

# SOUTHERN CAVER

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### **Editorial**

This issue features a reproduction of a report prepared in 1979 for the Tasmanian Hydro-Electric Commission (now known as Hydro Tasmania) when it was gathering background environmental data for its proposed "Gordon River Power Development Stage 2". Fortunately this scheme was never built, as a result of a celebrated conservation campaign and the intervention of the Federal Government following World Heritage listing of the area in 1982.

The report summarised cave information reported by cavers (mainly Kevin Kiernan, the Editor and members of the Sydney Speleological Society) and added some information gathered by HEC field staff.

This is not a facsimile; the text follows the original but has been reset and some pages omitted which duplicated information or contained little; some additional information has been inserted in Arial font and/or [within square brackets]. Some editorial comments are made by way of footnotes. The fact that a particular statement has not been challenged should not be taken to indicate its acceptance by the Editor or STC.

Graphics follow the original, except as indicated. Cave maps copied from published reports (in the *Journal of the Sydney Speleological Society*) have not been reproduced multiple times, as is sometimes the case in the original, to save space.

Suggested form of citation:

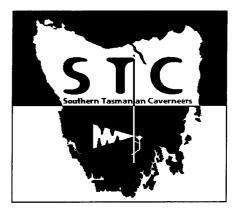
Naevi, I.H. 1979 Cave Survey [in] Hale, G.E.A. Lower Gordon Region: Land Use, Resources and Special Features. Hydro-Electric Commission, Hobart. 113 pp. Reprinted in Southern Caver, 64 (2008).

A contemporary (1980) critique of this report appeared in *Southern Caver*, 12(2): 24-33.

Greg Middleton, Editor ozspeleo@bigpond.net.au

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#### Cover photo:

Angel Cliffs – large limestone cliffs on the Gordon River, just downstream of the Sprent River junction.

Photo: Barry Blain, Dec. 1974. [Not part of original report.]

STC was formed from the Tasmanian Caverneering Club, Southern Caving Society and Tasmanian Cave and Karst Research Group in 1999. STC is the modern variant of the oldest caving club in Australia.

## **LOWER GORDON REGION**

#### **CAVE SURVEY**

#### I. H. NAQVI

# Hydro-Electric Commission, Hobart 1979

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APPENDIX B	Systematic Description of Caves	71 pp

#### **EDITORIAL NOTE: CAVE LOCATIONS**

This report contains location details for many caves. While it is contrary to normal practice among Australian speleologists to publish this information, the circumstances in this case – the caves faced inundation under hydro dams and any report on them had to establish their locations if it was to have any chance of being seriously considered – was deemed to require disclosure of the locations if the caves were to be accepted as significant resources directly threatened by the dams. Thus locations were included in reports published between 1974 and 1980. Most of the locations have therefore been published before; grid references for the few 'new' caves found by the HEC have been omitted from this reprint.

#### **FIGURES** [Figures have been incorporated in the text for easier reference.]

- 1. Index & Geological Map
- 2. Strike of joints
- 3. Typical cross-section B B of Lower Franklin Valley
- 4. Free flow aquifer with capping. Section A A
- 5. Major tourist caves in Tasmania.

#### PLATES [In this reprint the Plates follow the references.]

- 1. Gordon Limestone overlying Butler Island Formation
- 2. Gravels
- 3. Flat valley with Gordon Limestone
- 4. Angel Cliff
- 5. Folding in Gordon Limestone
- 6. Jointing
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- 9.
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- 13. Rectangular and horizontal cave
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- 15. Cave decorations in CF3.
- 16. Cave decorations in NR1.

#### **TABLES**

- 1. Cave Summary Lower Franklin Valley
- 2. Cave Summary Lower Gordon Valley

3

2

#### DISCLAIMER

Hydro Tasmania, in agreeing to the reproduction of this report (20 August 2007) required the inclusion of the following disclaimer:

This report was not created as a reference for exploration or caving purposes and the information in it has not been verified as accurate since original publication. Any use of information in the report is entirely at the risk of the reader.

NB Hydro Tasmania has not endorsed the editorial comments or any modifications made by the Editor in this reprint version.

#### INTRODUCTION

This report records the results of a survey of caves likely to be affected by the Gordon below Franklin and the Gordon above Olga power schemes, as part of an overall survey of the environmental effects of such schemes. The areas surveyed are shown in Figure 1.

The caves are developed in Gordon Limestone which lies in a N–S trending, strike oriented, straight valley 5–9 km wide, 100 km long between mountain ranges about 400 m high. This valley contains all the Olga River course and part of the Gordon and Franklin River courses.

No cave search was carried out in the Olga valley because the lack of relief has reduced the chances of finding the caves in this area.

In addition to the field survey carried out in February-March 1979, information has been obtained from internal H.E.C. sources and from publications by caving or conservation organizations, notably the Sydney Speleological Society (Goede, 1968), (Morley, 1971), (Middleton *et al.* 1974) [sic – Hawkins *et al.* 1974], (Kiernan, 1974), (Middleton and Sefton, 1975), (Kiernan, 1977), (Middleton, 1977) and (Middleton, 1979). The Sydney Speleological Society commenced numbering and listing caves within the area in 1974.

#### **GEOLOGY**

The regional geology of the area has been recently reviewed by Roberts and Naqvi (1979) and is summarised below.

#### Stratigraphy

The relevant stratigraphic units of the area in ascending order are:

Ordovician

Butler Island Formation - 400 m sandstones and carbonates (Plate 1)

Gordon Limestone - 1500 m limestone and siltstones

Silurian - Devonian

1100 m quartzites, siltstones, argillites and minor calcareous siltstones

Tertiary - Recent

Gravels, clays and sands.

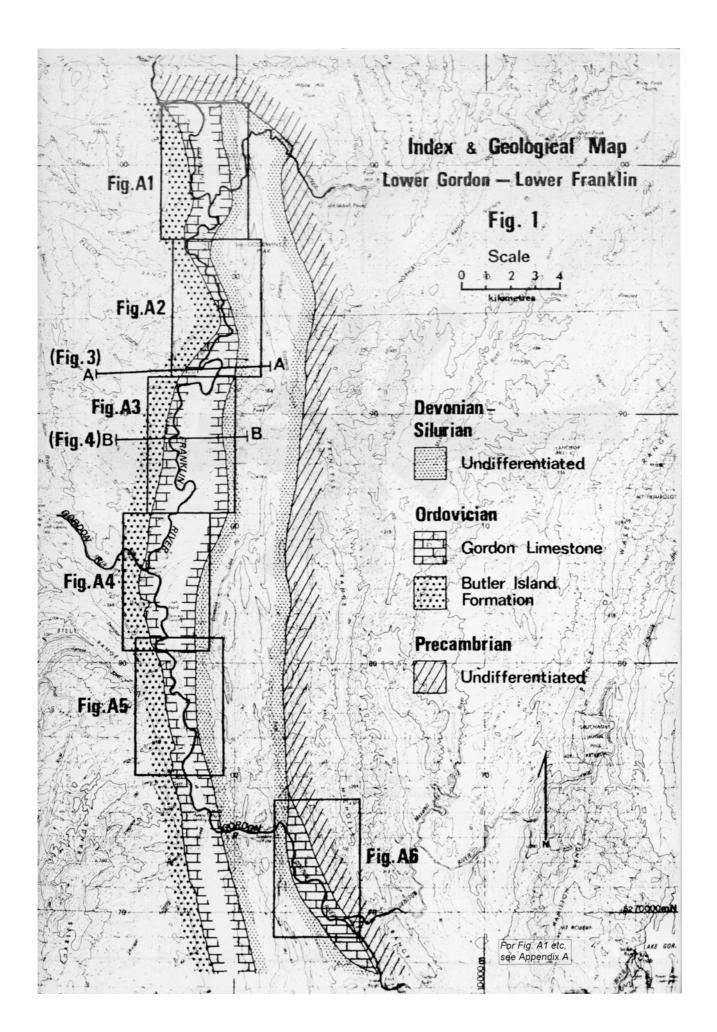
 $[2]^1$ 

Of these units the Gordon Limestone is the most important because it contains all the known caves. This is a major unit, including high and low grade limestones and calcareous and non-calcareous siltstones. The limestone is dense, displays stylolites and contains extensive veining of secondary calcite. It has a major topographic expression in broad, flat valleys (Plate 3). The valley floor is covered by a veneer of alluvial and colluvial material, with occasional, narrow ridges of strata with a low calcareous content that have more resistance to solutional degradation and erosion. Calcareous strata are only exposed in the river valleys, notably as cliffs up to 20 m high along the Gordon and Franklin Rivers (Plate 4) and as intermittent narrow bars of impure limestone in the river bed, exposed during periods of low flow.

Sporadic gravel deposits up to 6 m thick occur along the Gordon and the Franklin Rivers (Plate 2). The imbricate structures suggest similar direction of river flow to the present. In the Olga area the Gordon Limestone is blanketed by up to 19 m of clays, sands and gravels (Roberts and Andric, 1974). These superficial deposits are thought to be fluvioglacial in origin, but may be either Pleistocene or Recent in age.

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Centred numbers in square brackets represent original page numbers (top of page). These were included only as far as page 10; beyond that pages were not numbered.



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TABLE 1

	Cave	Summary - Range of o	Lower Fran	•	
	Min.		Max.		Median Range
Length	2	(F5)	$50^{2}$	$(CF8)[F28]^3$	10 - 20
Height	1 (CI	F7)[F32]	15	(CF9)[F26]	2 - 3
Width	0.4	(CF1)	10	(CF9)[F26]	2 - 10
Portal Height	0.4	(CF1)	15	(CF9)[F26]	1 - 2
Width	0.2	(CF1)	6	(CF3)[F1]	2 - 3

Decorations are present in only 4 caves (CF2 [F57], CF3 [F1], CF9 [F26] and CFTI2).

The best decorations consisting of stalactites and stalagmites are found in CF3[F1] (Plate 15) where they extend throughout the cave. They are also well developed in CF2[F57] but are confined to an area of about one square metre. Most caves tend to be horizontal and rectangular in shape reflecting the importance of joint control in development (Plates 13 & 14).

[3]

Most well developed caves occur in the higher cliffs along the main river courses. Very few caves occur on the western side probably due to the easterly dip of the beds and the relatively thin limestone on the western side of the Franklin River (Fig. 3).

#### Lower Gordon Valley

Two caves (NR1, NR2) were found in the Nicholls Range valley during investigations by the H.E.C. in 1971-73 and were subsequently described by Middleton (1976). Another three caves (GS1, GS2 and GS4) have been reported from the Gordon-Sprent area (Kiernan, 1974). Of these three (GS1 and GS2) have been examined by the writer. Seven new caves in the CG and CGT series have been described by the writer.

TABLE 2

	Cave Summary - Range of	Lower Gordon dimensions (m)	•	
	Min.	Max.		Median Range
Length	2 (GS3)	520	(NR1)	10
Height	0.25 (CGT10)	20	(CG6)	1 - 5
Width	0.25 (CGT10)	10	(NR1)	4

Decorations are present in only two caves (NR1 and CGT7). They are best developed in NR1. Most caves occur in cliffs over 10 m high as the result of solution along the joints roughly at right angles to the river.

#### **CAVE DEPOSITS**

#### **Stalactites and Stalagmites**

These are present in six caves only (CF2[F57], CF3[F1], CFT 12, CGT 7, CG 7, CC10 & NR1) and are best developed in CF3[F1] and NR1 (Plates 15 & 16).

The decorations are derived by internal processes (i.e. those operating within the cave) dominantly by the precipitation of calcite brought about by diffusion of CO<sub>2</sub> from water to cave air (Jennings, 1971).

[4]

The general lack of stalactites and stalagmites in the study area may be due to thin top soil over the limestone resulting in a diminution of organic  $CO_2$  in the percolating ground waters. Relatively recent cave development with insufficient time for the formation of deposits could be a contributing factor.

This is incorrect – e.g. App. A shows F36 to be 60+ m, F34 to be 170 m and F3 and F9 to be 150 m in length - GJM

Cave numbers shown in square brackets are 'ASF numbers' generally assigned by the author and have been added in this reprint. Source: plans in App. B - GJM

#### Gravels

These are best exposed in CF3[F1] at two levels, possibly representing two phases of stream aggradation under cold climate conditions during the Pleistocene. They have not been studied in detail. Gravels have also been noted in creek bed in CFT14. The bulk of this material appears to have been carried under flood conditions.

#### **Plant Debris**

Extensive driftwood is present in CF2[F57] 10 m above the present river level suggesting water flow through the cave during high flows.

#### **Animal Remains**

Middleton (1979) has reported a large bone deposit in F34.

#### **SPELEOGENESIS**

The most important factors influencing the formation of caves in the study area are believed to be as follows:

The structure of the limestone, particularly the dip, and the joint density.

The mode and volume of water flow through the passages i.e. whether the flow is under pressure or free (phreatic or vadose).

The regional physiography of the area.

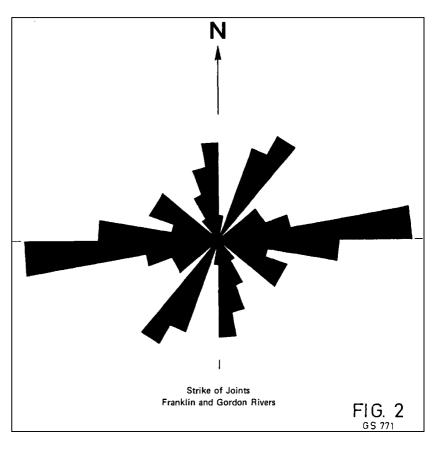
#### **Structural Control**

The importance of joint directions in controlling cave development can be seen in Plates 13 & 14.<sup>4</sup> The most preferred direction is at right angles to the river. Caves formed along single joints tend to he high, narrow, winding and sometimes just vertical slits (Plate 14). Joint-controlled passages are generally triangular passages formed by the con-

[5]

junction of several joints with the base wide and the passages narrowing upwards (Plate 14). This is due to solution working laterally along the bedding plane at the base of the joints (Ford, 1976).

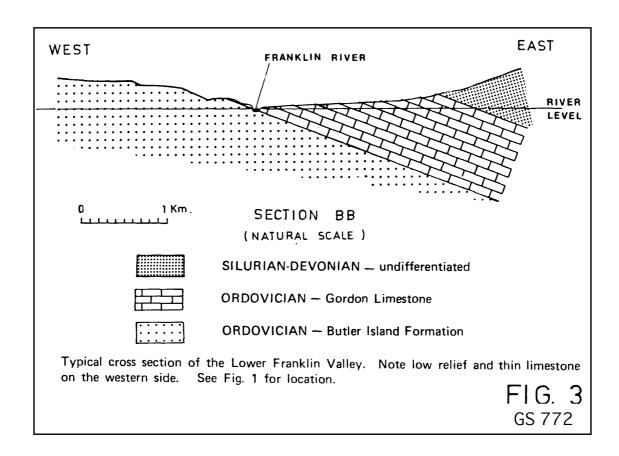
The easterly dip of the limestone beds has influenced the major cave development on the eastern side (Fig. 3).



#### **Solution**

Solution in the phreatic zone (flow under hydrostatic pressure) has been the major factor in the early stages of formation of the caves described in this report. The degree of structural control and the ample morphological evidence support this assertion. Smooth walls and rounded ceiling pockets indicate solution in three dimensions (Armstrong &[sic] Osborne, 1978).

<sup>&</sup>lt;sup>4</sup> Fig. 2 (not referred to in the original text) shows the frequency of strike directions along the rivers. *Southern Caver*, No. 64, December 2008 – page 8



Almost all the most important caves of the study area are related to the present rivers and the relief. This does not mean that these caves did not have an early phreatic stage, but as they have been inundated or traversed by streams many of the phreatic traces have been obliterated. The original circular or elliptical passages have been deepened by normal stream erosion as well as by corrosion the shapes becoming much more rectangular (Plate 13).

The type, of non-karstic terrain adjacent to the limestones is also important. Gams (1965) has shown in a study of the Slovenian caves that the largest occur where streams entering the caves come from terrain yielding pebbles and coarse debris compared with smaller caves whose streams come from areas which only yield clay. This is because river abrasion is important in addition to karstic solution in the formation of any river cave.

#### The Physiographic Factors Affecting Cave Formation

The relative height and available relief (Fig. 3) of the land is an important factor which affects cavern development (Sweeting, 1973).

The development of chiefly horizontally developed caves of the study area reflects the low available relief of the limestones (Jennings, 1971).

Not only horizontal caves, but also vertical features, can be shown to be partly dependent upon physical factors. This is particularly so of vertical features formed by vadose streams since vadose water will tend to form vertical caves when there is considerable available relief (Sweeting, 1973). In the study area dome pits (vertical features) are scarce. This is typical of areas of low available relief (Sweeting, 1973).

The type of non-karstic terrain adjacent to the limestones is also important. Gams (1965) has shown in a study of the Slovenian caves that the largest occur where streams entering the caves come from terrain yielding pebbles and coarse debris compared with smaller caves whose streams come from areas which only yield clay. This is because river abrasion is important in addition to karstic solution in the formation of any river cave.

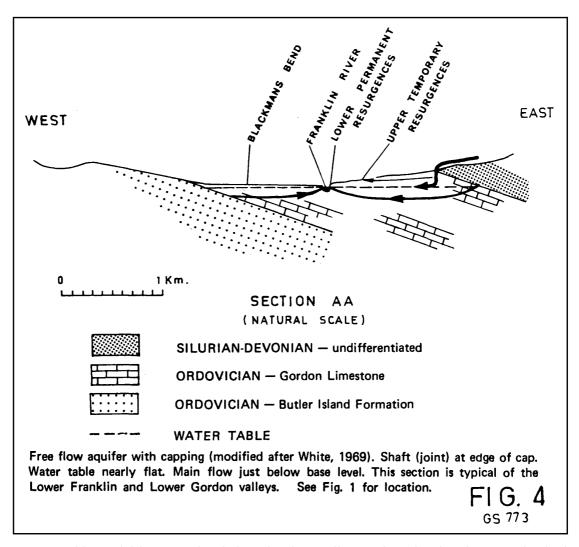
Γ6

The lack of big caves in the study area could therefore be partly due to lack of abrasive material in the streams entering the caves. Furthermore, the small size of the collecting basin for the drainage entering the cave will also be of significance, since more water and debris are likely to come from a larger basin (Sweeting, 1973). Thus there are many connections between

cave development and the physiography of the karst area. Once the initial cave network is established, the physiographic situation is of utmost importance and will often indicate why one cave has developed (e.g. CF9) and another has remained small (e.g. CF5).

#### **Hydrogeologic System**

White (1969) has postulated seven types of hydrogeologic systems for karsts of low or moderate relief such as the study area. One of his systems (IIB2), a free flow aquifer with capping, may apply here (Fig. 4).



In this model karst reaches below the river valleys to base level. The water intake is from the edge of an impervious cap down a shaft. The resulting caves are nearly horizontal and the water table gradient remains low in spite of irregularities in the surface topography.

In the Nicholls Range area drilling has shown no evidence of large, interconnected underground solution systems, and static water levels in the drill holes indicated relatively steep gradients towards the Gordon River (Roberts & Andric, 1974). All the major solution activity so far found occurs above the base level provided by the Gordon River, supporting the view that the karst is relatively recent in age. Evidence of closed systems of caverns is provided by high static water levels in drill hole 7063, suggesting that the present water movement through it is slow. Roberts & Andric have suggested that originally a more open system existed which has subsequently become clogged with debris carried in from the surface and finally sealed by insoluble clayey products of solution process. In the Nicholls Range valley the steep overall gradient shows that (a) the primary permeability on a regional scale remains low, and (b) a widespread, anastomosing pattern of small, secondary openings has not been developed.

#### Comparison of the Cave Systems with examples elsewhere in the State

Size and decorations of the caves in the Lower Gordon and Lower Franklin compare very poorly with the caves in other parts of Tasmania (Fig. 5). In the study area most caves are 10 to 20 m long with the exception of NR1 which is 520 m long. The width of these caves is mostly 1 - 2 m. Cave

[7]

decorations are either missing or very limited. The cave (CF3) with the best decorations (stalactites and stalagmites) occurs near Flat Island. It does not compare favourably with other well known tourist caves in Tasmania, as shown below:

King Solomon:

230 m long, 1 large cavern plus spacious passageway; easy grade; formation 90 - 95% of the tourist section (Fig. 5).

Marakoopa:

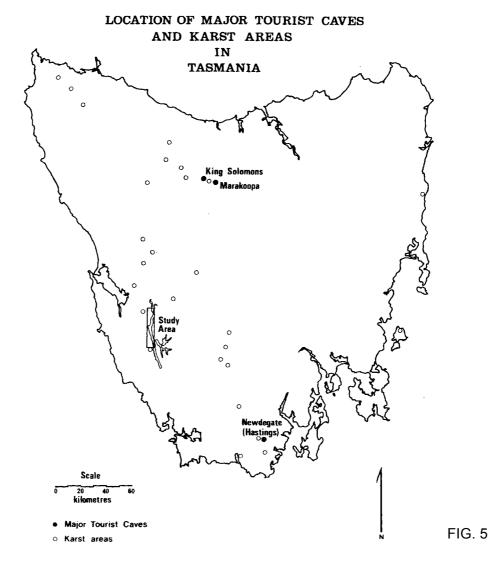
455 m long, including one large cavern stepped passageway; formation 60 - 75%.

Newdegate (Hastings):

460 m long; formation 90%

Gordon River, Nicholls Range area (Fig. A6).

520 m long; two downstream entrances on the banks of Gordon River flowing water; massive formation in roof are likely to be flooded during periods of high river flow; a permanent entrance for tourists would have to be via one of the seven daylight holes; however, the presence of flowing water and the relative lack of formation make the tourist potential very low.



#### **CONCLUSIONS**

Speleogenesis in the study area has been constrained by the following factors:-

- a. The monoclinal regional structure in the Gordon Limestone.
- b. The lack of adequate topographic relief.
- c. The low persistence of open discontinuities such as joints and bedding panes.
- d. The absence of suitable abrasive materials.
- e. The relatively small catchment areas of tributary streams to Gordon and Franklin Rivers.

As a result, relatively small caves with a low incidence of decorations have been produced.

[8]

By comparison with the rest of the state the tourist potential of the caves is very low.

Nothing of archaeological significance has yet been found in any of the caves.

The potential for future discovery of large cave systems is very poor.

[9]

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[10]

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[Pages were not numbered beyond p. 10 in original report.]

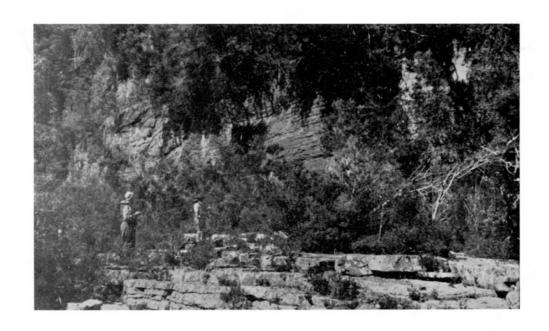


PLATE 1 Gordon Limestone overlying Butler Island Formation at M8, Franklin River (Fig. A-1)

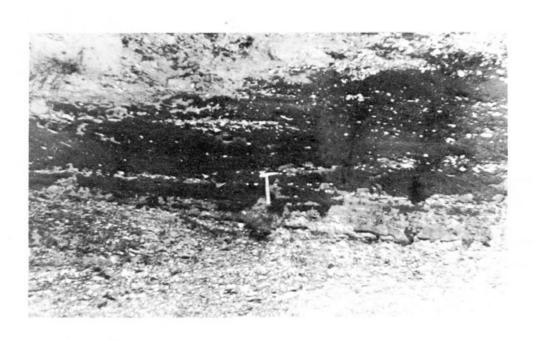


PLATE 2 Gravel deposits along the Gordon River.



PLATE 3 Flat valley underlain by Gordon Limeston.



PLATE 4 Angel Cliffs, Gordon River near Sprent junction.

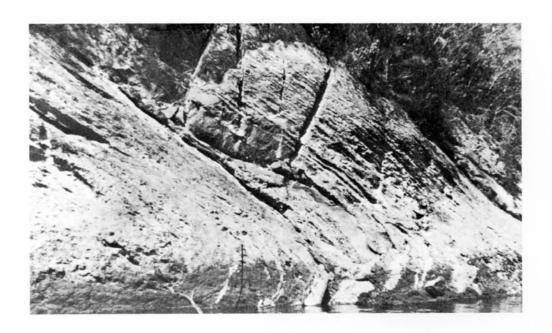


PLATE 5 Folding in Gordon Limestone. Joint planes are cut off by bedding planes, Gordon River.

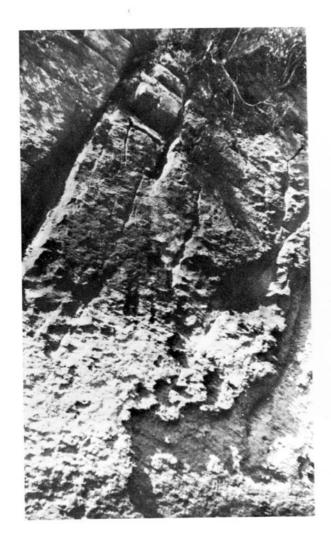


PLATE 6
Joints penetrating short distance.

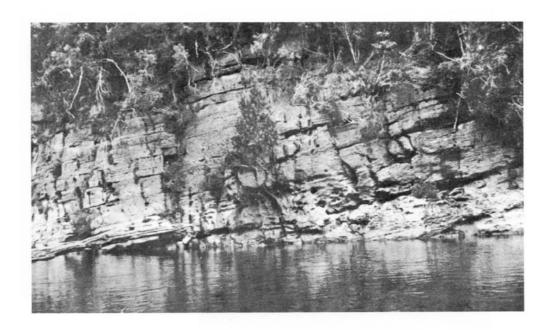


PLATE 7 Solution activity parallel to joints and bedding at M5, Franklin River (See Fig. A-1).

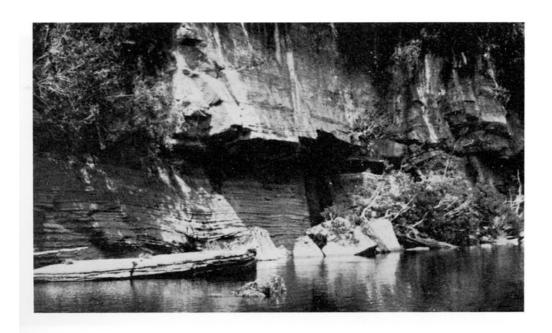


PLATE 8 Solution along intersecting bedding and joint planes resulting in blocks being torn off at M6, Franklin River (See Fig. A-1).



PLATE 9
Solution along joints at M7, Franklin River (See Fig. A-1).

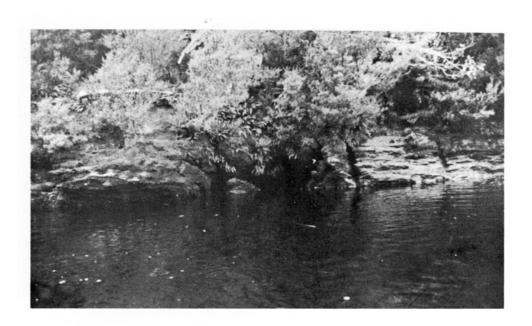


PLATE 10 Solution along joints and bedding at M4, Franklin River. (See Fig. A-1).



PLATE 11 Solution along vertical joints at M2, Franklin River. (See Fig. A-1).

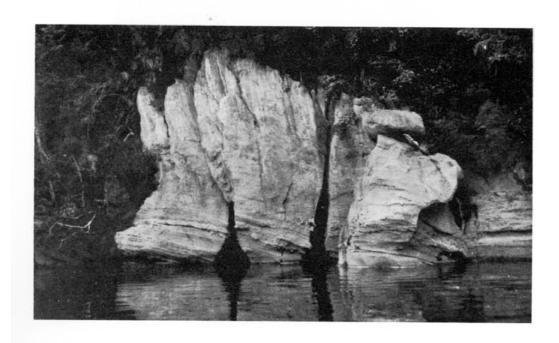


PLATE 12 Solution along joints roughly right angle to the river at M9, Franklin River. (See Fig. A-2).

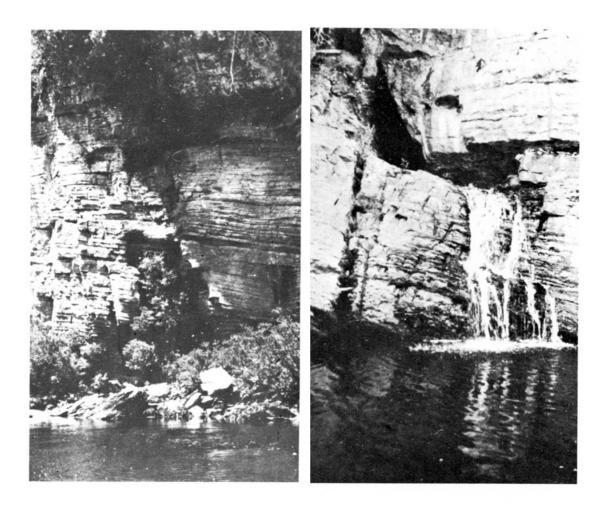


PLATE 13 Rectangular and horizontal, PLATE 14 Joint-controlled cave, cave, Franklin River. Franklin River.

[Photos repositioned]

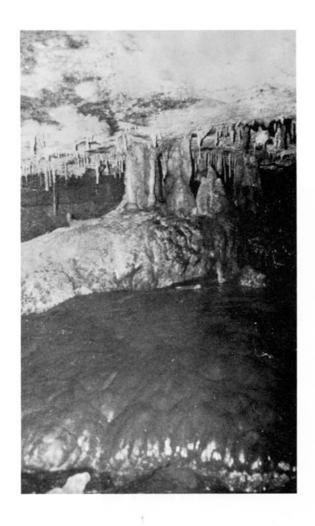


PLATE 15 Cave decorations in CF3. (See Fig. A-1).

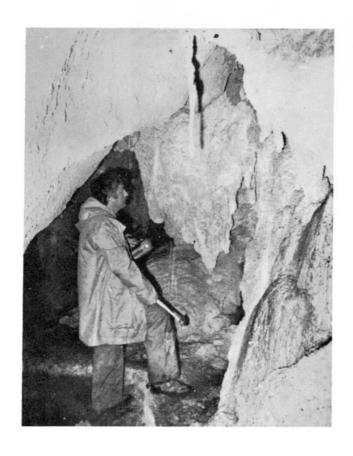


PLATE 16 Cave decorations in NR1. (See Fig. A-6).

## APPENDIX A

The cave index has been arranged roughly in a north to south direction. Knowledge of the caves has been obtained from internal H.E.C. sources and from publications of the Sydney Speleological Society (S.S.S.). See Figs. A-1 to A-6 for location.

Only H.E.C. photographs used

# APPENDIX A CAVE INDEX - LOWER GORDON & LOWER FRANKLIN

(See Figs. A-1 & A-2 for location)

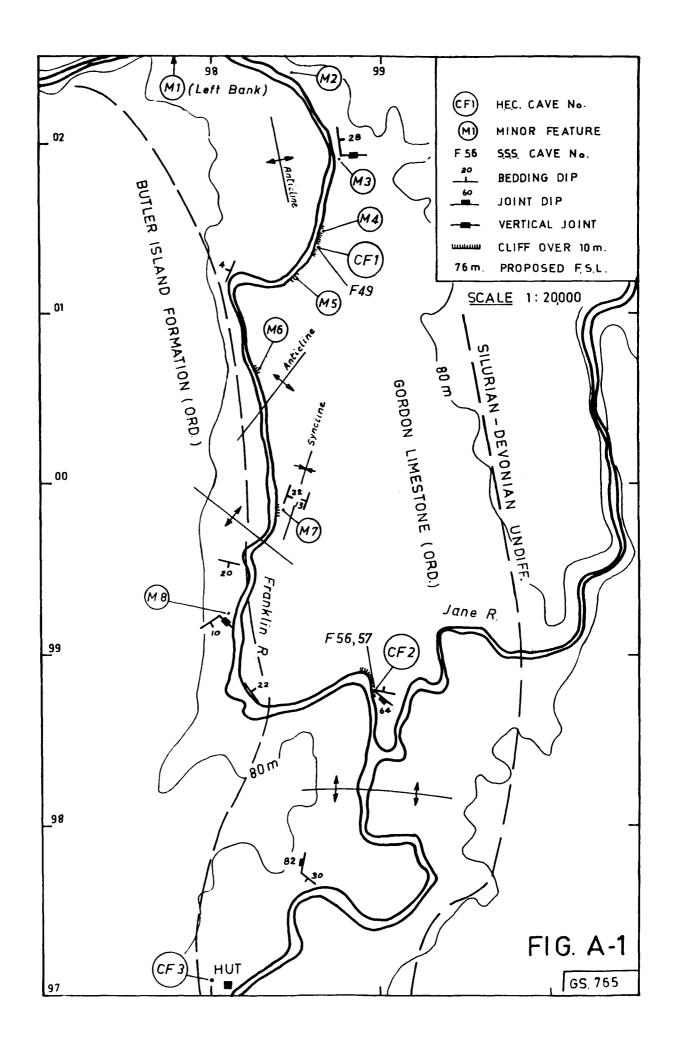
Sheet 1 of 11

HEC CAVE SSS No.		GRID No.	A	APPROXIMATE CAVE DIMENSIONS (m)				(m) PHO		SSS MAP No.	P GS	REMARKS	
			Lengt	h Height	Width	ENTR Height		3					
FR	ANK	LIN R	IVE	R									
CF 1	F49	986014		3	0.4	0.4	0.2	10	K728-8,		GS 774	Cave formation due to solution along major joint. 90/V	
	F56	989989	60	1- 5	2	4	2			601	GS 775	Entrance on prominent cliff on bend above Jane River junction; leads to complex of straight passages.	
CF 2	F57	"	12	2	2	2	2	15	K731- 10, 11 K726-1	605	GS 776	10 m above river level. 3 entrances. Stalactites confined to 1 m.	
CF3	[F1]	980971	35	10	15	10	6	15-20	K726- S,8		GS 777	100 m west of H.E.C. hut near Flat Island, possibly 3 levels; creek flowing through present level 1. Abundant decorations.	
CF 4	F42	985961	25	3	1-2	2	3	4	K726-9	600	GS 778	Cave formation due to solution along major joint 215/38W. Entrance just above river level. 3 m wide at entrance, reduces to 60 cm 10 m wide.  Sheet 2 of 11	
	F41	987956	30	1- 2	1	1	1			629	GS 779	One entrance to a complex low, muddy breakdown caves largely filled with	
	F40	994947	15	1.5	2	1.5	1.5			604	GS 780	rubble and mud.  Small cave with 'A'. shaped entrance at river level; 6 m dry stream passage to right and 4 m up at left; possible shaft to surface.	
	F39	995921	10	4	1- 3	4	3			628	GS 781	Fern lined grotto; small stream; mud choke at back	
	F38	995920	10	2	1	2	3	10	K727-1,	631 615	GS 782	'S' shaped passage 2 m in diameter, leading to sump 10 m in.	
	F37	991909								614	GS 783	Small cave just upstream of valley containing F34.	
	F34	990908	170	3- 10	2- 10	3	5			593	GS 784	170 m long cave with stream passage, dry formation section and large bone deposit; also has lower (stream outflow) entrance into same valley (neither tagged). F34 is some 32 m back from Franklin River; invertebrates.	
												Sheet 3 of 11	
	F35	990908								599	GS 785	Hole, 3 m down to chamber, mainly straws; 200 m beyond F34 along same dry valley. Second entrance.	
	F36	"									GS 786	No detail recorded; near F35.	
	F33	987908		4	2	2	2	10	K727-		GS 787	Cave formation due to solution along the major joint. Flowing water.	
CF7		984873		1	2	1	2	20	K727-5		GS 788	Cave is 1 m above river level; tufa deposit below entrance.	
CF8	F28	984869	50	4	1	5	3	-	K727-6	612	GS 789	Consists of 2 branches, could be in 2 levels. Cave due to solution along a major joint 215/90.	
	F30	986869									GS 790	Small cave on right bank of stream flowing through F26, about 600 m upstream from back of Arch.	
	F31	"		3	1						GS 791	Slot leading up to daylight on left bank of stream flowing into F26. c. 100 m upstream of back of F26.	
	F29	984869	10	2- 4	1- 3	4.5	3			603	GS 792	Large hole at river level below F27 but apparently not connected to F26-27.	
	F27	984869	20	1	5	2	4			602	GS 793	Sheet 4 of 11  Entrance 2 m high, 4 m wide in .bluff 40 m upstream of F26; c. 15 m above river at normal low flow; connects with F26.	
CF9	F26	984869	30	15	10	15	5	20		602		Creek flows through to join Franklin River high level passage system leads to F27.	

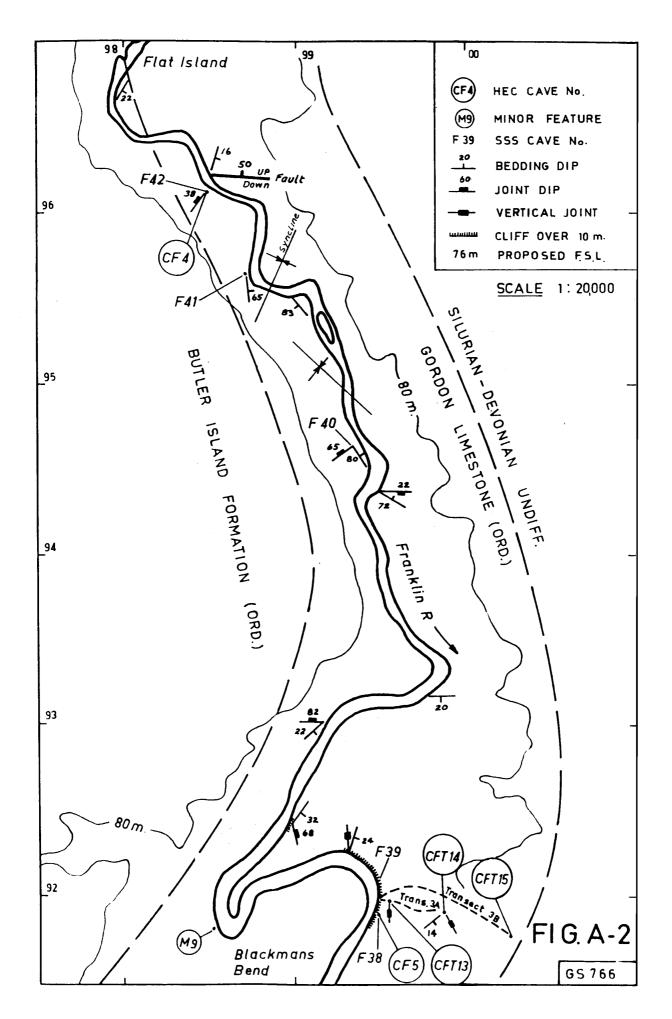
<u>rank</u>	LIN R	VER	<u>(con</u>	ıt.)					
F43	974863		2.5	2- 5	2.5	2	612	2 GS 795	Upstream entrance to cave below arch (F44) on 'Verandah Creek'.
F44	"	4	2- 3	6	2	6	610	6 GS 796	Classic arch at centre on left bank of 'Verandah Creek'.
F45	974861							GS 797	Long, narrow meandering slot; carries small flow of water; c. 100 m from right bank of 'Verandah Creek', downstream of F44.
F23	977860							GS 798	Impenetrable hole discharging waterfall to river; 3 m above normal low flow level; on east bank, upstream side of bend above Verandah Cliff.
F24	"	5					590	6 GS 799	Cave 5 m long just downstream of F23.
F2.5	072050						50	6 66 000	Sheet 5 of 11
F25 F17	973859						590 41°		Cave at downstream end of Verandah Clift Located downstream of Verandah Cliff.
F18	"						590		Small cave near F17.
F19	"							GS 803	Narrow crack in cliff between F17 and F18.
F20	"	5	5	1	1	4	59		
F21	"						590		behind Verandah Cliff.
F16	974852						59	1 GS 806	Steep but easily climbed entrance to F8- 13-16 system; doline filled with horizontal scrub and fallen trees.
F13	"						"	GS 807	
F8	"						"	GS 808	Hole at bottom of doline connecting with F13 and F16.
F10	"						590	0 GS 809	Hole; very steep sided doline; drops to water.
									Sheet 6 of 11
F14	974852						590	0 GS 810	6 m long cleft dropping steeply 7 m to water; inland from F6.
F7	"	4					"	03 611	Drop of 4 m to choked crawl; inland from F6.
F6	"	3					"	GS 812	sumps; wetas.
F5 F4	"	10					"	GS 813	Impenetrable rising 4 m east of F4.  Outflow stream cave c. 5 m long; ends
Г4		10						GS 814	in sump 30 m up a valley on rising of stream entering F9, etc.
F12	974852						"	GS 815	Cleft with slope to pool, near F8.
F15	975851	150	1- 8	2			592	2 GS 816	Steep narrow slit dropping to downstream end of F3.
F11	"	"	"	"			"	GS 817	Large steep sided doline giving access to main chamber of F3.
									Sheet 7 of 11
F9	975851	150	1- 8	2			592		Stream entrance to F3-9-11-15, c. 4 m high, at end of steep sided valley.
F3	"	"	"	"			"	GS 819	Side entrance to major stream cave (F3-9-11-15); 150 m long.
RANK					-				
CFT15	[**]	20	3- 7	7	3	15		GS 820	creek flowing out
CFT13	[**]	24	4	0.5	4	0.5		GS 821	60 m up transect 3A, cave parallel to the major joint 180/V which caused it.
CFT14	[**]	20	0.5	1	0.5	1	K810-2	GS 822	End of transect 3A, creek comes out of a tunnel. Another sinkhole 200 m up the hill is dry, running water. [?]
CFT10	[**]	10	2	2	2	2		GS 823	350 m up transect 2; creek goes through a tunnel.
EFT11	[**]	20	10	5	10	5		GS 824	flows through main tunnel. 2 main branches exist. Cave formation due to solution along the major joint 270/90.
									Sheet 8 of 11
	[**]	20	3		3			GS 825	850 m up transect 2; creek disappears in

GO	RDO	N R	IVE	R									
	GS3	9688	36	2							416	GS 826	Small hole 2 m deep; blocked with mud and silt; eastern bank 200 m upstream of Franklin Junction.
CG6		[**	]	5+	20	0.5 -6	20	3				GS 827	A creek coming from a cavern flows through part of the cave leaving the remainder dry. Cave open at the surface.
CG5	GS2	9718		5	1	4	1	4	20	K761-1	.0	GS 828	Cave is mostly under water.
CG4	GS1	9738		3	5	3	5	3	20		438	GS 829	300 m downstream of the Angel Cliffs.
CG3	GS4	9767	98	30	4- 5	2	7	3	4	K761-	5 510	GS 830	At the junction of the Sprent River. Cave for the first 30 m then canyon for 60 m; 3 daylight holes in the cave floor inclined a about52° parallel to bedding. The canyon cuts across bedding at first, then meander
													Sheet 9 of 11
CG2		[**		15 +	8	1.7	2	1.7	15	K761-	3	GS 831	A cavity 2 m high, 3 m wide exists towards the end; opening at the top; creel flowing through cave. Cave floor rises 0.5 about 5 m in from the portal. Flowing water.
CG1		[**		10	1	3	1	3	10			GS 832	Cave parallel to the major joint 165/18W. Also cavities 1 m/2 m parallel to bedding Flowing water.
	NR1	0337	13	520	5	5	5	1			509	GS 833	Flowing water; two downstream entrance on banks of Gordon River; upstream endin a tight day-light hole; massive formation in roof at one place; passages 5-10 m wide; 7 day-light holes; wetas, harvest men, millipedes, spiders, beetles present.
	NR2	"		15	6	20	6	10	15- 20		511	GS 834	Entrance at high river level, large overhang with chambers.
GO	RDO	N TI	RAI	NSE	CTS								Sheet 10 of 11
CGT		[**	_	5+	1.5	3	1.5	3		K810-	3	GS 835	2 branches; narrows inwards. Some stalactites near entrance.
CGT	8	[**	]	5	4	2						GS 836	Sinkhole 450 m up Connelly's Creek. Contains a small cave on cliff face.
CGT1		[**		<u>5</u> 30	0.25	0.25	0.25	0.25				GS 837 GS 838	650 m up Connelly's Creek. 600 m up Connelly's Creek. Creek goes through a tunnel 30 m long parallel to bedding.
MI	NOR	FEA	TU	RES	S - F	RAN]	KLII	N & G	ORD	ON R	IVERS		Sheet 11 of 11
HEC		rid		Joir	nt		Bedo	ding		LIFF HT (m)	HEC		REMARKS
No.	Nur	nber-	Strik	e	Dip	Str	ike	Dip		prox.)	Photo No		
M1	978	3027							0.2	2-0.5	K728-1		valley with Gordon Limestone outcrops.  Imbrian in the background.
M2	984	1024							0.	5-3	K728-2		ion along joints roughly at right angles to ver resulting in cavities 0.7 m high 0.5 m
M3	988	8019	90		90	170	)	28NE	(	).5	K728-3	Solut	ion along joints roughly at right angles to ver causing cavities 0.25 m high, 0.4 m
M4	987	7015							(	).5	K728-4		dissected country.
M5		5012								15	K728-10	Туріс	cal .solution activity.
M6	983	3007								15	K731-4		ion along intersecting joint & bedding as resulting in torn off blocks.
										3.0	K731-6	0.2 ca	avity parallel to a joint.
M7	984							10275					on Limestone overlies the sandstone of
M7 M8		998	38		V90	14:	5	10NE		3	K731-8		er Island Formation.

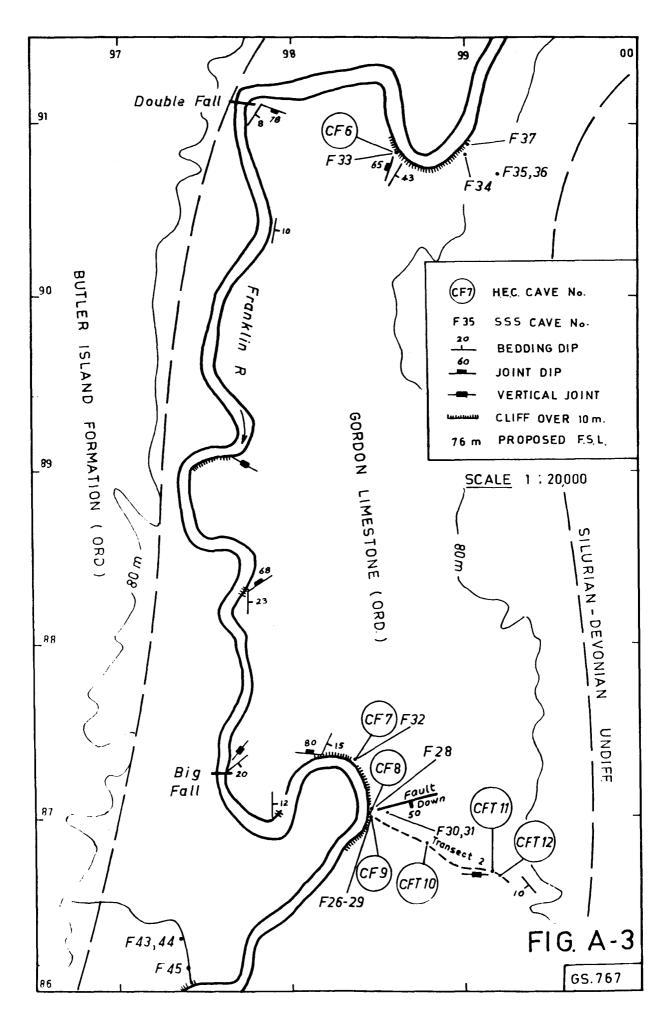
<sup>\*\*</sup> Location omitted – see note on p. 3.



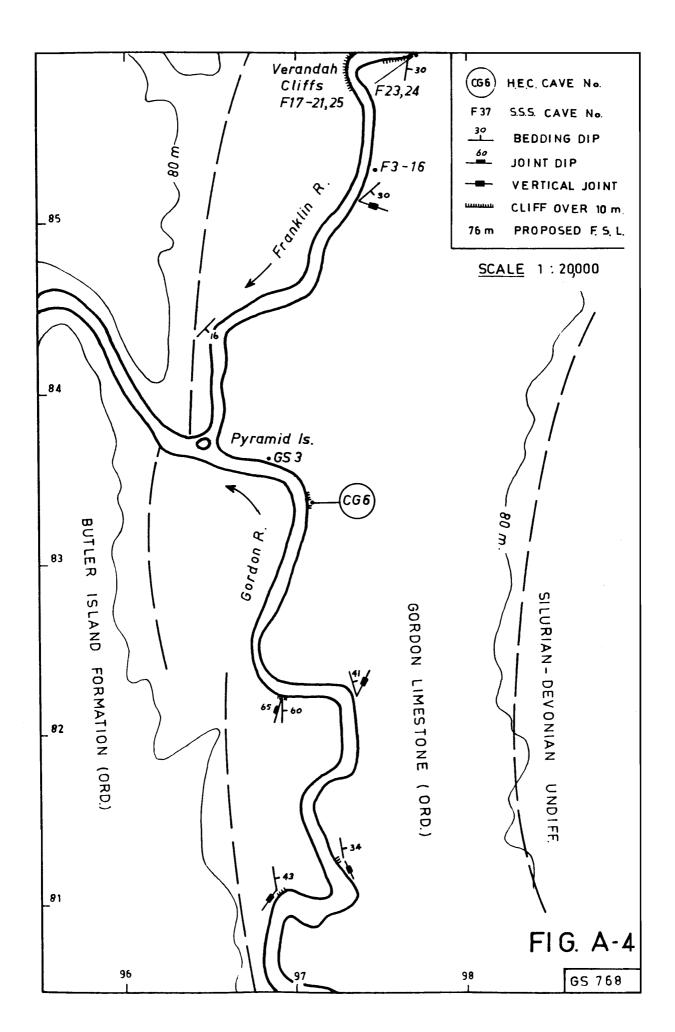
Southern Caver, No. 64, December 2008 – page 25



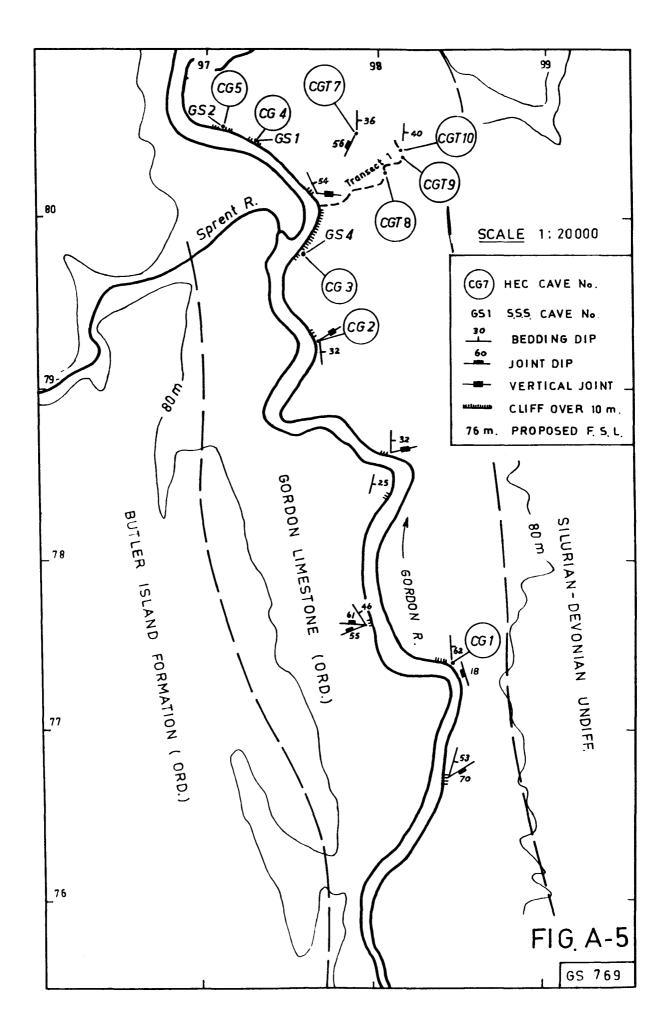
Southern Caver, No. 64, December 2008 - page 26



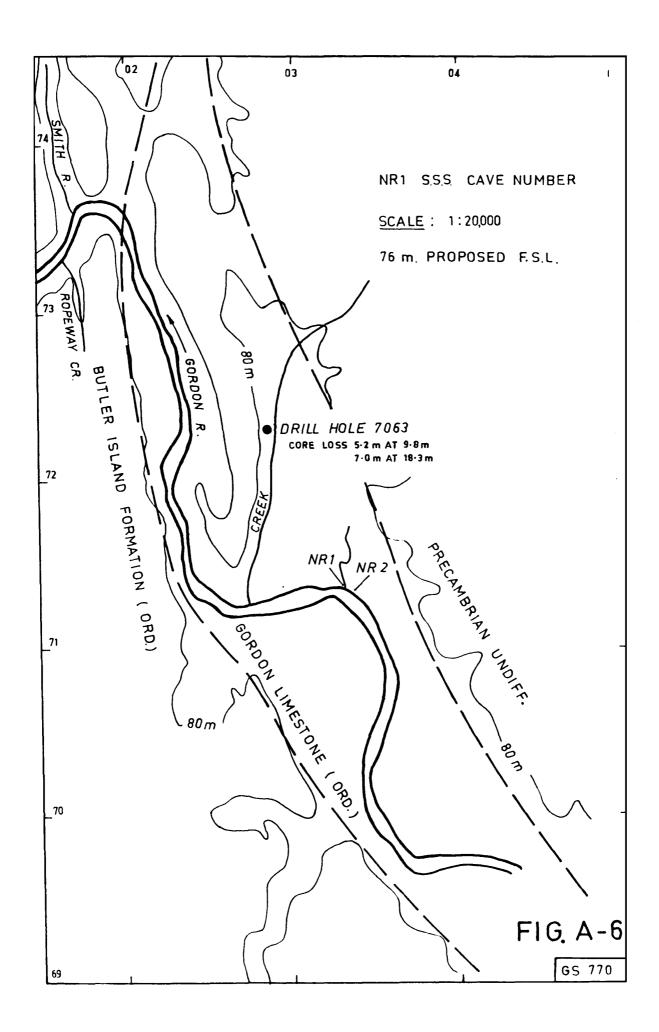
Southern Caver, No. 64, December 2008 - page 27



Southern Caver, No. 64, December 2008 – page 28



Southern Caver, No. 64, December 2008 - page 29

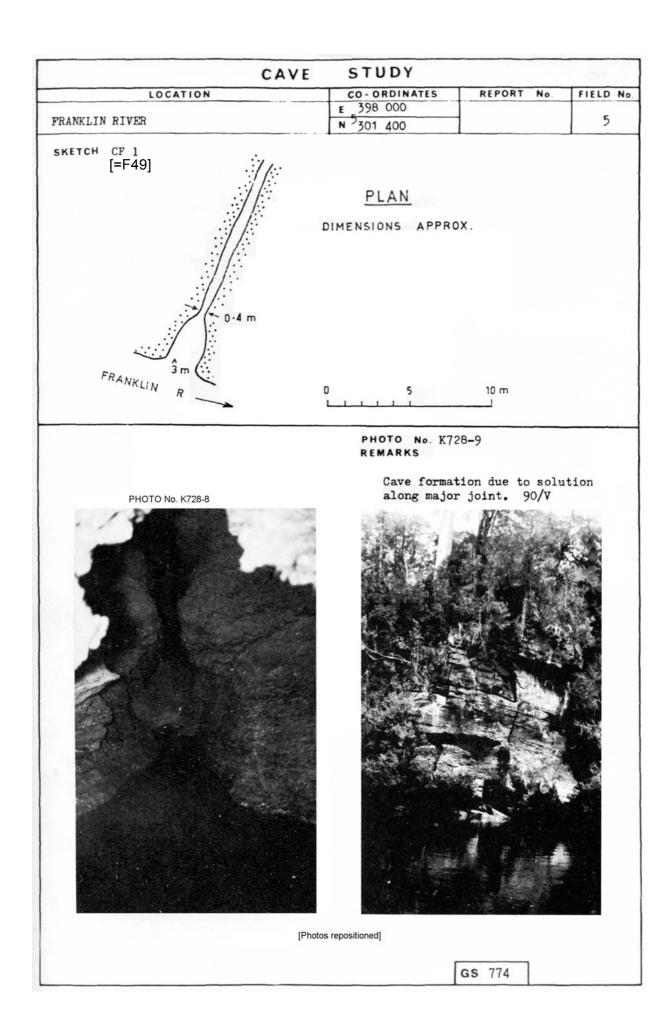


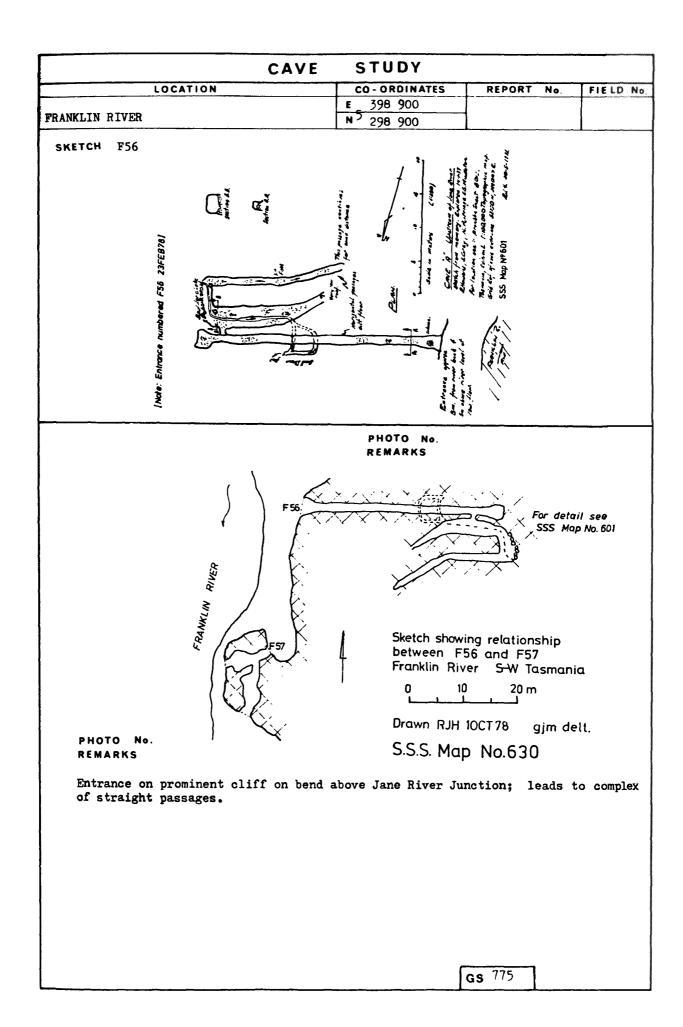
## APPENDIX B

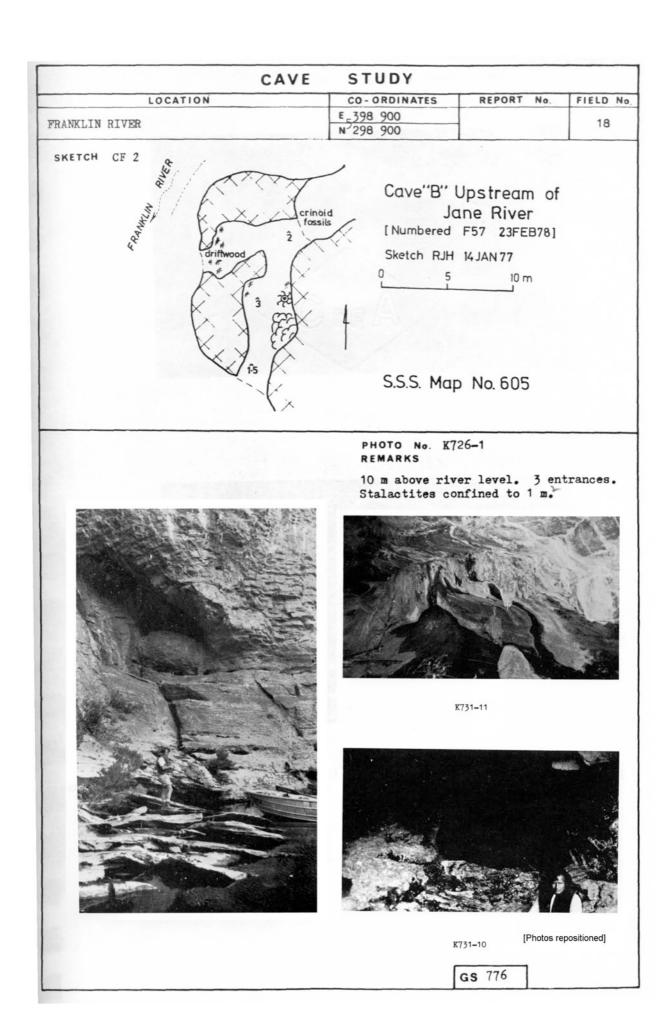
#### Systematic Description of Caves

[NOTE: The cave record forms in this study were numbered GS 774 to GS 838. Those containing no graphical data (map or photo) and those sheets duplicating such data have been omitted from this reprint. Remarks are also recorded on these sheets; these are the same as shown in the 'Remarks' column in Appendix A. Omitted records are:

GS No.	Cave No.	Note
GS 786	F36	
GS 790	F30	
GS 791	F31	
GS 793	F27	
GS 796	F44	Same map as on GS 795 (F43)
GS 797	F45	
GS 798	F23	
GS 801	F17	
GS 803	F19	
GS 807	F13	Same map as on GS806 (F16 – also F4, 5, 6, 7, 8, 10, 12, 13,
CC 000	ГО	14, 16)
GS 808	F8	00000 111 50 40 40 111 1
GS 809	F10	Same map as on GS806 – with F8-13-16 omitted
GS 810	F14	н
GS 811	F7	"
GS 812	F6	II
GS 813	F5	m .
GS 814	F4	"
GS 815	F12	"
GS 817	F11	Same map as on GS 816
GS 818	F9	II
GS 819	F3	"
GS 820	CFT15	
GS 826	GS3	
00000		







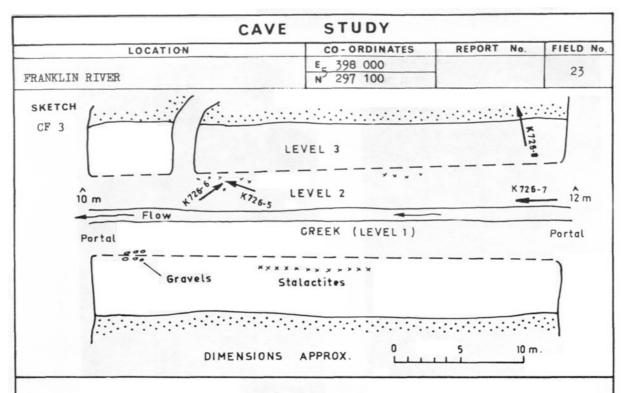




PHOTO No. K726-5 REMARKS

100 m west of H.E.C. hut near Flat Island, possibly 3 levels creek flowing through present level 1. Abundant decorations.

GS 777

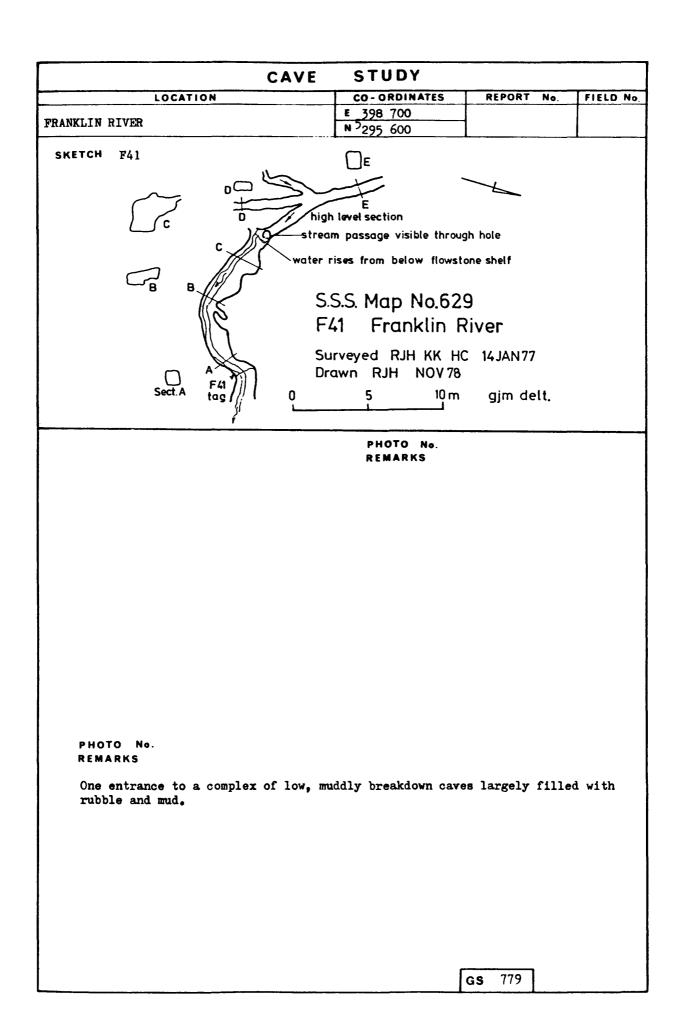
	CAVE STUD	Y	
LOCATION	CO-ORD		No. FIELD N
TO LOWER TWO DESIGNATION	E 398 50		26
FRANKLIN RIVER	N <sup>3</sup> 296 10	0	26
SKETCH CF 4	F42 Franklin Riv South-West Tasman SSS Map Nº 600		
Take	Pon Pon Sect.	₫.	

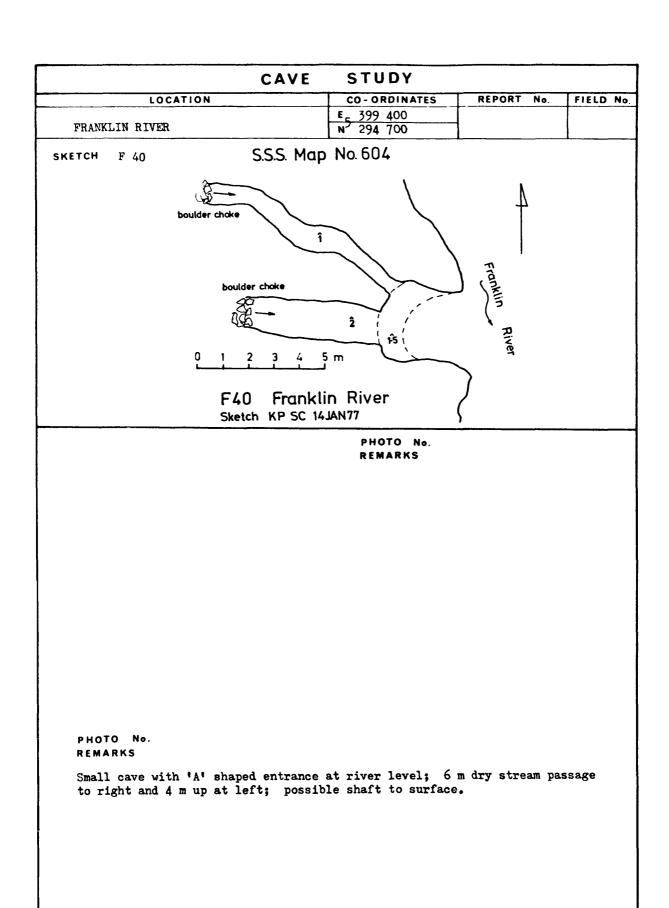


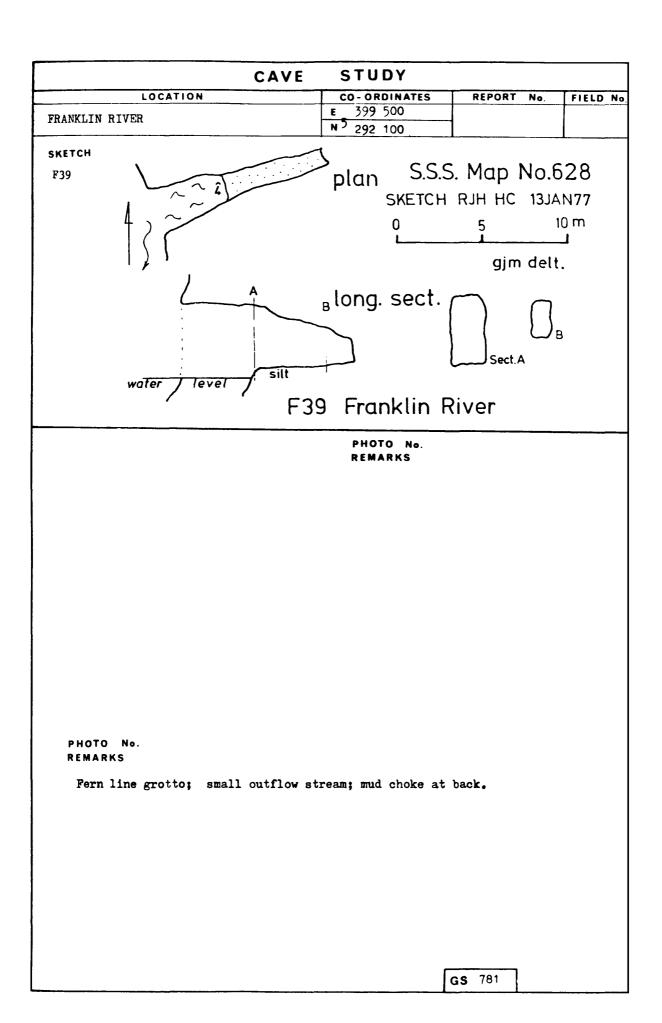
PHOTO No. K726-9 REMARKS

Cave formation due to solution along major joint 215/38W. Entrance just above River level; 3 m wide at entrance reduces to 60 cm 10 m in.

GS 778





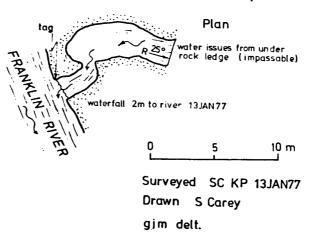


	CAVE	STUDY			
LOCATION		CO-ORDINATES	REPORT	No.	FIELD No.
FRANKLIN RIVER		E 5399 500 N 292 000			36

SKETCH

CF 5

## F38 S.S.S. Map No.631



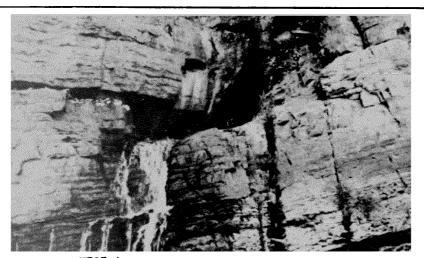


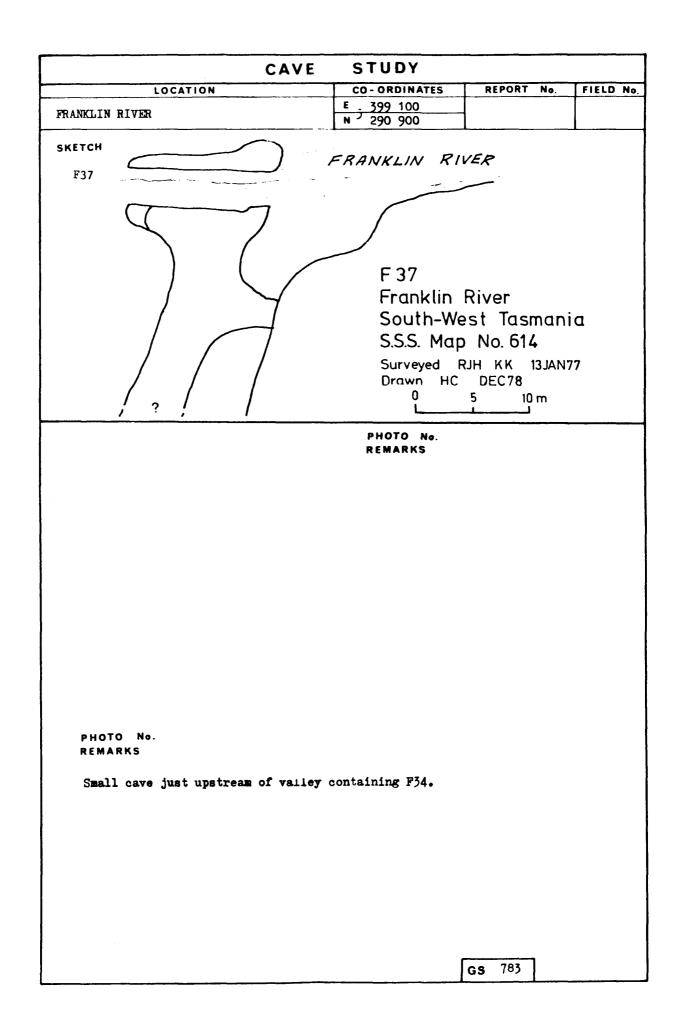
PHOTO No. K727-1 REMARKS

\*S\* shaped passage 2 m in diameter, leading to sump 10 m in.

NB Above photo has been flipped horizontally; cf. K727-2



[Photo repositioned]



	CAVE	STUDY		
LOCATION		CO-ORDINATES	REPORT No.	FIELD No
FRANKLIN RIVER		E_ 399 000		
FRANKLIN KIVER		N <sup>2</sup> 290 800	1	

SKETCH F34

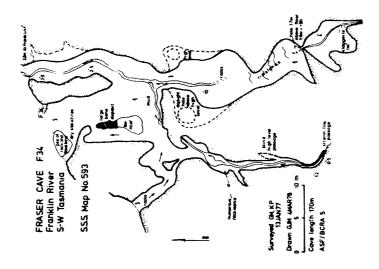


PHOTO No.

PHOTO No. REMARKS

170 m long cave with stream passage, dry formation section and large bone deposit; also has lower (stream outflow) entrance into same valley (neither tagged). F34 is some 32 m back from Franklin River; invertebrates.

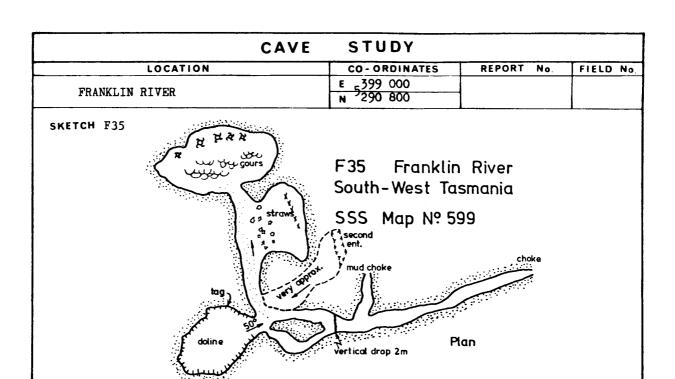
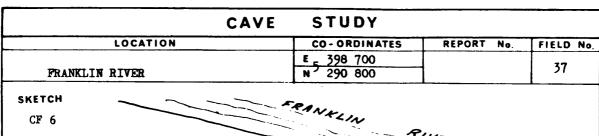
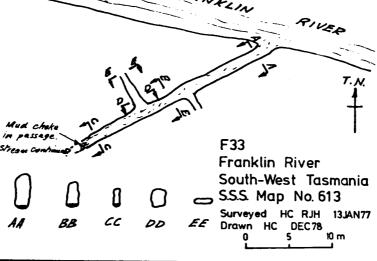


PHOTO No.

PHOTO No. REMARKS

Hole, 3 m down to chamber, mainly straws; 200 m beyond F34 along same dry valley. Second entrance.





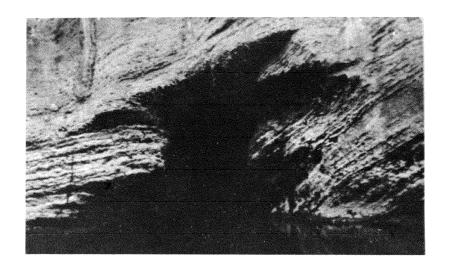
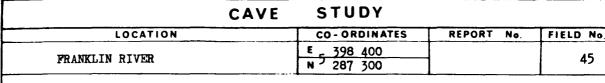
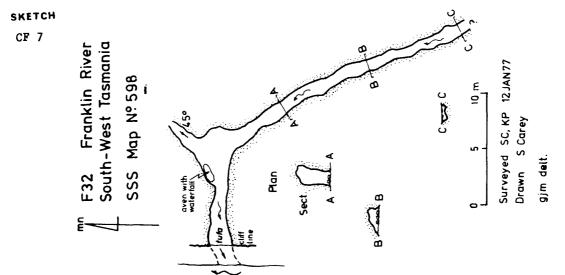


PHOTO No. K727-3

Cave formation due to solution along the major joint. Flowing water.





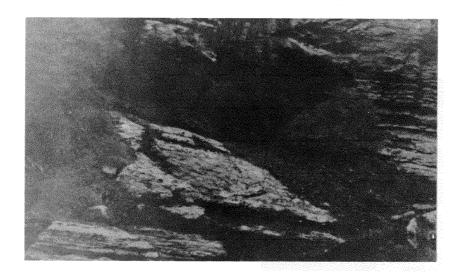


PHOTO No. K727-5 REMARKS

Cave is 1 m above river level; tufa deposit below entrance.

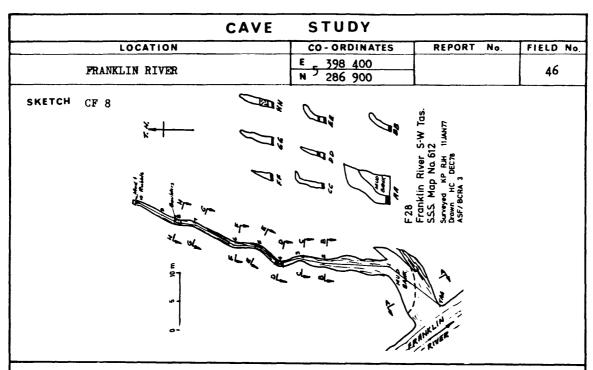
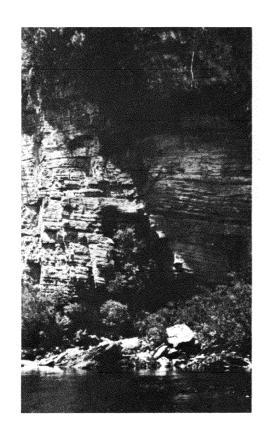
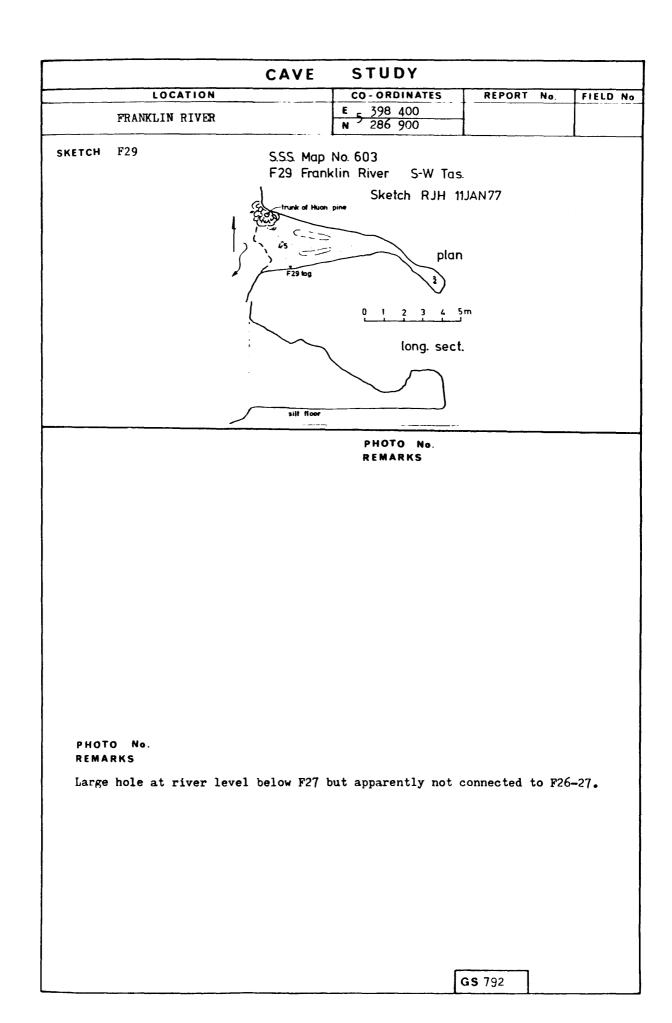


PHOTO No. K727-6 REMARKS

Consists of 2 branches, could be in 2 levels. Cave due to solution along a major joint 215/90.





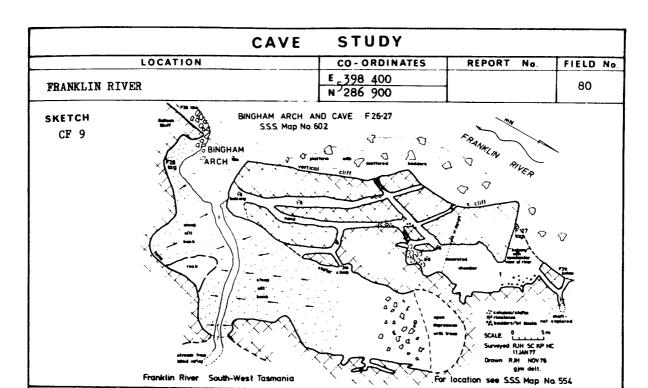
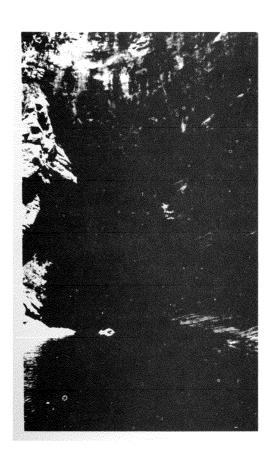


PHOTO No. K727-7 REMARKS

Creek flows through to join Franklin River; high level passage system leads to F27.



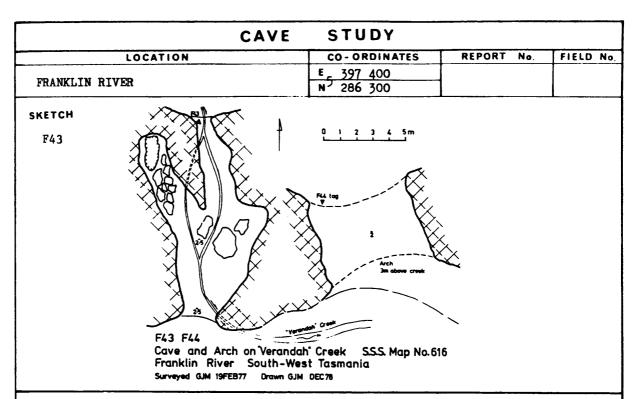
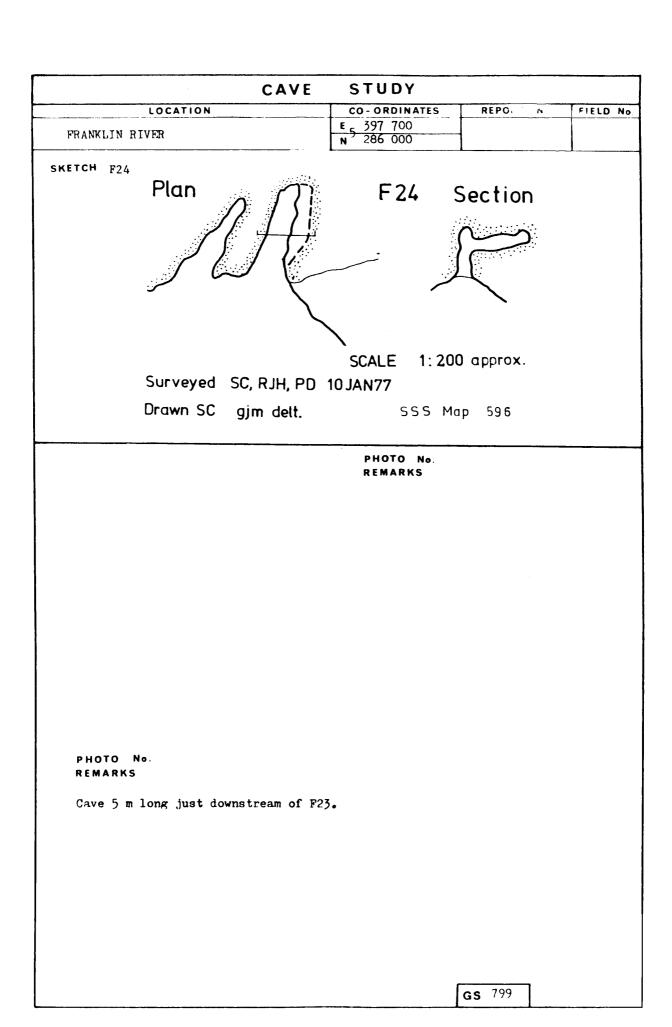


PHOTO No.

PHOTO No. REMARKS

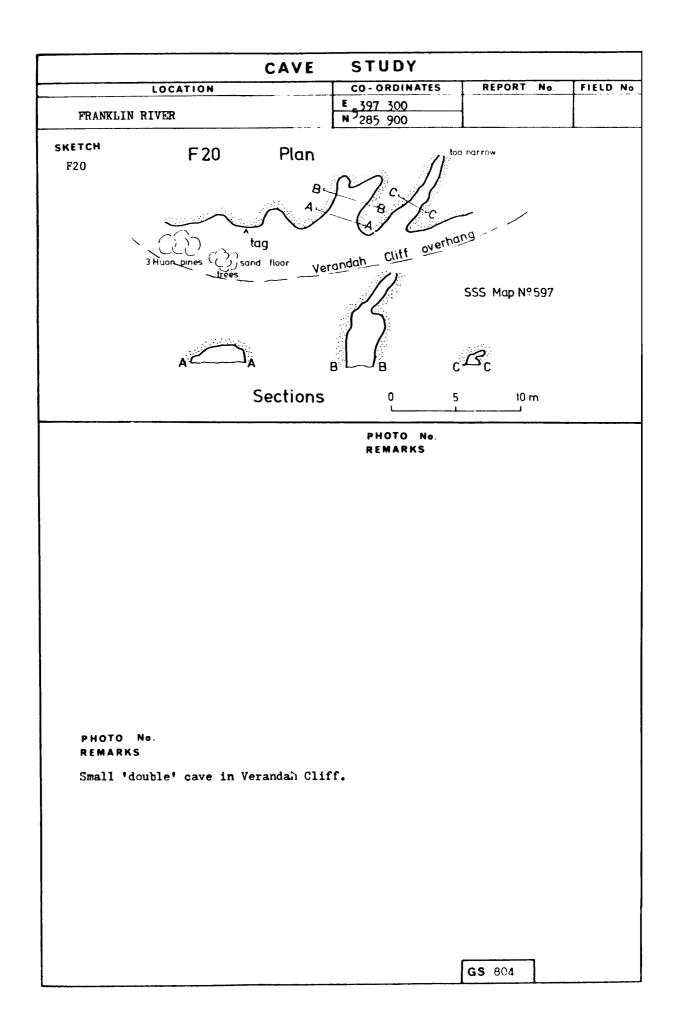
Upstream entrance to cave below arch (F44) on 'Verandah Creek'.

Record applies also to F44 (GS 796) Remark: Classic arch at centre on left bank of 'Verandah Creek'. – Ed.

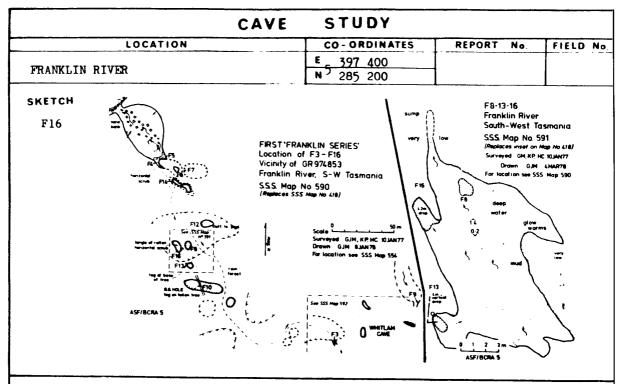


	CAVE	STUDY		
LOCATION		CO-ORDINATES	REPOR	No FIELD
FRANKLIN RIVER		E 397 300 N 285 900	-	ı
SKETCH F25		1 207 700		
	F 25	Plan		
	Section			
	6			
	S.S.S. Map. 5: SCALE 1:	200 approx.		
		PHOTO No. Remarks		
		REMARKS	•	
PHOTO No. Remarks				
Cave at downstream end	of Verandah C	liff.		
		_		
		Г	GS 800	

	11 - 1		
CAVE	STUDY		
LOCATION	CO-ORDINATES	REPORT No.	FIELD No.
FRANKLIN RIVER	E 397 300 N 5285 900	1	
SKETCH F18		<b>1</b>	_ <del></del>
<b>3.12</b> - 3.12			
_			
F18	Pla	ın	
	7	•	
	<i>3</i> (		
	<b>.</b>		
	S.S.S. Map 59	16	
SCALE 1: 200	O approx.		
	PHOTO No. Remarks		
	14 # 111 ha 11 1 1 #		
PHOTO No. Remarks			
Small cave near F17.			
Small cave near rile			
	r	<b>GS</b> 802	
	i	GS 002	



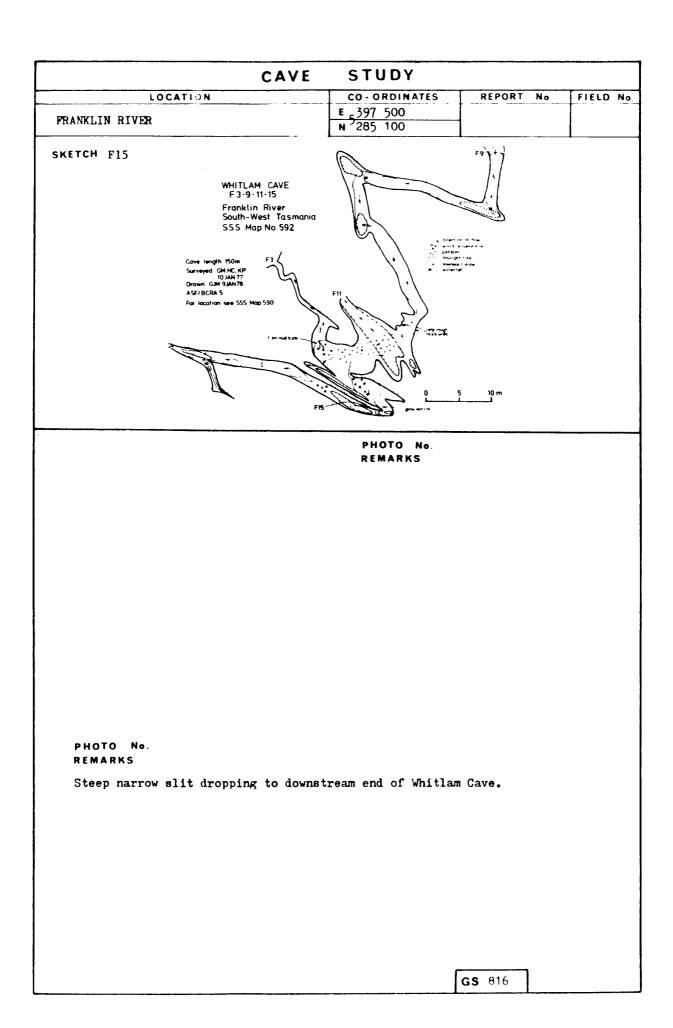
		,	
CAVE	STUDY		
LOCATION	CO - ORDINATES	REPORT No.	FIELD No.
FRANKLIN RIVER	E 5397 300 N 285 900	1	
	N 1285 900	<u> </u>	<u> </u>
SKETCH F21			
F Sect	21		
•	<b>一·</b>		
C4			
26C1	ion / /		
555 Map 596.			
SCALE	1: 200		
SOME			
	PHOTO No.		
	REMARKS		
рното No.			
PHOTO NO. REMARKS			
Small, steeply inclined slot in dry	valley hehind Vers	ndah Cliff.	
Small, steeply inclined stor in dry	teriel centur term	VIIII	
	ſ	205	
		<b>GS</b> 805	



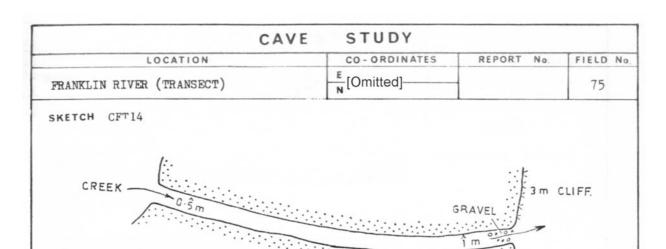
## PHOTO No. Remarks

## PHOTO No. REMARKS

Steep but easily climbed entrance to F8-13-16 system; doline filled with horizontal scrub and fallen trees.



	CAVE	STUDY		
LOCATION		CO-ORDINATES	REPORT No	FIELD No.
FRANKLIN RIVER (TRANSECT)		[Omitted]		74
SKETCH CFT13				
		PL	. <u>A N</u>	
			NS APPROX.	
<i>:</i>				
·	Am Dry			
	reek			
		0 5	10 m .	
		<u> </u>	<u></u>	
		PHOTO No.		
		REMARKS		
PHOTO No. Remarks				
60 m up transect 3A, ca	ve parallel	to the major joint	180/V which cau	sed it.
•				
		<b>-</b>		
			GS <sup>821</sup>	



PLAN

DIMENSIONS APPROX.

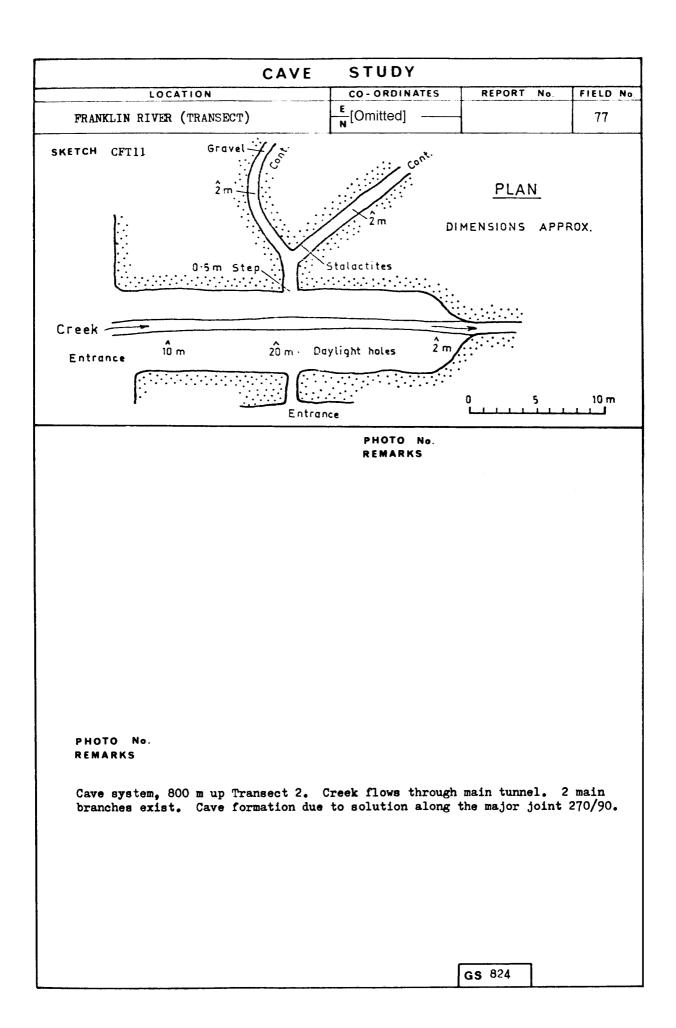




PHOTO No. K810-2

End of transect 3A, creek comes out of a tunnel. Another sink-hole 200 m up the hill is dry, running water.

TOCATION CO-ORDINATES REPORT No.  FRANKLIN RIVER (TRANSECT)  E [Omitted]  PLAN  PLAN  DIMENSIONS AF  CREEK  0 1 2 3 4 5m	FIELD No.
SKETCH CFT10  PLAN  DIMENSIONS AF  CREEK	L
DIMENSIONS AF	·
2 m CREEK	
	PPROX.
[;: :: : : : : : : : : : : : : : : : : :	
0 1 2 3 4 5m	
PHOTO No. Remarks	
PHOTO No. REMARKS	
350 m up transect 2; creek goes through a tunnel.	
G\$823	



		CAVE	STUDY		
	LOCATION		CO-ORDINATES	REPORT No.	FIELD No
FRANKI	IN RIVER (TRANS	ECT)	E Omitted]	1	78
SKETCH	CFT12			PLAN	
			DIM	ENSIONS APPRO	ox.
	<b>l</b> :.		Stalactites \ Davi	ight hole	
	<u> </u>	<u> </u>		<i>∷</i> ∵	
-		3 m	***************************************	Creek	
				H	
			0	5	10 m
			PHOTO No.		
			REMARKS		
	TO No.				
REM	ARKS				
850	m up transect 2	creek disappe	ars into a tunnel.	Stalactites con	nfined
to 3	ш.				
				GS 825	

GORDON RIVER  SKETCH CG6  PLAN  DIMENSIONS APPROX.	CO-ORDINATE E N  20 m  Dry cav		FIELD N
SKETCH CG6 PLAN	20 m Dry cav	ity	69
PLAN	20 m Dry cav	ity	
PLAN		ity	
<del></del>		ity	
<del></del>			
DIMENSIONS APPROX.			
	:.) (' · · :		
	Flov	w	
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	::\ \:\:		
	2000011 14	0	10 m
4	GORDON K	لللنبللا	
	PHOTO No		
	REMARKS		
PHOTO No. REMARKS			
REMARKO			
	flows through part of	the cave leaving	the
A creek coming from a cavern	the cumface		
A creek coming from a cavern remainder dry. Cave open at	one Suriace.		
A creek coming from a cavern remainder dry. Cave open at	one Suriace.		
A creek coming from a cavern remainder dry. Cave open at	ene surlace.		
A creek coming from a cavern remainder dry. Cave open at	one surlace.		
A creek coming from a cavern remainder dry. Cave open at	one surface.		
A creek coming from a cavern remainder dry. Cave open at	one surface.		
A creek coming from a cavern remainder dry. Cave open at	one surface.		
A creek coming from a cavern remainder dry. Cave open at	one surrace.		
A creek coming from a cavern remainder dry. Cave open at	one surface.		
A creek coming from a cavern remainder dry. Cave open at	one surface.		

CAVE	STUDY		
LOCATION	CO-ORDINATES	REPORT No.	FIELD No.
GODDON DIVINO	E_ 397 100		64
GORDON RIVER	N <sup>)</sup> 280 500	1	64

SKETCH CG5



PHOTO No. K761-10 REMARKS

Cave is mostly under water.

CO-ORDINATES E_397 300 N 280 400	REPORT No.	FIELD N
E _397 300	1	
N 280 400	<u></u>	63
Angel Clip		
	GORDON RIVE.  300m down streum j  ingel Clift	GORDON RIVER  300m down stream from ringe! Clift

PHOTO No. REMARKS

PHOTO No. REMARKS

Cave situated 300 m downstream from Angel Cliff.

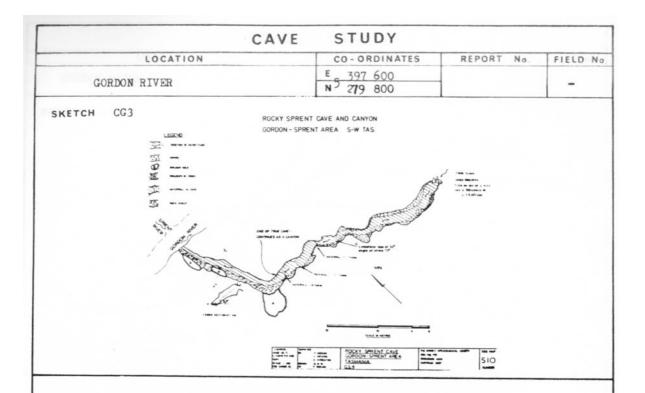
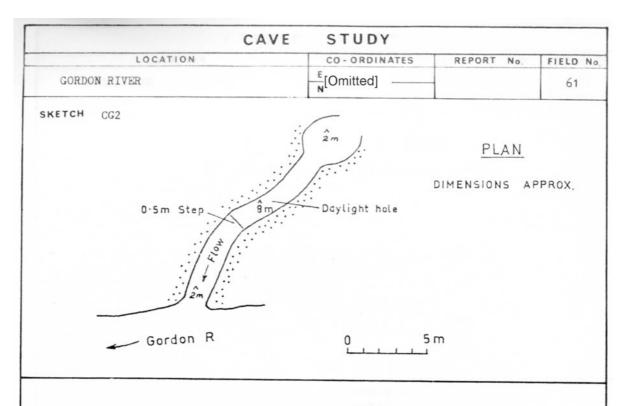




PHOTO No. K761-5 REMARKS

At the junction of the Sprent River. Cave for the first 30 m, then canyon for 60 m, 3 day light holes in the cave floor inclined at about 52° parallel to bedding. The canyon cuts across bedding at first, then meanders.



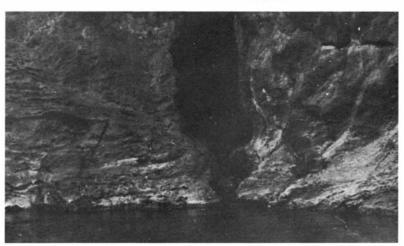


PHOTO No.K761-3 REMARKS

A cavity 2 m high, 3 m wide exists towards the end; opening at the top; creek flowing through cave. Cave floor rises 0.5 about 5 m in from the portal. Flowing water.

	CAVE	STUDY	T 05007 "	Teres -
LOCATION		CO-ORDINATES	REPORT No.	FIELD No.
GORDON RIVER		[Omitted]	1	57
SKETCH CG1				
	<b>(</b> :.	PLAN	<u>1</u>	
/:-	\	DIMENSIONS		
:	\	DIMENSIONS	Α	
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•	$\hat{\beta}_m$	منننن		
:: <u>::</u> :	$\vdots$			
	Gordon F	<b>?</b> 0	5m 	
	<b>G G G G</b>			
		PHOTO No. Remarks		
PHOTO No.				
REMARKS				
Cave parallel to the major bedding. Flowing water.	r joint 165	5/18 W. Also cavit	ies 1 m/2 m par	allel to
bedding. Flowing water.				
			GS 832	

CAVE	STUDY		
LOCATION	CO-ORDINATES	REPORT No.	FIELD No
GORDON RIVER	E <sub>5</sub> 403 300 N 271 300		
SKETCH NR1			
	PHOTO No.		
	REMARKS		
PHOTO No. Remarks			
Flowing water; two downstream entrends in a tight daylight-hole; mas passages 5 - 10 m wide; 7 day-ligh spiders, beetles present.	sive formation in re	of at one place	9 ;
spiders, seeries presents.			

