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SOUTHERN CAVER

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DOLERITE SEA CAVE AT DODGES FERRY

Phillip Jackson

The cave is located in the south-western corner of Spectacle Head, which is the point between Red Ochre and Park Beaches. The cave has two entrances that are surrounded by solid cliffs up to 20 metres high.

Nearby, there are also two smaller caves, one nine metres long and the other unexplored, as well as two clefts both above five metres long.

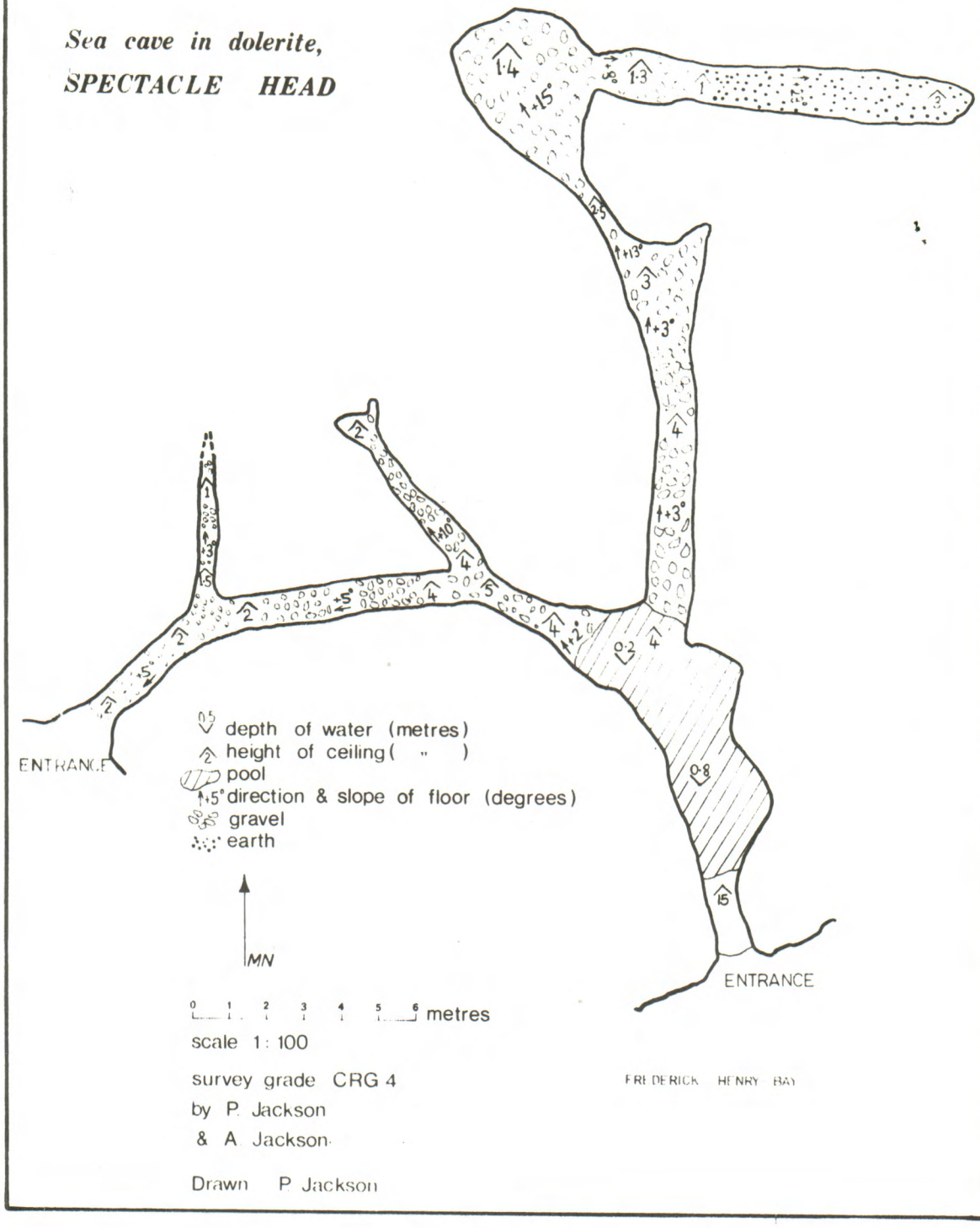
The larger entrance faces south into Frederick Henry Bay. In a high tide this entrance fills to a depth of about 50 centimetres, and in rough weather becomes inaccessible.

The second and much higher entrance which faces south-east towards Spec Island is unaffected by tide and weather.

In the first entrance a pool about 80 centimetres deep is left when the tide recedes. Although the rock around the entrance appears solid, the rock inside has many cracks that appear to be filled with some kind of ooze. There is also a small section of a wall that has on it some small crystalline type of formation that appears similar to that seen in the bottom of some rimpools in limestone caves. The total surveyed length of the cave is 64 metres.

Sea cave in dolerite,

SPECTACLE HEAD



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by P. Jackson

& A. Jackson

Drawn P. Jackson

FREDERICK HENRY BAY

THE DANTE RIVULET KARST AREA, CENTRAL WEST COAST RANGE

Kevin Kiernan

In limestone areas which have been subject to recent glaciation there is often a chicken and egg difficulty in attributing some land forms to glacial or karst processes. For instance, both may develop enclosed depressions. To what extent is Lake Timk in the Mt. Anne area the product of glacial overdeepening and to what extent does it reflect karstic depression? At Frenchmans Cap glacial lakes occur in areas of carbonate rock, and are interpreted by Peterson (1966) as reflecting glacial processes operating on pre-existing karst depressions.

In the central West Coast Range glacial ice has also acted upon pre-existing karst. Here many major valleys, such as the King, Linda, Comstock, Nelson and others are preferentially entrenched in limestone, with more resistant siliceous rocks forming the flanking ranges. These valleys have in some cases been occupied by valley glaciers. Many have the U-shaped cross profile frequently regarded as characteristic of glacial erosion, but the profile may be due to the presence of Ordovician Gordon Limestone rather than glacial ice.

The Dante Rivulet karst area consists of a broad synclinal outcrop of well bedded, shaley and impure limestone of some 5km^2 extent in the upper Dante Valley. The limestone also outcrops a few kilometres to the south-west near Lake Margaret. The Dante Rivulet rises from a conglomerate plateau at around 1000m elevation, south-east of Mt. Tyndall. The less resistant limestone forms a basin trending SW-SE, at the downstream end of which lies a narrow conglomerate gorge several hundred metres deep lying immediately upstream of Lake Beatrice. The limestone relief is around 100m. Other karst areas occur at Nelson River and at Bubs Hill, respectively 15 km and 18 km to the south-east; at Jukes-Darwin 40 km to the south; and on the Sophia River and Mackintosh River respectively

25 km and 40 km to the north.

EXPLORATION

The limestone was recorded by Bradley (1954), but the finding by the writer of an old rusty iron spike in the most upstream cave and of prospecting implements near Lake Beatrice, together with the very name of the stream implies the caves (which were not mentioned by Bradley) were known long before. The caves appear to have first reach speleological literature when Arthur Clarke followed the gorge downstream during the 1970-71 summer and found caves opening off the side. A T.C.C. attempt to visit the area in 1971 failed. There was subsequently a visit to the upstream end of the outcrop by Eric Colhoun and Albert Goede in 1973 (Goede, 1973; Bowden, 1974). In an over-view of Tasmanian caves compiled in 1974 (Goede, Kiernan, Skinner and Woolhouse, 1974), six caves were recorded. The topography remains rugged however, and the vegetation dense, and it was not until early 1980 that the outcrop was again visited by the present writer with Greg Middleton and Stefan Eberhard. Whereas Colhoun and Goede used a four wheel drive vehicle to approach via now unserviceable prospecting tracks leading toward Lake Spicer, the latter party gained access in perfect weather conditions over Mt. Sedgwick and the adjacent plateau, descending the south-western side of the Dante Valley to a small lake, and examining the eastern margin of the outcrop before crossing to the caves on the Dante Rivulet itself. Shortage of time coupled with the terrain to be traversed prevented an intended continuation downstream to Lake Beatrice and beyond to the King River plains. Your scribe well remembers struggling back up onto the Sedgwick Plateau and beyond, in miserable weather, laden down by a usual walking pack, with crammed or appended additions including caving gear, an inflatable rubber boat, a wet suit, a pair of paddles and an echo sounder! Some weeks later an attempt to push upvalley was thwarted by flooding of the King, and the capsize of a rubber boat and loss of gear while attempting a crossing.

SURFACE KARST

The West Coast Range was subject to glaciation during the late Last Galcial stage. Bowden (1974) considered ice occupied the Dante Valley upstream of Lake Beatrice, and the caves were regarded as postglacial features by Goede

(1973) and Bowden (1974). Goede (pers.comm.) has since implied a proglacial position, with a limited ice body lying upstream. However, more recent work (Kiernan, 1980a) has shown virtually the full length of the Dante Valley to have been occupied by glacial ice during at least three glacial stages. Radiocarbon assay of a driftwood fragment in deposits underlying those of the most recent ice advance indicate it reached its maximum after 18 800 ± 500 BP (ANU 2533). Erratic boulders of Owen conglomerate of up to 6m in diameter occur on the limestone, with their surface unpitted by weathering. The plateau area has been severely burned and only sedgeland and the skeletons of burnt alpine conifers cloak the depressions between rocky eminences smoothed by glacial erosion. Heavy scrub occurs on the steeper slopes. Button grass plains occur on the upstream part of the limestone outcrop and heavy scrub and wet scleraphyll forest further downstream.

Exploration in 1980 revealed residual blades of limestone up to 3m high in the Upper Dante Rivulet Valley. Some blades are partly detached parallel to and about 10-40 cm from the ground surface. Their crests are very sharp, with fluting down their flanks. For these to have formed entirely in postglacial time, the rate of karst denudation implied would exceed that recorded from any comparable climate (Table 1). Large scale postglacial grikes occur on scarp edges in Yorkshire, and 1-2 m grikes of largely postglacial age are present on Vancouver Island, but such a scale of development is only possible where the hydraulic gradient exceeds 1:50, with virtually none where it is less than 1:100 (D.C. Ford, pers.comm.) as on this part of the Dante.

A second possibility is that the karren partly formed beneath the ice while the Dante Glacier was present. However, while small karren forms may actively develop beneath an overlying ice mass (Barriere, 1964; Ford, 1977) nothing on the scale of the Dante Karren has been recorded. A third possibility is that the karren partially survived the passage of the glacier. In New Zealand residual projections of marble of 5-10 m amplitude at Mt. Owen were only partly smoothed by Last Glacial ice (Handel *et al.*, 1978; J.N.Jennings, pers.comm.) and karren may survive glacier passage beneath a till mantle (D.C. Ford, pers.comm.).

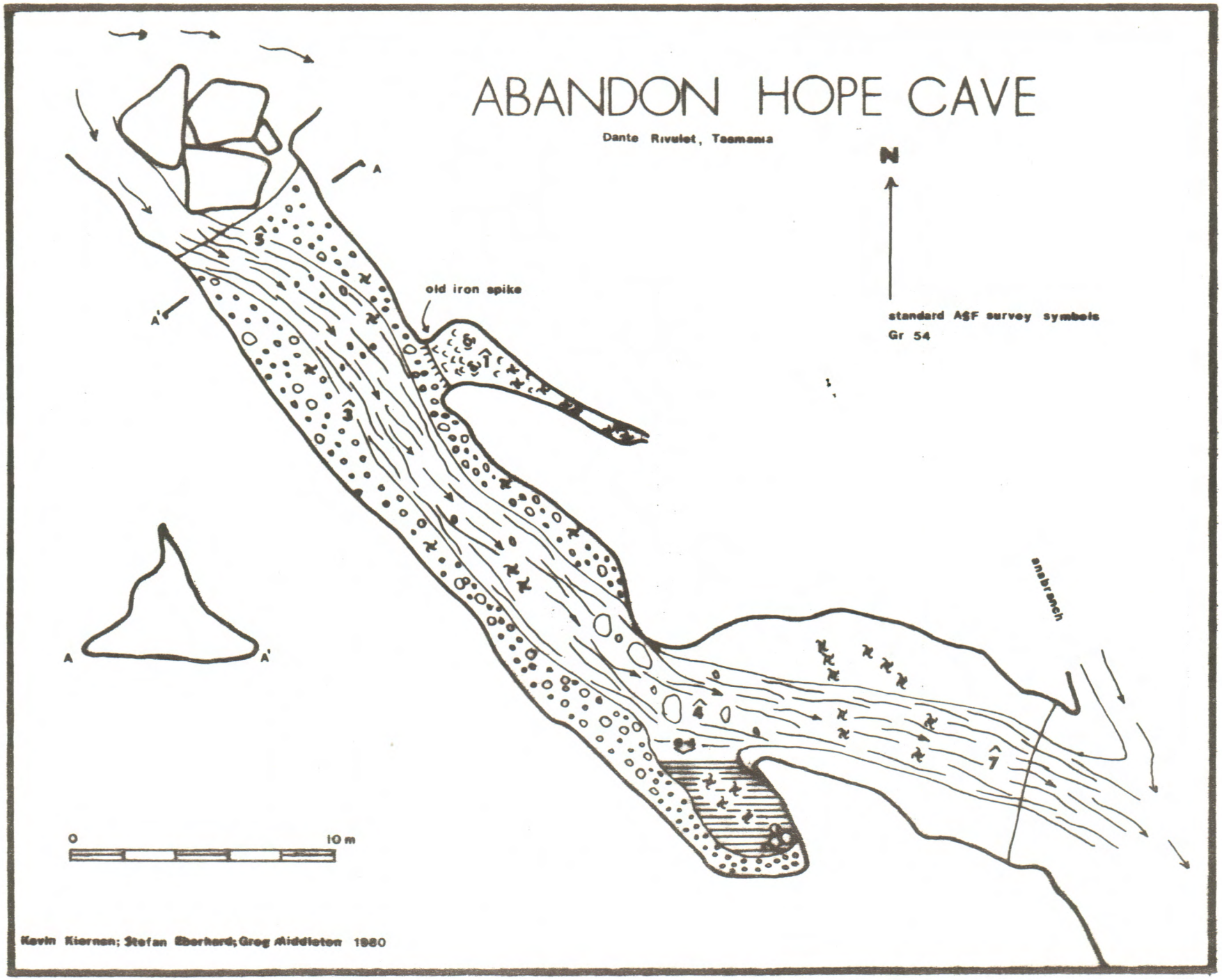
TABLE 1.

Rates of karst denudation from Cfb climates

Author/s	Area	Precipitation (mm)	Surface lowering (mm/1000 years)
Corbel, 1959	Mendip,England	900-1100	40
Gams, 1966	Slovenia, Yugoslavia	1250-2000	10-100
Groom & Williams 1965	Melle, R., Wales	1600	16
Sweeting, 1965	Craven, England	1250-1500	40
Williams, 1965	Fergus R. & Shannon R. Ireland	1000-1250	51-53
Bingelli, 1961	S. Alps (Europe)	100±	250-330
Dowling, 1974	Riwaka Basin, N.Z.	2000-2400	99
Pitty, 1968	Peak District, England	800-1200	83-86
Jennings, 1972	Cooleman Plain, Australia	1000±	24

That the Dante Glacier remained active even during its decline is indicated by fluted moraine covering the upstream part of the limestone outcrop. However, the karren is aligned in the same direction as the fluted moraine, as the regional strike of the limestone and as the direction of ice movement, and would therefore be less susceptible to ice erosion than a transverse grain would be.

Moreover reduced ice velocity may have prevailed in this area due to compressive flow conditions upstream of the narrow gorge upstream of Lake Beatrice. Hence while acknowledging that the area is probably among the most favourable environments for limestone solution in the world, the impurity of the limestone militates against rapid removal, and other considerations suggest that the most delicate genus of karst landform (albeit a comparatively rugged species) at least partially survived the passage of ice.


ABANDON HOPE CAVE
Dante Rivulet, Tasmania
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standard ASF survey symbols
Gr 54
old iron spike
A
A'
A
A'
anabranch
0
10 m
Kevin Kiernan; Stefan Eberhard; Greg Middleton 1980

CAVE DEVELOPMENT

The caves themselves lie in a limestone gorge towards the north-eastern margin of the limestone outcrop. In places this gorge is a narrow slot over 30 m deep and less than 5 m wide, with swiftly flowing deep water, short cascades and frequent log jams. The principle caves located to date occur at varying intervals, and consist of short tunnels of 5 m or more in diameter. Where the caves occur there are frequently dry gorge segments adjacent, the floor level of which approximates the ceiling height in the cave, except at Abandon Hope Cave (DR3) where the gorge retains part of the flow. The extent of cave and gorge development downstream cautions against assuming a postglacial age, but the possibility must be conceded. Deposits which might shed light on the question are absent from the caves, there being few places where such could lodge.

If glacial ice had existed for any length of time upstream of the caves then the abundance of meltwater and rock fragments available to aid mechanical erosion would have permitted the caves and gorge to be rapidly developed. Given such conditions enhanced proglacial cave development has been claimed (Ciry, 1959; Jennings and Sweeting, 1959; Geze, 1965; Engh, 1977; Handel *et al.*, 1978) but the evidence is in some cases equivocal. A proglacial position may have led to the infilling of Lake Beatrice and later perhaps of the caves, yet there is evidence of neither. Nor is there any other evidence to suggest a long-lived phase of ice upstream of the caves.

On the other hand caves have been known to survive the passage of ice (Davies and Krinsley, 1960; Ford, 1977; Karolyi, 1977), but the Dante caves are not so spectacularly developed as to demand this. An alternative is that they were formed beneath the ice mass. Limestone gorges are currently developing beneath ice in Norway, and cave development in the Holloch is known to have continued during glacials and interglacials (Sweeting, 1973).

Speleothems continue active growth in Castleguard Cave beneath an ice sheet in the Canadian Rocky Mountains (Ford *et al.*, 1976). In a temperate glacial environment abundant meltwater may be present in the ice

mass. Contrasting views have been expressed regarding the aggressiveness of meltwater (Corbel, 1954, 1957; Ek, 1964; Smith, 1969; Warwick, 1971; Hladnik & Kranjc, 1977; Ford, 1971, 1977). In the glacial environment just the volume of water and the abundance of tools are probably the most important factors, coupled with low evaporation rates.

Temperate glaciers often contain a karst-like drainage system involving the development of large caves and tunnels by meltwater within the ice, with hydraulic gradients provided by the slope of the ice surface (Kiernan, 1978a, 1979). These drainage patterns may themselves remain evident in the deglaciated landscape (Kiernan in press). It is therefore not surprising that in Canada individual shafts and galleries have been generated in a few decades or centuries by superimposition of glacier hydrologic systems upon karst terrains (Ford, 1977, 1979). There may be a return to phreatic conditions due to changed hydrological gradients, with a vadose zone where the system is open to addition CO_2 at 0°C favouring accelerated corrosion, and an upstream phreatic zone closed to additional CO_2 but where groundwater circulation is accelerated by the glacial head (Ford, 1975).

The Dante Rivulet caves may be entirely postglacial, but less problematic is the suggestion that they develop subglacially. This would be an entirely consistent and logical consequence of a temperate glacier occupying the Dante Valley during the late Last Glacial Stage. It is an intriguing possibility, involving as it does the development of limestone karst caves as an adjunct to a larger glacier cave system. Nor is the Dante Rivulet the only site in Tasmania where the relationship between glacier and limestone karst may be important to understanding the present karst geomorphology - Mole Creek, Mt. Anne and Nelson River stand out as potentially rewarding places for such a perspective.

CAVE LIST - DANTE RIVULET

(numbers in parentheses have not been affixed)

DR1: Tributary stream cave entering gorge 3m. above stream level, penetrable for 6m; north bank.

DR2: Small efflux; very narrow; unexplored.

DR3: ABANDON HOPE CAVE: Stream cave with 60m of passage up to 5m high;

entrances at upstream and downstream ends; wetas of genus *Micropathus*; glow-worms; some decoration; old iron spike found on wall; contains an anabranch of the Dante Rivulet.

DR4: INFERNO GATES: Natural arch representing meander cutoff; 4m high.

(DR5) 8m high entrance at both ends; deep water; stream passage about 200m long; some decoration.

(DR6) Spectacular tunnel beneath 30m limestone cliff; passage is up to 10m high and about 150m long.

(DR7) Small efflux adjacent to Inferno Gates; Impenetrable after 2m; South bank.

(DR8) Short stream cave on minor tributary 200m north (?) from (DR6); 50m of passage of rather restricted size.

(DR9) Small swallet on the edge of dry gorge adjacent to (DR6); debris in entrance; unexplored.

(DR10) Small cave with 40m of passage developed in southern wall of gorge just above stream level; 200m downstream of (DR5); by passes deep water.

(DR11) Small meander cutoff downstream of (DR6); represents downstream limit of cave documentation; scarcely penetrable.

Other small holes have been noted but not explored in the karren field east of the limestone gorge. They are not recorded above due to the difficulty of relocating them.

BIBLIOGRAPHY

Barrier, P. (1964) Le relief karstique dans l'ovest des Pyrenees Centrales, *Rev.Belg.Geogr.*, Ed. Soc.Roy.Belge.Geogr.Spec.Pub. *Karst et Climts Froids, 88,* (1-2): 9-62.

Bingelli, V. (1961) *Zur morphologie und hydrologie der valle del Lucomagno,* Bertrage zur Geologic de Schwuz Hydrologie 12.

Bowden, A. (1974) *The Glacial Geomorphology of the Tyndall Mountains,* Unpub. thesis, Dept. of Geog., Uni. of Tasmania.

Bradley, J. (1959) The geology of the West Coast Range of Tasmania, *Pa.Proc.Roy.Soc.Tas., 88*: 193-243.

Ciry, R. (1959) Une categorie speciale de cavites souterraines: les grottes cutanees, *Ann.Speleol. T14:* 23-30.

Corbel, J. (1954) Les phenomenes karstiques en climat froid, *Erdkunde, 8*: 119-120.

_____ (1957) *Les karsts due Nord - Ovest de l'Europe,* Lyon.

_____ (1959) Erosion en terrain calcaire, *Annls. Geogr., 68:* 97-120.

Davies, W.E. & Krinsley, D.B. (1960) Caves in northern Greenland, *Bull.N.S.S., 22:* 114-116.

Dowling, R.K. (1975) Karst solution processes in the Riwaka Basin, *N.Z. Spel.Bul., 5*(95): 437-457.

Ek, C. (1964) Notes sur les eaux de fonte des glaciers de la Haute Maurienne, *Rev.Belge.Geogr., 88:* 127-56.

Engh, L. (1977) Karst morphology in subantartic Sweden, *Proc. 7th IUS Congr.* : 168-170.

Ford, D.C. (1971) Characteristics of limestone solution in the southern Rocky Mountains and Selkirk Mountains, Alberta and British Columbia, *Can.J.Ear.Sci., 8*(6): 585-609.

_____ (1975) Castleguard Cave - An alpine cave in the Canadian Rockies, *Stud.in Spel., 2*(7-8): 299-310.

_____ (1977) Karst and glaciation in Canada, *Proc.7th IUS Congr.:* 208-209.

_____ (1979) A review of alpine karst in the southern Rocky Mountains of Canada, *N.S.S.Bul., 41:* 53-65.

Ford D.C. *etal.*(1976) Geohydrologic & Thermometric observations in the vicinity of the Columbia Icefield, Alberta and B.C., Canada. *J. Glac., 16*(74): 210-230.

Gams, I. (1966) Faktorji in dinamika Korozije na karbonatmih kameninah slovenskeya dinarskegain alpskegu krasa, *Geogr. Vestnik. 38:* 11-68.

Geze, B. (1965) Les conditions hydrogeologiques des roches calcaires, *Chron.Hydrogeol., 7:* 9-39.

Goede, A. (1973) Limestone area west of Lake Spicer, *Speleo.Spiel., 76:* 6-7.

Goede, E., Kiernan,K., Skinner & Woolhouse, R., *Caves of Tasmania,* unpublished MSS.

Groom, G.E. & Williams, V.H. (1965) The solution of limestone in south Wales, *Geogr. Jour., 131:* 37-41.

Handel, M., Jennings, J.N., James, J.M., Martin, D., Martyn, M. & Warild, A. (1978) The East Owen Karst field - and discoveries on the South Owen, 1977,*J.Syd.Spel.Soc., 22*(2): 27.

Hladnik, J. & Kranjc, A. (1977) Fluvio-glacial cave sediments - A contribution to speleochronology, *Proc.7th IUS Congr.:* 240-243.

Jennings, J.N. (1972) Observations at the Blue Waterholes, March 1965-April 1969, and limestone solution on Cooleman Plain, N.S.W., *Helectite, 10:* 1-46.

Jennings, J.N. & Sweeting, M.M. (1959) Underground breach of a divide at Mole Creek, Tasmania, *Aust.J.Sci., 21*(8): 261-262.

Karolyi, M.S. (1977) Glaciokarstic development in Ordovician carbonates - Western Newfoundland, *Proc.7th IUS Cong.:* 252-253.

Kiernan, K. (1978) Glaciospeleology I - An introduction to Caves and karst in snow and ice, *Southern Caver, 10*(2): 3-12.

___ _____ (1979) A shallow englacial cave system in the Mueller Glacier, New Zealand, *Southern Caver, 10*(4): 4-8.

_____ (1980a) *Pleistocene Glaciation of the Central West Coast Range, Tasmania.* Unpublished thesis, Geog.Dept., Uni. of Tasmania.

_____ (in press) The Legacy of Glacier Karst, *Southern Caver.*

Peterson, J.A. (1966) Glaciation of the Frenchmans Cap National Park, *Proc.Roy.Soc.Tas., 100:* 117-129.

Pitty, A.F. (1968) The scale and significance of solutional loss from the limestone tract of the Southern Penines, *Proc.Geol.Ass.,79:*153-178.

Smith, D.K. (1969) The solution erosion of limestone in an artic morphogenetic region, pp. 99-110 *in* O. Stelel (ed.), *Problems of the Karst Denudation,* Br no.

Sweeting, M.M. (1965) Denudation in limestone regions, I. Introduction, *Geog.Jour., 131:* 34-37.

_____ (1973) *Karst Landforms,* Columbia Uni. Press, N.Y.

Warwick, G.T. (1971) Caves and the ice age, *Trans.Cave Res.Group Gt. Britain, 13*(2): 123-130.

Williams, P.W. (1965) An evaluation of the rate and distribution of limestone solution and deposition in the River Fergus basin, Western Ireland, *in, Contributions to the Study of Karst,* ANU Dept. Geog. Pub G/S.

AREA REPORTS

(to the 13th December, 1980)

S. Eberhard

MOLE CREEK

Over the 29th and 21st September the 1980 cave Search and Rescue workshop was successfully conducted at Mole Creek.

Steve Harris led a party consisting of Stefan Eberhard, Rolan Eberhard and Phil Jackson to this area. On the 29th November a narrow 6m shaft above Wet Caves campsite was explored to a short horizontal passage. A photographic trip to Shishkebab preceded a noctural visit to Kubla Khan where the Pleasure Dome, the Khan Chamber and the Jade Pool were all admired.

JUNEE/FLORENTINE

On the 11th September Stefan Eberhard led a party through the upper sections of Bone Pit whilst a dig in JF227 had to be aborted due to flooded passages. The following day saw some surface trogging in the Florentine Valley where a promising looking swallet hole was located.

On the 28th Stefan and Rolan Eberhard returned to explore the swallet located nearly two weeks earlier. The cave was descended, via a 30m pitch, to an estimated depth of 70m where further progress was halted by a waterfall pitch of unknown depth!

A fortnight later the same party returned with the support of Steve Harris and Robert Blakers. However, the waterfall pitch could only be descended a short distance before the large volume of water forced a retreat.

In recognition of a "happy discovery by chance", the cave was named Serendipity.

On the 5th October Phil Jackson, Bob Cockerill, Stefan Eberhard and Compton Allan introduced some students of the Rosny Matriculation College to the joys of caving in Beginners Luck and Welcome Stranger.

Over a three day period in December intensive surface exploration was conducted in the Junee/Forentine area by Stefan Eberhard. Numerous shafts were located near Serendipity and several other very promising looking holes were found west of this region. The Crisp's Rd. area also saw some investigation with the relocation of JF67 (Deefour Pot), JF201 (Rescue Pot), JF202, JF217, JF218, JF253 and some other insignificant holes.

IDA BAY

In Mid-November Stefan Eberhard, Rolan Eberhard and Leigh Gleeson investigated a previously unexplored shaft (IB12) situated close to Midnight Hole. It was found to consist of a short drop to a tight vertical squeeze followed by a further 30m freehanging. Lack of time prevented the descent of another 6m drop which did not appear overly promising.

Over the 2nd, 3rd and 4th December Stefan Eberhard searched for caves on the northern side of Marble Hill. Not many caves were found and only a few require further investigation.

HASTINGS

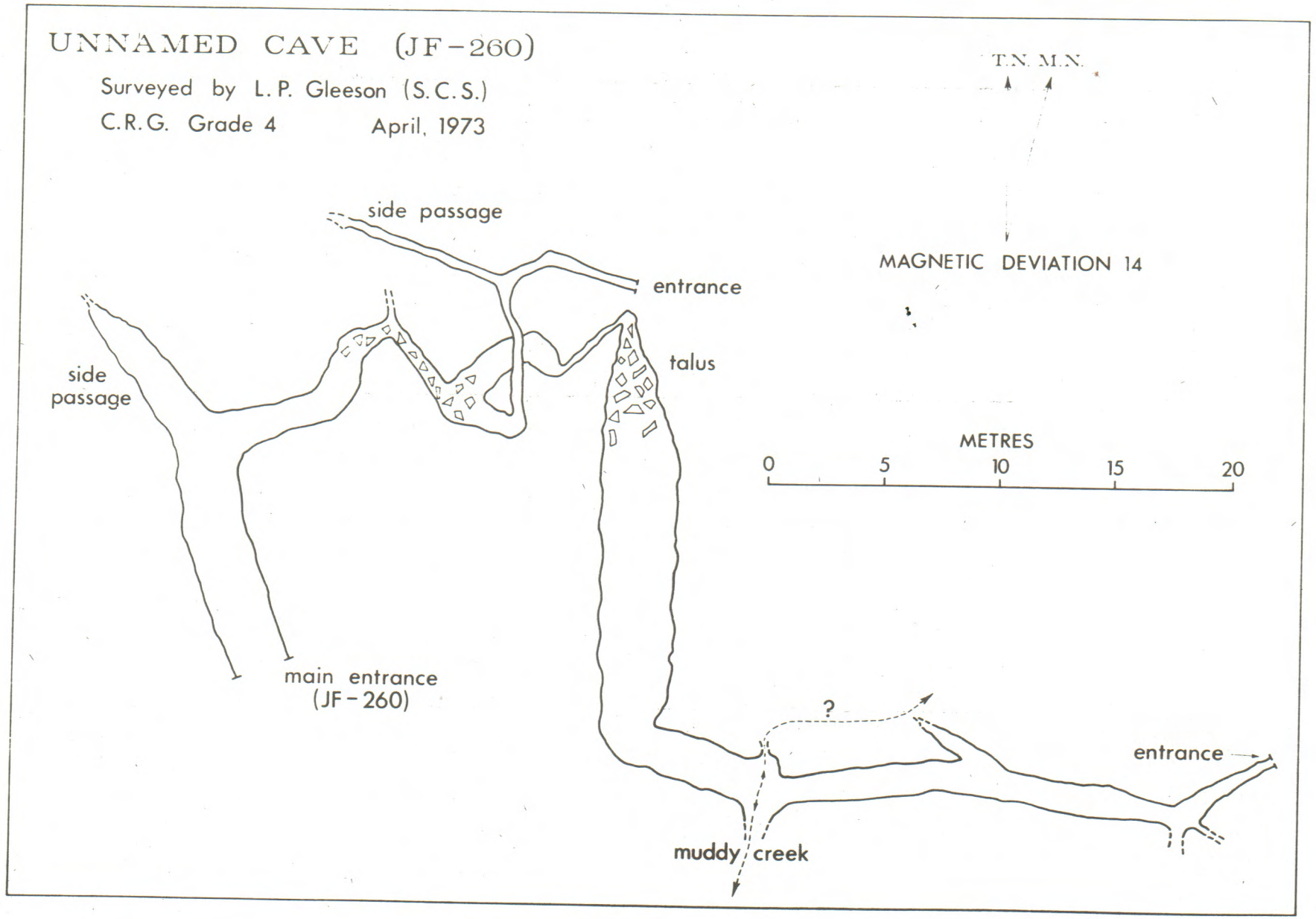
Lindsay Wilson led a trip to Wolfe Hole in late November.

On the 13th December members of the Police Search and Rescue diving squad, in conjunction with Stuart Nicholas and Nick Hume (T.C.C.), undertook a cave dive in Lake Pluto, Wolfe Hole. They were accompanied by Phil Jackson and Stefan Eberhard who assisted in transporting the large quantity of gear down the 30m entrance pitch and eventually to the lake. The trip provided a worthwhile introduction to the problems involved in a cave diving environment.

UNNAMED CAVE (JF-260)

Surveyed by L. P. Gleeson (S.C.S.)

C.R.G. Grade 4 April, 1973



Dramatic find in S.W. cave

Tasmanian Wilderness Society members have made one of Australia's most important archaeological discoveries in the South-West wilderness.

A three-man party, which included wilderness society director Dr Bob Brown, discovered dozens of stone tools, animal bones and the charcoal of Aboriginal fireplaces believed to be 8000 years old in a cave on the lower Franklin River.

The discovery was announced yesterday, but the find was made last Monday and had been kept secret.

Only last month one of the first archaeological finds in the South-West was made by members of the National Parks and Wildlife Service in conjunction with the Australian National University pioneering further trips to the area.

Their discovery included stone tools, quartz pebble core and flakes struck from the core.

Mr Don Ranson, the National Parks and Wildlife Service archaeologist, said last Monday's find was exciting and tremendous for Tasmania.

The three-man party — Dr Brown, geomorphologist Mr Kevin Kiernan and wilderness society secretary Mr Bob Burton — spent only two hours at the cave.

But a large party will make another trip to the area before the end of the month to gather further samples.

The three men made the trip to the Franklin to look for limestone caves, because of last month's find, and to take photographs of the little known Humbaba Gorge on the lower Jane River.

Mr Kiernan said the group had pulled up on a river bank after finding that Mr Burton's waterproof drum had leaked, saturating his clothes.

"While they were trying to dry the clothes, I went inland through thick scrub for about 20 minutes before coming across the cave," Mr Kiernan said.

Mr Kiernan said it had been a freak find.

Charcoal and pollen samples collected from the cave are being radiocarbon dated to determine an accurate age.

The exact location of the cave has not been released by the society because of the fear that casual visitors could do irreparable damage.

"The discovery must rank as one of the most important archaeological finds in Australasian history," Dr Brown said.

He said the cave would be flooded if the Gordon-below-Franklin hydro electric power development went ahead.

"It highlights the need for funding by the State and Federal Governments of a major survey of the Gordon-Franklin region," he said.

Dr Brown also called for an expert inquiry to assess the value of the Gordon-Franklin wilderness to the nation.

The senior fellow at the ANU's School of Archaeology, Dr Rhys Jones, said the find confirmed the discovery three weeks ago that the South-West was once occupied by prehistoric man.

"Limestone caves with human occupation are rare in Australia and this one is of great importance," Dr Jones said.

"It will give us an insight into the climatic conditions of the time and the general hunting strategy of prehistoric man."