Pol-an-Ionain

(Pol Craggycorradan)
(I.O.S. map 6 in. to 1 mile, Clare, Sheet 8)

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INTRODUCTION

The cave lies in the townland of Craggycorradan at the base of a cliff on the east side of a valley running south-west from Ballynalachan Castle. On the Irish Ordnance Survey maps 6 in. to 1 mile there is no grid and neither latitude nor longitude are marked so the location of the entrance is given by reference to the south-west corner of the sheet at 12·9 in. east and 20·1 in. north. The valley in which the cave lies is the generally dry, lower extension of the Coolagh River valley. In these lower reaches limestone cliffs occur on both sides and the valley itself ends against a ridge a mile from the sea.

The first recorded entry into the cave was made by two members of The Craven Pothole Club, Brian Varley and J. M. Dickenson in Whitsun 1952. The account and survey which they published were rather inadequate and left many questions unanswered. It was decided by this Society in 1956 that a survey should be made of this cave in accordance with the policy of this Society to collect into the Proceedings detailed accounts and surveys of all the larger Clare caves.

The name given by the C.P.C. was Poll-an-Ionain. This was for some years taken to be a reference to the Grecian Column-like nature of the stalactite in the Main Chamber. It is now apparent that this is not so and the name was derived from an Erse word, adaineán, for ivy which covers the cliff above the entrance. This being so, while respecting the claims of the finders of the cave to name it as they wish, the liberty of suggesting a second name, Pol Craggycorradan, has been taken, thereby calling the cave after the townland in which it is situated, this being the more normal practice in Clare.

DESCRIPTION OF THE SURFACE VALLEY

The valley below Ballynalachan Castle extends approximately three quarters of a mile towards the southwest and widens to about 400 yards before terminating against a ridge. In parts the valley is cliffed but the sides are more normally steep slopes up to 100 ft. high. The floor of the valley is covered with glacial drift material and this is banked up against the cliffs. Near to Ballynalachan Castle the valley is narrow and sheer sided, and it

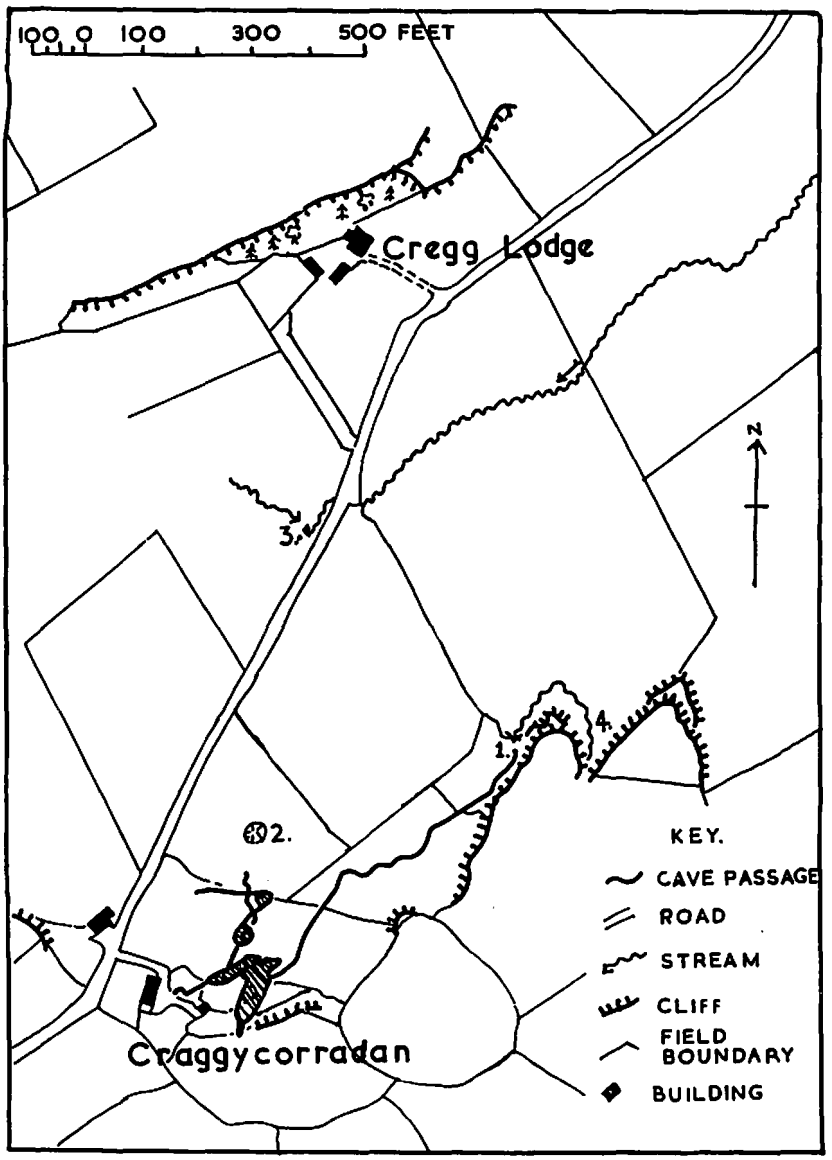


Fig. 13.—Map showing position of Poll-an-Ionain based upon the Ordnance Survey by the permission of the Minister for Finance, Republic of Ireland.

appears to be glacially overdeepened. In the centre of the valley a small stream is ordinarily running but this disappears down a swallet (*Fig.* 13, No. 3) west of the road and south of Cregg Lodge. This swallet is not passable. In

the continuation of this valley beyond the swallet there are various places which could lead into this cave or the water system under the valley, and this part of the valley is said never to flood. Upstream from the swallet the valley is really a continuation of the Coolagh River valley system but it rarely floods and only does so under exceptionally high-water conditions. From this it could be argued that either the Coolagh River system is not continuing to run under the valley or that if it does the cave is fairly well developed beyond the present explorable limit in the final bedding plane (Tratman and Ollier, 1955, p. 149). The latter explanation seems more likely. There is a close correlation between the surface valley and the surveyed Coolagh River cave (Bendall and Pitts, 1953, p. 228) and this relationship would be likely to continue. Furthermore a mature cave system below this valley could account for the valley's immaturity. It is narrow, sheer sided and appears to be a glacially overdeepened valley, which has been left untouched by any subsequent erosion by streams.

The valley below Ballynalachan Castle is occupied by a largely underground drainage system which may or may not be explorable. The cave system of Pol-an-Ionain appears to be totally unrelated to this. On the southeast side of the valley two cliffs are prominent. A steep grassy slope lies between them and drift material is banked up against them. A small stream flows between the cliffs (*Fig.* 13, No. 4) and it once joined the central drainage system of the valley. The stream now, however, curves at a right angle round the foot of the more southerly cliff into a steep sided depression about 30 ft. deep before disappearing into the Pol-an-Ionain system. The line of the stream's course down the slope between the cliffs is now continued out into the main valley by a slight, dry depression, which heads directly towards the swallet beyond the road (*Fig.* 13, No. 3). The cliff extends nearly vertically for 100 ft. above the entrance (*Fig.* 13, No. 1) but becomes increasingly blanketed with drift towards the south-west, until it is a mere 5–10 ft. high at Craggycorradan farm where the valley side turns north to join the terminal ridge. (*See Fig.* 13.)

DESCRIPTION OF THE CAVE

The cave is best considered in three sections, each of which is strikingly different from the other two.

Stream Passage

The cave entrance lies in the corner of a field at the foot of a steep, high, ivy-covered cliff. About ten feet upstream from where the stream disappears there is a narrow, evil smelling slot at ground level with a six foot drop inside onto boulders. After a few feet of crawling between boulders the roof rises rapidly to twenty feet in a chamber with a chert banded limestone wall on the left and boulders and drift on the right. At this point the stream is first met.

For the next 160 ft. the way on is largely out of the streamway climbing above and to the right through a maze of fairly stable boulders and clayey silt. Eventually after an upward corkscrewing wriggle between boulders one arrives at the head of a 12 ft. boulder-slope. This is easily climbed down into a 20-ft.-high chamber. For the next 520 ft. to G-G′ the way on cannot be mistaken. Until C-C′ it is possible to use the passage at roof level or in the streamway. The latter is a low, aggressively scalloped crawl. If the roof of the passage is used a small chamber is reached at C-C′. The floor of this is about ten feet above the streamway. It is about 12 ft. high with a solid rock wall on the left hand but otherwise walled and roofed by unconsolidated boulder clay. Limestone and shale fragments lie haphazardly in a setting of sticky, light yellow-brown clay.

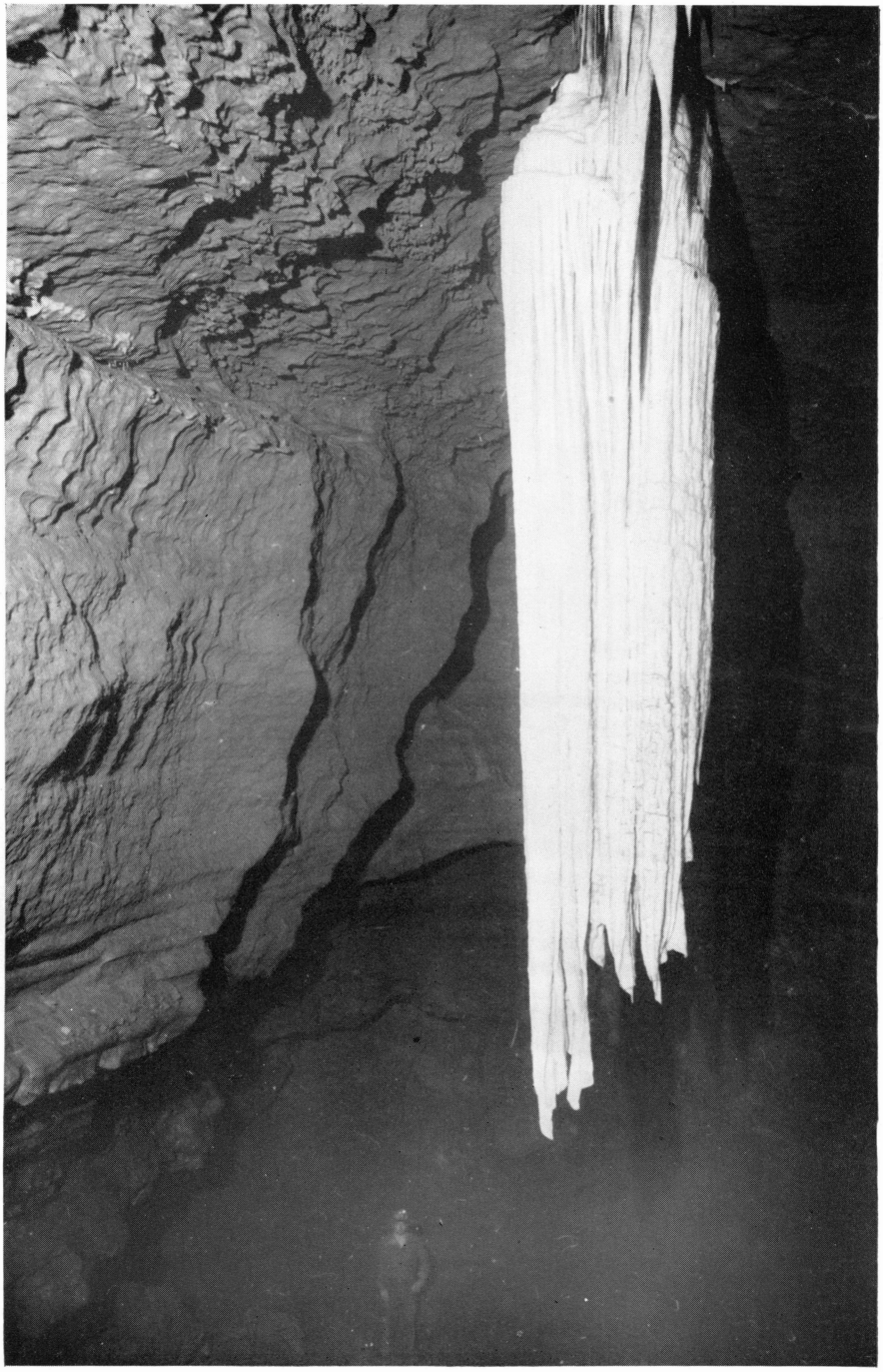
Immediately after C-C′ the roof route joins the stream down what was probably once a water chute, but in which the present stream has now incised its narrow bed. Just above the chute and at the same level as the roof traverse to C-C′ a passage with a calcite floor and calcite blocked end leads off to the left. Below the chute one must crawl again over aggressive scalloping. For most of the way the crawl is in the stream with occasional dry patches where slip-off slopes jut out. In this meandering section there is evidence of both phreatic and vadose action; and there are bedding plane anastamoses in the roof. Calcite veins of 210° bearing are followed for much of the way. At E-E′ there is another chamber, similar to that at C-C′ but with a small stream, little more than a drip, entering through the roof, in July 1959, which month was unusually dry.

At G-G′ the stream goes down an impassable channel to the right. The next 135 ft. consists of a crawl through a 3 ft. high oxbow, followed by a crawl along a high level passage and ending in a clamber around the sides of two avens. On the far side of the second of these a six feet long passage leads into the Main Chambers.

The Main Chambers

This section is made up of the two chambers through which the stream flows. The larger chamber is 120 ft. long with a low 20 ft. long extension leading off at the south end. Leading from the north-west side is the Second Chamber which is 63 ft. long.

The major feature, which is common to both chambers, is the all-pervading clay and silt. This is banked up steeply towards the north-east in both chambers. In the Main Chamber it reaches up to the roof (H-H′). This infilling is, throughout, of fine clay in varved layers. Sections were dug at all levels on the clay slopes and always yellow, layered clay was found (*Plate* 5). Occasional limestone fragments in the infilling could have come from the roof or walls.



(*Photo: O. C. Lloyd*, 1959.)

PLATE 4

Stalactite in Main Chamber.

(*Photo: O. C. Lloyd*, 1959.)

PLATE 5

Varved clays in Main Chamber.

The dominating feature of the largest chamber is the solitary, gigantic stalactite (*Plate* 4) which hangs from the centre of the roof, stopping nine to ten feet short of the stubby stalagmite boss beneath it. This feature is so singular that the roof was examined with considerable care. The roof is almost entirely formed by the underside of a band of chert. The only exceptions to this are along the line of a calcite vein bearing 210° down the centre of the chamber. Only along this vein is the limestone exposed in phreatic solution pockets, and the only sizeable pocket of this kind occurs where the stalactite hangs.

Although the roof is fretted by solution it is generally flat. The walls of the chamber, where free of drift, are markedly vertical and generally meet the roof at right angles and there is no T-form. Phreatic solution features are observable from floor to roof and there is no evidence of vadose action in the main chamber except for the small, short, choked passage which rises above the general level of the roof in the centre of the northeast wall (H'). This passage shows evidence of considerable vadose action on walls and roof. It is floored with unlaminated drift material partly covered with a crust of stalactite.

The stream enters the chamber from the west through boulders at floor level. Entry for cavers is halfway up the same wall on to the mud slope. The stream flows in a shallow trench through the drift pursuing a curved course round the boss at the foot of the stalactite. There is evidence of considerable loss of fill for remnants are visible on the walls well above the stream. After flowing round the lower end of the chamber the stream passes out through a narrow, high passage in the west wall. This continues for 30 ft. until it enters the lower end of the Second Chamber. In this chamber the drift is banked up from the stream bed towards the entrance to the Main Chamber to the east. The walls are much less vertical and there are two, domed, aven-like features in the roof (J-J'). The stream flows along the south wall and then turns into a thirty foot long, twenty foot high, length of canyon passage. This suddenly narrows and lowers and after a series of near right-angled turns the stream disappears in a sump.

The 1959 Series

Running parallel to the main trend of the Main Chamber and twice cutting through the west wall of the Main Chamber, there is a narrow, steeply descending passage. It starts at about the roof level of the chamber as a small hole. From this it drops steeply down, cuts into the wall of the chamber providing a window into it halfway up the north-west wall, then crosses over the top of the stream passage between the two chambers, and finally cuts off northwards to enter the Second Chamber at a point near to its junction to the Main Chamber.

Directly opposite to this 60 ft. length of passage is a low arch at floor level leading out of the Second Chamber into a 1 ft. high, dry, silt-floored passage. In the C.P.C. survey an entrance is marked "Passage not surveyed, explored 180 yards" leading out of the north corner of the Main Chamber. In the north corner there is a small formation filled grotto which has obviously never been passed. The low arch described above leads into a passage which is probably the one referred to in the C.P.C. survey. In 1959 this arch was rediscovered and explored. The system found was surveyed to C.R.G. Grade 2 accuracy. For 140 ft. from the arch the passage does not rise above 18 in. in height. At only two points is it really possible to pass another person, and halfway along this grovel there is a double squeeze, which starts as a vertical slit and ends as a horizontal one within four feet. The floor is, throughout, with the exception of the squeeze, a soft, dry gravel. This passage leads into what is perhaps the most perplexing part of the whole system of Pol-an-Ionain.

After 140 ft. of writhing, as it is not possible to crawl, the passage turns sharply west and the roof rises to three feet. It then enters the first of the two main passages. There is a rapid change from dry gravel to very wet, glutinous, yellow clay and the passage suddenly meets a 20 ft. high passage running at right angles to it. The little crawl passage continues on the other side of this new main passage, heading north-west. This main passage extends north-east to south-west and the point of entry is at the lowest point of the passage floor. On both sides of the point of entry the main passage floor of thick, slippery clay climbs steeply. To the south-west the floor continues to rise over mud then very brittle white stalagmite towards the roof until there is only a 1 ft. high gap. Through this gap there is a large, roughly circular chamber, 40 ft. across with a stalagmite floor which slopes steeply up to the south. The roof is flat and a maximum of 40 ft. above the floor.

To the north-east of where the connecting crawl meets this main passage the clay floor rises steeply to the bottom of a large circular aven (L'). The roof is over 30 ft. high but evidently does not take a stream at present as the floor and lower walls are covered in a moist silty clay of the same nature as that in the Main Chamber of Pol-an-Ionain, i.e., yellow and fine but much wetter.

Leading out of the aven directly to the west is the second passage of the 1959 Series. This passage has two levels like the other. The lower level was followed until it became too narrow and stalagmite choked. The upper level can occasionally be seen through gaps in the roof of the lower but was not accessible and may continue further. Immediately after the second passage leaves the foot of the aven the continuation of the entrance grovel passes across the passage in a hollow in the clay floor. This low passage continues for 30 ft. northwards until it becomes too tight to follow.

The two main points about the 1959 Series are that there is nowhere any visible stream flowing and that the series is phreatic throughout.

The Relation of The Cave System to The Surface

On the south and south-west sides of the valley the valley edge is marked by a line of cliffs. The cliffs extend in a line to the south-west for 300 yds. from the two high cliffs above the cave entrance. They then start to curve round to the west behind Craggycorradan Farm. Here they are totally drift-covered but appear again north of the road. At the entrance to the cave the stream has carved out a considerable depression in the boulder clay lying against the nearly vertical cliffs. To the south-west of this the drift blanket increases in extent, reaching higher up the cliffs and extending in a long slope from them out to the centre of the valley, beyond the road. It is apparent that these drift-covered cliffs cannot be vertical beneath their covering, as most of the Pol-an-Ionain system lies beyond the cliffs and out beneath the valley floor (*Fig.* 13), and the cave would have been unroofed if the cliffs were vertical.

Certain parts of the cave system were plotted on the surface map and an attempt was made to correlate surface and underground features. This was not very successful. The results were as follows. Firstly, at that point where it was calculated that the second small chamber in the entrance passage lay, a small surface stream disappears. This could be the small stream noticed in the roof. Secondly, it was realized that the entrance to the cave is very low in comparison with the surrounding land surface. The cave descends quite rapidly. It is estimated that the roof of the Main Chamber must have at least 50 ft. of material (limestone or boulder clay) above it. The roof of the aven in the 1959 Series has probably half this thickness of rock above it.

Theories of Formation

This system presents many problems. The major ones are to decide the age of the cave and the relative age of its parts.

Most of the other Clare caves are obviously young geologically and post-glacial. They are closely related to the post-glacial surface topography of the area, with few exceptions, and consist largely of joint controlled, meandering stream passages, which have little material in them other than that produced by the formation of the cave. Pol-an-Ionain is obviously different. It bears little relation to the surface drainage. The material found within the cave cannot under any circumstance have been a product of the cave's formation but is a post-formation infilling which in most places is being removed. A study of the nature of this infilling can give a lead to a possible sequence of events. From the entrance inwards for 100 ft. the route is through a long chamber which is part filled and frequently nearly blocked with boulders

of shattered limestone and thick yellowy clay. Farther down the streamway at C-C′ and E-E′ there are two domed chambers with roofs and three sides of clay with rock fragments. This material has definitely not been laid down in water. The fragments are of shale and limestone and lie haphazardly in an unstratified matrix of clay and the material is a boulder clay. In the Main Chambers the infilling is nearly all stratified. Test pits, three feet deep, were dug at several points at all levels on the clay slope and in all cases laminated clays were found (*Plate* 5). They were damp but looked very much like the varved clays in Sand Chamber in Gaping Ghyll Cavern. In the case of Pol-an-Ionain the layers can be peeled apart separately and form thin layers of tightly compacted, fine silt.

As a possible series of events leading to the present state of the Stream Passage the following stages of development are suggested.

Firstly, before the last glaciation the present pattern of the Stream Passage was evolved along normal Clare lines—bedding plane anastomosis followed by phreatic development along a joint and subsequent formation of a vadose stream passage. The cave entrance at this time lay much farther upstream and the pre-glacial topography probably differed considerably from that of the present day.

Secondly, with the onset of the last glaciation (correlated by Charlesworth with Würm II of the Alps), cave development largely ceased. This led eventually to the choking of much of the passage with stalactite, which is evident throughout the stream way at roof level. The surface valley was widened and deepened by ice action and in so doing the ice broke through into the Pol-an-Ionain system in at least three places. At the present entrance the overdeepening cut right through the passage causing collapse and intruding a considerable amount of boulder clay into the exposed cavity. At C-C′ and E-E′ the ice broke through the right wall and intruded more boulder clay. At the end of this stage, with the retreat of the ice, a blanket of drift was left covering most of the surface of the area. The Pol-an-Ionain system was left, choked and without any stream contact with its original catchment area.

Thirdly, in this post-glacial period a small stream, which flowed down between the two cliffs above the present entrance and out into the centre of the valley found a more attractive route through the drift banked up against the cliffs and into the cave. A slight dry valley across to the centre of the valley marks this former course. Since the cave system captured the stream a considerable depression has been hollowed out at the foot of the cliffs and the stream has washed the entrance streamway clear of all but the largest fragments. Also the two domed chambers have been formed by erosion, solution and collapse. A certain amount of passage deepening appears to have gone on since the present stream entered the cave. This has generally taken the form of vadose meanders, frequently undercut and generally narrow. In parts this

takes the form of a slot cut below the old wider streamway, e.g., at B-B′ and G-G′. This theory for the formation of the stream passage fits the facts as they have been described. The present stream is a small one with a very small catchment area. Most of its effort has been spent on transporting a load rather than erosion and this would explain the apparently small amount of post-glacial erosion in the streamway.

The Main Chambers and 1959 Series present a more difficult task. It is suggested, however, that these also are pre-glacial. Both sections are largely phreatic and it is difficult to visualize a post-glacial period when these would have been below the watertable long enough for formation and subsequent infilling. Dr. Kellaway* has stressed the vast volumes of water involved in the break up of a glaciation. The water is only just above freezing point and holds the maximum amount of carbon dioxide in solution and therefore has the maximum dissolving power. He further accepts and confirms the views of other writers that ground under glaciers can be either frozen or not frozen, depending on the thickness of the ice. On the basis of this it could be postulated that the solution of the main chambers was a product of glacial or post-glacial times. This is considered unlikely. The thick mantle of drift covering this area is evidence that the ice carried a considerable load. Any melt water would carry much of this in suspension. It is difficult to see how this could fail to choke passages or mantle limestone surfaces so effectively as to make solution very slow so that chambers forming under these conditions would be choked before they attained any size. What does seem more likely, and ties in with the varve-like layers of the clay in the Main Chamber is that a connection was made between the already formed Main Chamber and the surface valley at the end of the glacial period. This valley at some time contained a meltwater lake, as it has no surface exit to the sea. The annual pattern of meltwater and sediment entering the lake and the Chamber in spring and summer followed by winter freezing would account for the varves. Silt which had been carried into the cave in spring and summer would have the winter to settle in before the following year's supply of sediment arrived. A certain amount of solution would be inevitable but the main process of infilling of the chamber would have dominated. If this theory bears any relation to the course of events, an entrance for the clays must be found. The present entrance of the Stream Passage into the main chamber does not provide an answer for at its highest point it is 12 ft. below the level of the roof and of much of the remaining clay.

The character of the varving of the clays provides a possible answer. The bands lie, generally horizontally across the chamber (north-west to south-east), but dip at a fairly gentle angle of 10 to 15 degrees from north-east

* Personal communication.

to south-west. The clays extend right up to the roof in the north-east end. If the water which carried the silts in, entered the chamber under any kind of hydrostatic pressure, they could not have been so uniformly laid down. An entrance for the water must therefore be found in the highest part of the chamber, preferably nearest to the surface valley. There is in fact such a possible entrance. There has been described above, a small, short, choked passage, which rises above the general level of the roof in the centre of the north-east wall (H'). This is formed along the same 210° calcite vein as the Main Chamber. The roof of the passage rises steeply at about 40°, but the floor of silt and stalactite rises even more steeply and the two meet after ten feet. There is some evidence of vadose action on the walls and roof. It is suggested that this was the entrance by which the infilling was brought in from the surface. Once the chamber had become choked, the choking of the passage would rapidly follow and the surface entrance would be lost in the general silting of the lake's floor and sides. This again is a theory but it is presented as a possible series of events which explains and fits the known facts.

For the 1959 Series no such cycle of events is postulated. It also has an infilling of clay, but far wetter than in the rest of the system and with no obvious lamination; however, this was not looked for. The amount of this fill excludes the possibility of a post-glacial origin for this series if the same reasoning is applied as to the Main Chambers. It is possible that the aven at the junction of the two passages has a small stream in it for part of the year. This might explain the dampness and removal of much of the infilling for there are remnants high up the walls. However, this appears to be an almost entirely quiescent series of passages which lost its original stream a long time ago. It is suggested that glacial deepening and straightening of the valley was responsible for so altering the valley floor that this system lost its stream at that time. There is little water there now and everything is covered in mud. What water there is seeps out through the continuation of the low level entrance passage from Main Chamber. This passage passes across the two main passages of the 1959 Series at their lowest level, and, linking the two main sections of Pol-an-Ionain, presents an unanswered problem of possible age and position in the pattern of development. Its present lack of height makes it impassable for some but the dry gravel floor could be an infilling of considerable depth.

SUMMARY

It is suggested, in conclusion, that the cave system of Pol-an-Ionain is almost entirely pre-glacial. In the Stream Passage there are certain features which can be explained in no other way. There has however been some post-glacial stream action which has deepened and cleared most of the passages.

In the Main Chambers the huge amount of fill laid in parallel, compacted sheets, almost certainly varves, suggests an immediately post-glacial deposition in a chamber which already existed and which must therefore be pre-glacial. A similar argument can be advanced about the 1959 Series. This section would repay further exploration at roof level in both main passages and a link back to the rest of Pol-an-Ionain may be found. These considerations apart, Pol-an-Ionain is obviously different from normal Clare caves. It has many more of the characteristics of a Mendip cave system like G.B. Cavern than of a typical Clare cave such as any of the Cullaun Series or Poll Balliny.

The course that the stream follows on leaving Second Chamber and forming a sump is unknown. It must pass through the ridge on which Craggycorradan Farm stands but has yet to be found beyond.

SURVEY

The cave was surveyed using a hand-bearing, liquid-filled, prismatic compass, wire reinforced linen tape and simple clinometer. The results were computed and plotted at 25 ft. to the inch. The survey of the Stream Passage and Main Chambers is deemed to be Cave Research Group grade 4-5. The 1959 Series is grade 2. The Stream Passage is 825 ft. long. The Main Chamber is 120 ft. long, from 25 to 50 ft. wide and a maximum of 53 ft. high. The 1959 Series is 450 ft. long, the entrance passage is 140 ft. of this.

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POL-AN-IONAIN

POL CRAGGYCORRADAN

COUNTY CLARE, EIRE.

UBSS SURVEY 1957, 1959

CRG GRADE 4

CRG GRADE 2-3

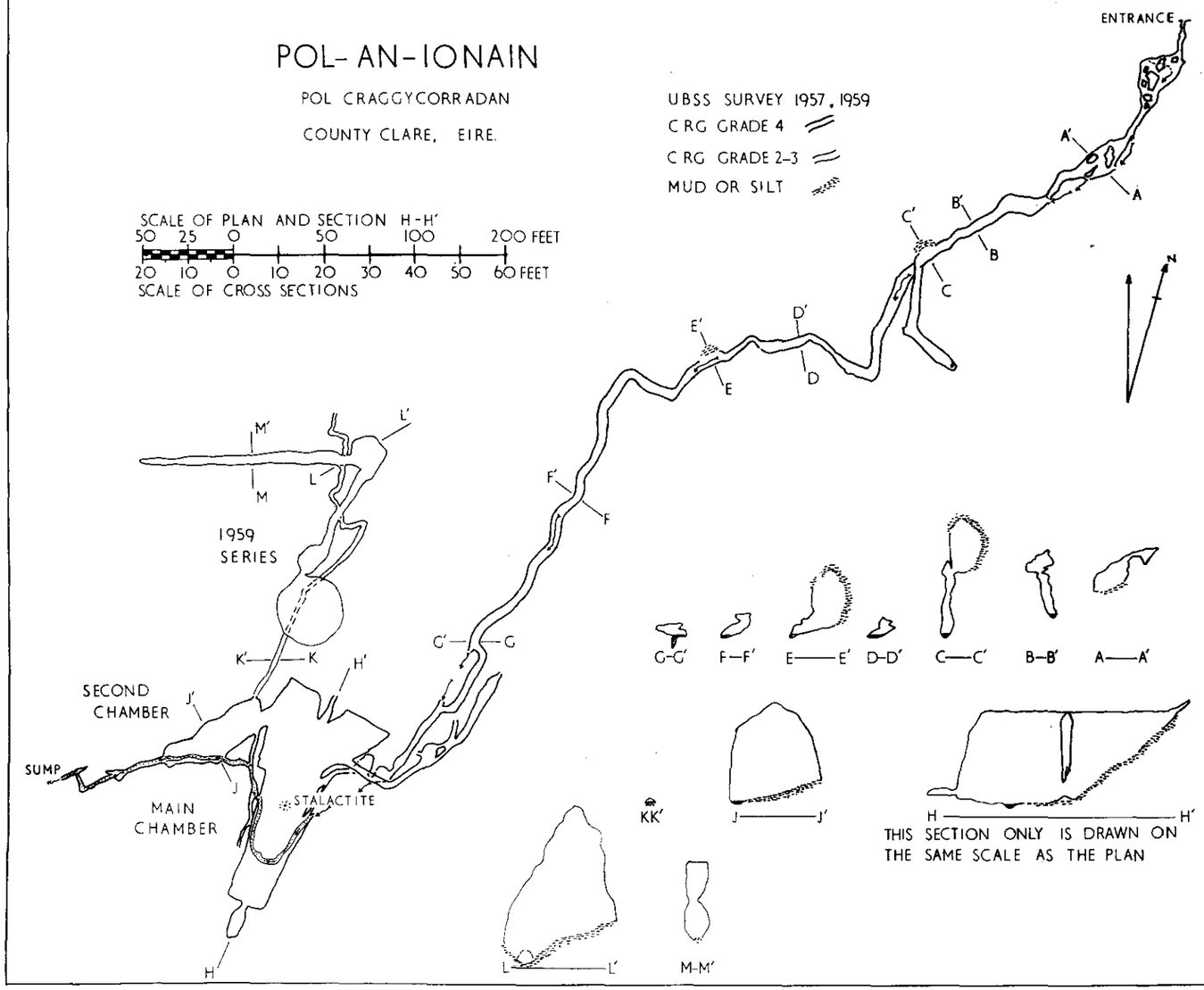
MUD OR SILT

SCALE OF PLAN AND SECTION H-H'

50 25 0 50 100 200 FEET

20 10 0 10 20 30 40 50 60 FEET

SCALE OF CROSS SECTIONS



THIS SECTION ONLY IS DRAWN ON THE SAME SCALE AS THE PLAN