerous small risings and sinks in the area all of which are shown in Fig. 70; the larger risings being marked S1-S7. In most cases the water appears over a wide area from one or more enlarged bedding planes only to sink within a short distance. Over a period of fourteen months it was observed that all the sources dried up in drought excepting S3, S5 and S7. The water rising and sinking at S5 was traced to the rising at S4 and thence to the larger permanent spring at S3. From S3 onwards the water is intermittently on the surface in the steeply descending valley running north, before finally sinking at the foot of the valley short of the Rathborney River. Despite its proximity to the numerous sinks on the hill, no water was traced to the intermittent rising S6 on the north flank of the hill.

Springs S2 and S7 emerge from many points along a bedding plane in the headwalls of their respective valleys. S.2 is depositing tufa. Total hardness values for the various waters were uniformly within the range 120-160 ppm (mean Ca was 136 ppm, mean Mg was 7 ppm) and the water was consistently close to saturation both with respect to calcium and magnesium. Thus no differentiation can be made between the various waters on a chemical basis.

Flooding is only observed in Kilcorney turlough at the lowest point of the system. It is considered that the present day hydrology of the area—or at least the superficial drainage—is largely unrelated to the landforms and to the palaeohydrology. Water is forced to the surface when the particular bedding parting along which it is flowing outcrops at the surface, commonly in the wall of a closed depression. The overall direction of groundwater flow seems to be controlled by dip—to the south-southwest.

THE CAVES

There are twelve caves known in the area, all but two of which can only be penetrated for very short distances. The location of these caves is indicated in Fig. 70.

A. The Kilcorney Caves (1, 2, 3, 4) are described in detail by Tratman (1968). Kilcorney 1; Cave of the Wild Horses (Hanna 1968), is located near the lowest point of the main depression, on its southern side and directly opposite Kilcorney Glebe. The cave is developed on two levels—an upper series approximating to the level of the turlough floor and a lower series descending to c.62 m O.D. The cave entrance is at 102.6 m O.D. The majority of the passages are largely phreatic

in form and although the cave is subject to intermittent flooding it appears to be largely a fossil system. Kilcorney 2, 3 and 4 are all phreatic tunnels at 122 m O.D.—they are completely inactive and heavily filled with what Tratman regards as resorted till.

B. Poulawillin Cave (6) is located some 15 m above the floor of the depression at an altitude of 152 m O.D. The cave can only be explored for some 5 m. At its entrance the cave is 3 m wide and 2 m high but ends in a series of enlarged bedding planes partially blocked by a fill of angular limestone fragments and clay. The cave is guided by a major joint but essentially the cave is simply an enlarged bedding plane with the entrance enlarged in part by frost action and in part by rapid turbulent water flow during the brief period for which it functioned as a resurgence when intersected by the formation of the depression.

C. Glensleade Cave (5), at an altitude of 140 m, is in the east wall of the depression and some 18 m above its floor. The cave is some 20 m long with an almost circular cross section of 1.5 m diameter. The passage meanders slightly but trends overall at 108°; in form it is completely phreatic. There is a partial fill of angular limestone cobbles and cave earth very well compacted. At the explorable limit the cave is completely blocked with calcited fill.

D. Ballymihil Cave (7) is at the head of the Ballymihil valley at an altitude of 195 m. The cave is described in detail by Williams & Williams (1966). The cave is 23 m long, 2.5 m high and 3.5 m wide. According to Williams the cave is an old resurgence, and the fill is 96% limestone, the rest being derived from boulder clay.

E. Poul nabrone Cave (8) (altitude 158 m) and **Poulgorm Cave** (9) (167 m) are both short tunnels. Poul nabrone has a second entrance in a surface depression.

F. The Aillwee Caves. There are three caves located in the depression sequence 19-23. The lowest of these, Aillwee Lower Cave (10), altitude 229 m O.D. is near the top of the northern wall of a closed depression. The cave is a short length of canyon passage developed in two intersecting joints. Some scalloping is present and the passage walls show shelving features:—this cave is quite different in form from any of the others in the area. There are numerous cobbles of Namurian flagstone included in the floor fill. A plan survey together with passage cross-section of this cave and of Aillwee Upper Cave is given in Fig. 72.

Aillwee Upper Cave (11) (altitude 234 m O.D., length 140 m) is a rectilinear net of passages riddling a prominent north-south spur in the highest depression of this sequence (19). The passages run completely through the spur providing several entrances to the system. The cave is exclusively joint controlled and shows no evidence of vadose action. The larger passages show much modification by frost shattering, whereas the smaller rifts have smoother walls. Large scallops occur in several sections suggesting slow flowing water. The roof and walls over much of the cave is coated with 3-10 cm of soft, spongy white calcite saturated with water and in places a similar deposit is found on the floor overlying 15 cm of cave earth, gravel and calcite. In the outer

passages of the cave the floor gravel is largely of limestone but further in the cave and especially in the area of section d-d' the fill consists of cobbles and gravels of rounded limestone and gritstone. Some of the non-calcareous deposits are certainly Namurian flagstones but a dark red silt/sandstone could not be identified with certainty and may be of Old Red Sandstone of the type found on the Slieve Aughty Mountains to the east. There is no discernible continuation of this cave system in the cliffs either to the east or the west of the spur.

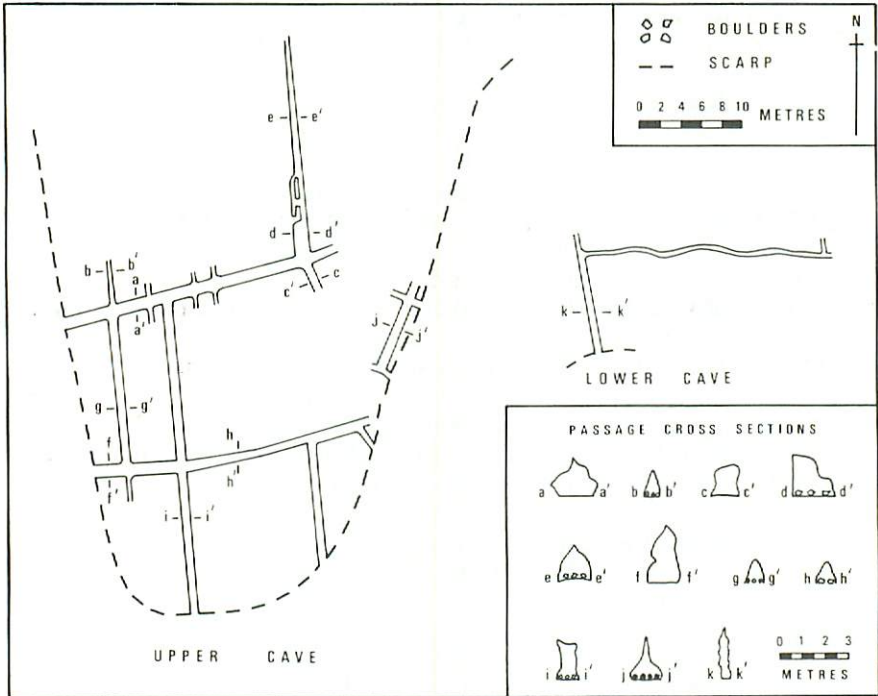


Fig. 72. Plan survey and passage cross-sections of Aillwee Upper and Lower Caves.

Aillwee Top Cave (12) at an altitude of 274 m O.D. is located in the small scarp face marking the northeastern limit of the larger valley feature enclosing this set of depressions. A small, elongate depression runs down from the cave towards the main hollow. Although only a few metres of passage are accessible, the cave would seem to be a small section of meandering streamway one metre square in cross section and similar in form to the entrance series of many of the active swallets at the shale—limestone boundary elsewhere in northwest Co. Clare, in which vadose trenching has only just begun.

CONCLUSIONS

Any attempt to explain the origin and development of the land-forms of the Aillwee area must account for:

- (a) the development of the major depressions of Kilcorney, Glensleade, Caherconnell and Carran.
- (b) the convergent series of dry valleys fragmented to a greater or lesser degree into closed depressions.
- (c) the larger scale valley network still discernible in part.
- (d) the marked linearity of the westerly depression sequence and its apparent complete lack of accordance with the present-day topography.

That these features are largely confined to the central and eastern Burren is presumably a function of the greater maturity of the karst in these areas—the longer interval for which the limestone has been exposed to sub-aerial erosion. The Burren has often been described as a 'youthful' karst area, but whilst this may be true of the western area, the region to the east would seem to reflect past rather than current processes and to that extent is a relict landscape.

The major depressions are certainly earlier than the last local glaciation as is evidenced by the drift deposits *in situ* in Kilcorney, Glensleade, Caherconnell and Carran (Sweeting 1953, 1955, Farrington 1965). During the last glacial advance the ice almost certainly overrode the summit of Aillwee hill though no drift deposits have been found above an altitude of c.180 m and the only non-calcareous rock fragments found could have been derived from a local caprock. Such fragments were found in several of the gulleys on both the north and south flanks of the hill up to an altitude of 260 m. It is thus possible that the development of the valley system was in part due to the erosive action of ice on certain previously enlarged zones of weakness in the rock, possibly modified by snow patch erosion and melt water fluvial action while the ground remained frozen. Such a combination of processes may explain the development of the most westerly depression sequence (1-18) where the initial zone of weakness coincided with ice movement from the northeast and a relatively exposed position of the flank of the hill. As such it resembles the valley features of Sligo and Leitrim called alts.

However, the development of the other valley systems and of the major closed depressions seems unlikely to have been due to the effects of glaciation alone. Williams (personal communication) regards the summit of Aillwee Hill as being within the top few metres of the Carboniferous Limestone beds and suggests that a shale cover remained in this area possibly until the last glaciation. Fig. 73 shows a long section at 020° from the northwestern flank of Aillwee to the shale-limestone junction near Kilfenora. The projected height of the former shale-limestone boundary is shown based on the dips of the two rock types in the area and assuming a conformable boundary between the two.

It is noticeable that south of Kilcorney depression the amount of limestone removed has been relatively small and therefore it may be that for some time the shale/limestone boundary stood at the southern

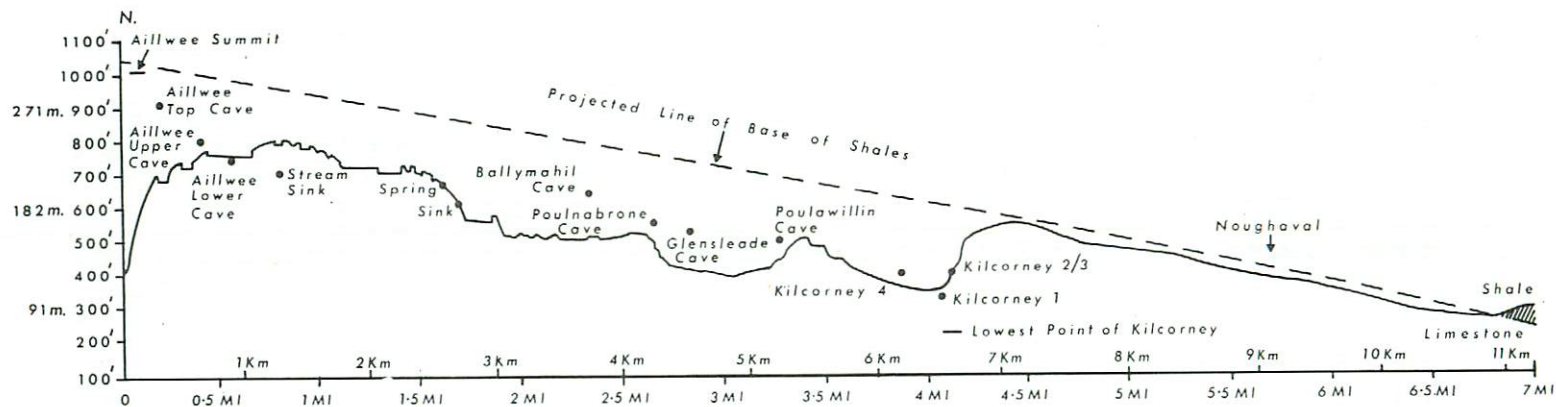


Fig. 73. Longitudinal section from the summit area of Aillwee Hill to the shale/limestone boundary near Kilfenora.

Based on Ordnance Survey of Ireland by permission of the Government. (Permit No. 1939).

edge of this depression and this would mark the southern limit of karstification for a considerable period. If it is supposed that the valley system to the north was in part cut by allogenic streams from a shale cover then a shale-limestone boundary at *c.*210-230 m O.D. may be postulated with several limestone re-entrants corresponding to the valley heads. The deeply trenched sections of the valleys all begin at that altitude. Fig. 74 shows the major depressions of the central Burren together with the present limestone-shale boundary and major valleys.

The evidence from the cave systems, limited though it is, does not suggest that subterranean drainage was well established. In most cases the caves have been exposed by the cutting down of the depressions, which they therefore must predate, and commonly consist of a short section of bore passage closing down to a bedding or point opening. It is possible that such caves could develop in the relatively brief period for which a primitive bedding cave functioned as a resurgence or sink

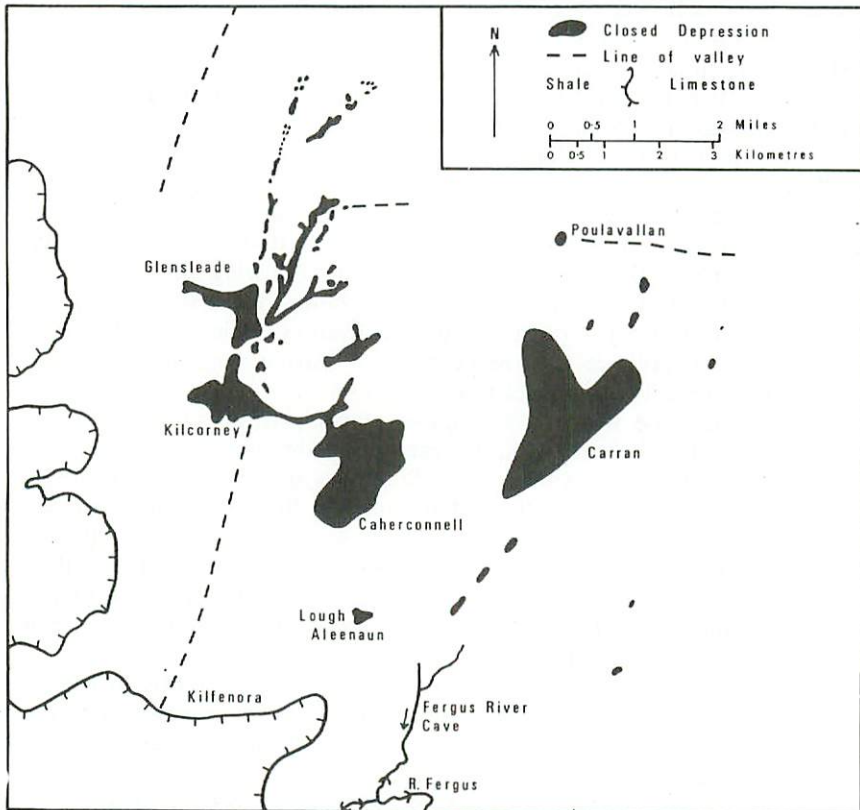


Fig. 74. The major closed depressions and valley systems of the Kilcorney, Aillwee, Carran area.

Based on Ordnance Survey of Ireland by permission of the Government. (Permit No. 1939).

following its intersection by the depression. The entrance zone would correspond to the region of accelerated, turbulent flow developed before the cave became inactive. Several of the present day springs show the beginnings of similar entrance enlargement today. The presence of a shale cover just south of Kilcorney may have meant that the development of an efficient groundwater transmission net was inhibited and that the supply of allogenic water from the Aillwee summit area may have ceased before mature cave systems could develop.

As may be seen from Figure 73, Aillwee Upper, Ballymihil, Glensleade, Poulawillin and Kilcorney 2, 3 and 4 caves form a descending sequence from the Aillwee summit area and may thus represent sections of the primitive NNE-SSW subterranean drainage network. In every instance the caves are located some distance above the depression floors, often on the level of the terrace feature, and this implies that the formation of the depressions occurred in at least two distinct phases. The exceptions to this are the Kilcorney 1 Cave developed close to the base of the Kilcorney depression and extending well below the floor and the sink in the Carran depression. On the north-eastern flank of Moneen Mountain, where the underground drainage may have been less restricted, there are remnants of large conduits and solution chambers at an altitude of c.35-60 m O.D.

A hypothetical development sequence for the area is suggested as follows:

- 1 During the period when the area was completely overlain by Namurian strata the major drainage was down dip to the SSW, perhaps with an east-west component following the line of the Glen of Clab and the valley east of valley A'-N. Such a network would broadly correspond to the shallow valleys on the limestone of Aillwee and the faint valley feature running south from Kilcorney to the shales near Kilfenora.
- 2 A limestone window or windows developed, elongated east-west between Kilcorney and Carran and extending north to c.120-240 m O.D. on Aillwee Hill, Sinkholes developed in favourable locations at the southern limit of this limestone inlier aligned along the major jointing. These would initially be shallow features enlarged by lateral corrosion. Shallow surface valleys were cut across the limestone and a limited degree of underground drainage was initiated. This stage could have been reached by late Pliocene or early Pleistocene times.
- 3 During the glacial advances the depressions were partly or wholly drift filled whilst the higher valleys may have been scoured by the ice if aligned parallel to the ice movement and later deepened by surface water flow and snow patch erosion. As deepening took place, successive subterranean drainage levels became fossil.
- 4 The shale cover was stripped from west to east on the summits and thus the westerly valleys lost allogenic runoff first and gradually became discolated into individual sinks, a process accentuated by later glacial scour and periglacial action. The valleys to the east and south became dry at a later date. The

process of fluvial development of the valleys and limited underground flow in the interglacials and scour and infilling during the glacials continued.

- 5 When the Fergus River area to the south lost its shale cover, integrated, efficient groundwater flow became established and the upper levels of Kilcorney 1 Cave and Fergus River Cave could form. The removal of the remainder of the shale from Aillwee and the recession of the shale edge south of Kilcorney may have happened during the last local glacial leaving all the valleys dry but allowing less time for the more easterly valleys to become fragmented into local drainage units. The major depressions are still partially blocked with drift and material washed in from higher up the mountain—hence their susceptibility to flooding. The underground drainage has recently dropped to the level of the active Fergus River Cave and to a level below the lowest passages of Kilcorney 1 Cave.

ACKNOWLEDGEMENTS

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ADDENDUM

In April 1973, a cave, approximately 200 m in length, was discovered in Ballycahill townland in the northwestern flank of the Aillwee Mountain. The entrance is located at the foot of the lowest scars on the hill at c. 100 m O.D.

A preliminary examination of the cave showed it to be of large dimensions though largely blocked by fill. From its size and situation it would appear to have functioned as a resurgence conduit of considerable importance. A full survey and study of the cave and its relationship to the geomorphology and hydrology of the Aillwee area is being undertaken and will be published at a later date.

D. P. DREW

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