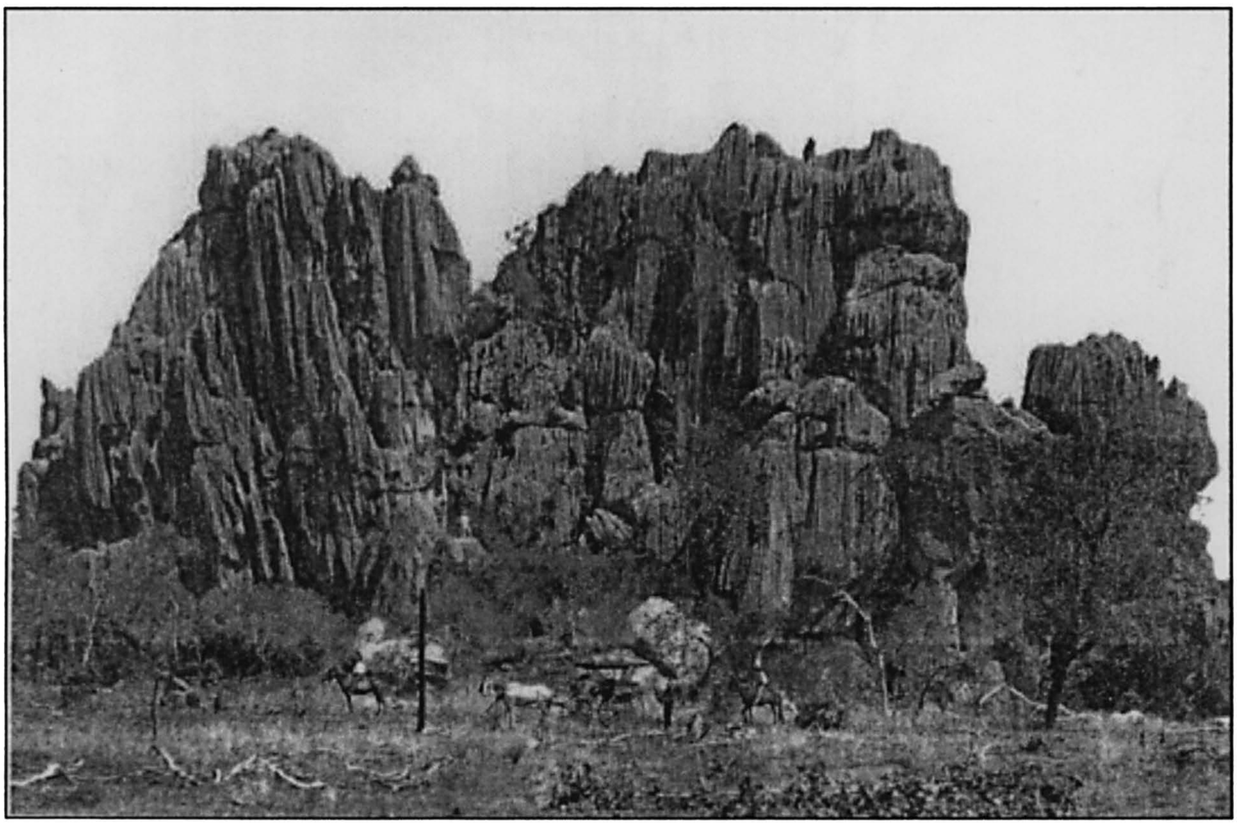
28th Biennial Conference of the Australian Speleological Federation

CHILLICON

2011 ASF Conference

17th to 22nd April 2011

Conference Handbook



An early photograph taken by Livesley (photographer from Herberton)

CHILLICON CONFERENCE HANDBOOK
for the 28th Biennial Conference of the Australian Speleological Federation, Chillagoe, 7-22nd April 2011.

Compiled by Les Pearson
With assistance from Alan Cummins

Photos by compiler unless indicated otherwise

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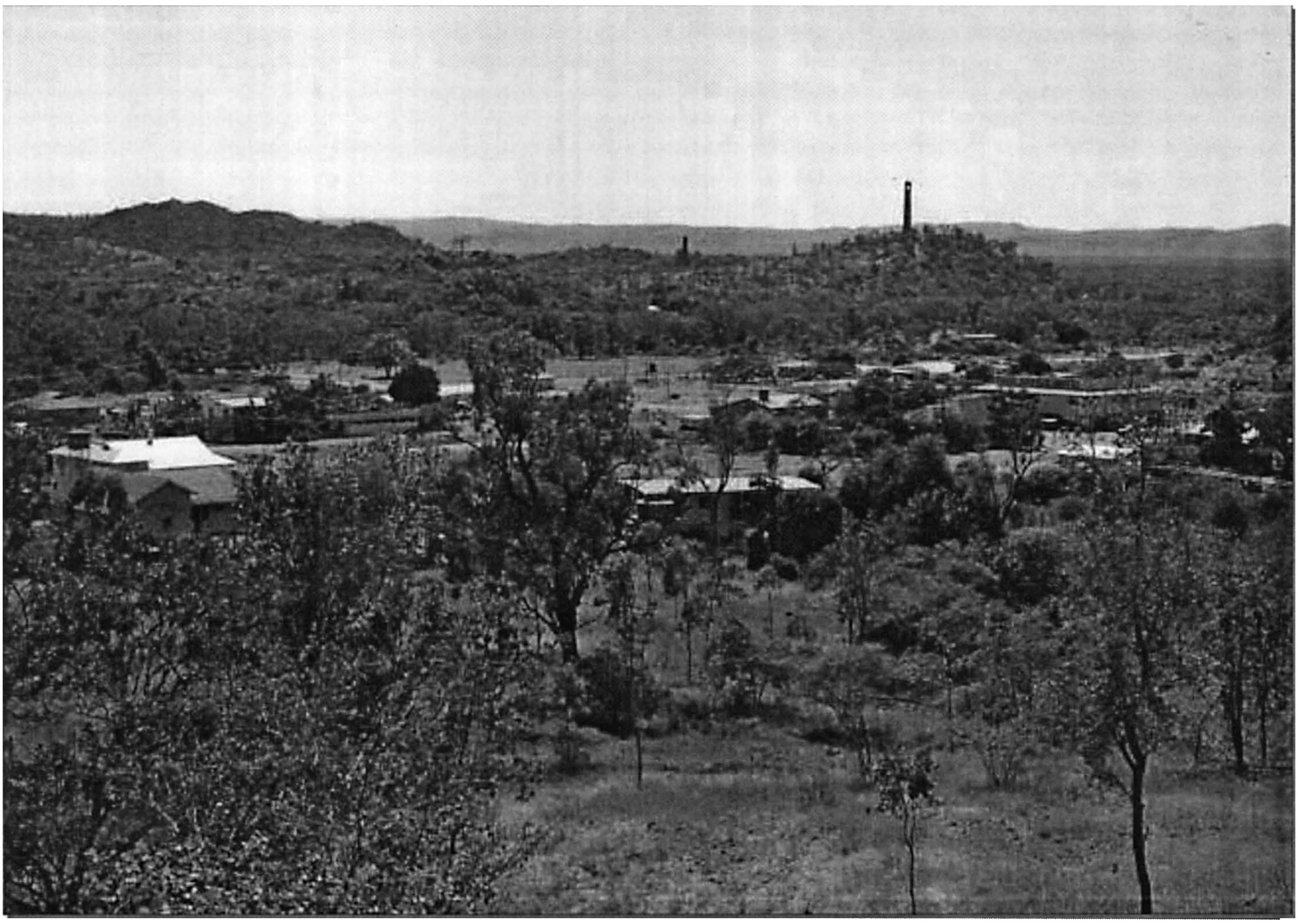


Chillagoe township from hillside above CCC Clubhouse

Warning to Conference Delegates - Mosquitos are bad. Suggest you bring mosquito net and insect repellant.

CONFERENCE PROGRAM

Sunday	12 noon	Registration	Peter Bannink	Clubhouse
	6.00 pm	Barbecue	SES	Clubhouse
Monday	8.00 am	Registration	Peter Bannink	Town Hall
	8.45 am	Welcome and Housekeeping	Alan Cummins	
	9.00 am	Official Opening	Tom Gilmore	
	9.30 am	Opening Speaker: Humans and Karst	Emil Silverstru	
	9.50 am	Questions	Winfried Weiss	
	10.05 am	Morning Tea		Town Hall
	10.35 am	Chillagoe geological history and karst development	John Nethery	
	11.20 am	Cave Survey	Brad Erkhe	
	12 noon	Lunch		Town Hall
	1.30 pm	Cave tours	QPWS	
		Historical tour	Mary Bolam	
		SRT	Douglas Irvin	
	3.00 pm	Afternoon Tea		Town Hall
	3.30 pm	Bats and Swiftlets in the Chillagoe Caves	Lana Little	
	4.00 pm	Questions	Winfried Weiss	
	4.15 pm	Quest for the Mole Creek master cave	Nic Haygarth	
	4.40 pm	Questions	Winfried Weiss	
	5.00 pm	Break for dinner		
	7.00 pm	DVD/slide show	Paul Osbourne	
Tuesday	8.00 am	Registration	Peter Bannink	Town Hall
	9.00 am	Cave science Shri Lanka	Penney Osbourne	
	9.30 am	Questions	Winfried Weiss	
	9.45 am	The thin edge of utilitarianism	Nic Haygarth	
	10.05 am	Questions	Winfried Weiss	
	10.15 am	Morning Tea		Town Hall
	10.30 am	Cave tours - Royal Arch	QPWS	
		Fossil tours	Mary Bolam	
		Rope walking	Tom Porritt	
	11.30 am	Should ASF host an International Caving Conference	Jim Crockett	
		Discussion Chairman	Nicholas White	
	12 noon	Lunch		Town Hall
	1.30 pm	Swiftlets survive and thrive in the caves of the South Pacific	Mike Tarburton	
	2.00 pm	Questions	Winfried Weiss	
	2.20 pm	A history of caving in Chillagoe	Les Pearson	
		Questions	Winfried Weiss	
	2.45 pm	Lava caves of Hawaii	Nicholas White	
		Questions	Winfried Weiss	
	3.15 pm	Afternoon tea		Town Hall
	3.45 pm	Paleokarst - an alternative view	Emil Silverstru	
	4.15 pm	Questions	Winfried Weiss	
	4.30 pm	Karst in Mid-Proterozoic dolomite, Pungalina Station, NT	Susan White	
		Questions	Winfried Weiss	
	5.00 pm	Break for dinner		
	7.00 pm	Observatory		
		Night walk		
		Caving		

DURING THE CONFERENCE THERE WILL BE SHOPS/DISPLAYS IN THE PRIMARY SCHOOL BUILDING OPPOSITE CAVING CLUB PREMISES

CONFERENCE PROGRAM (Continued)

Wednesday	8.00 am	Registration	Peter Bannink	Town Hall
	9 00 am	Tham Din Phieng, Thailand: an unusual maze cave in sandstone	John Dunkley	
		Questions	Winfried Weiss	
	9.30 am	Laterite parakarst - Regional mapping - Optimal karst Management	Ken Grimes	
		Questions	Winfreid Weiss	
	10.15 am	Morning tea		Town Hall
	10.45 am	Caves and ruiniform features in sandstones of NT	Ken Grimes	
	11.15 am	Questions	Winfried Weiss	
	11.25 am	A typology of sandstone caves in NSW	John Dunkley	
		Questions	Winfreid Weiss	
	12.30 pm	Lunch		Town hall
	2.00 pm	Speleo sports		)
	Equipment demonstrations		Adventure Equipment	)Clubhouse)
		SRT challenge	Tom Porritt	)Grounds
	3.30 pm	Afternoon tea		) |
	7.30 pm	Caveman's dinner	Caterer (Andy)	(Up Behind (Clubhouse
Thursday	9.00 am	Registration	Peter Bannink	Town Hall
	10.00 am	Morning tea		Town Hall
	10.30 am	Karst on Vancouver Island, BC Canada	Emil Silverstru	
	11.00 am	Questions	Winfried Weiss	
	11.10 am	Microkarren - Regolith Mapping	Ken Grimes	
	11.30 am	Questions	Winfreid Weiss	
	11.35 am	Fossils in the Chillagoe area	Gilbert Price	
		Questions	Winfried Weiss	
	12.30 pm	Lunch		Town Hall
	2.00 pm	Cave Tours - Donna & Trezkinn	QPWS	
		Historical tours	Mary Bolam	
	3.30 pm	Afternoon tea		Town Hall
	4.00 pm	The terminology of karst, pseudokarst and Ruiniform Landscapes	Ken Grimes	
		Questions	Winfried Weiss	
	4.25 pm	Fossils from the Chillagoe caves	Jonathon Cramb	
	5.00 pm	Break for dinner		
	7.00 pm	Photo Judging, auction, trivia & social	(Greg Thompson (John Dunkley (Douglas Irvin	
Friday	9.00 am	Registration	Peter Bannink	Town Hall
	9.30 am	Karst features and remnant dune systems on the Nullabor Plain	Shannon Burnett	
		Questions	Winfried Weiss	
	10.00 am	Silverfish in Australian Caves	Graeme Smith	
		Questions	Winfried Weiss	
	10.30 am	Morning tea		Town Hall
	10.45 am	Closing session		

11.30 am	ASF Council Meeting		Town Hall

Caving Areas in Far North Queensland

The Far North Queensland area, while not being richly endowed with caves, does have some significant areas of limestone, volcanic, granite, sandstone and sea caves.

Limestone: the most significant area is the limestone belt along the Palmer Fault from near **Almaden** to Chillagoe, **Mungana, Rookwood** areas then again from **Bellevue** through **Mt Mulgrave** to **Palmerville** and some 20 km north of the Palmer River.
In this area in addition to pediment areas the limestone karst frequently stands high above the plain showing very sharp and rugged features. Caves develop both under and above the ground line.
The next most extensive area is at **Broken River** and **Pandanus Creek**south west of Greenvale. Here the outcrops, while extensive, are not so tall above ground and caves seem to follow more closely the jointing patterns. There is a small area possibly related to the Broken River Karst at **Christmas Creek** southeast of Greenvale. Here the caves seem to be more like those at Chillagoe, but much smaller in extent. CCC is treating this area as being separate from Broken River as, while part of the same formation, it is sufficiently distant and different to Broken River area to be considered as a separate area.
There are a number of small limestone outcrops which include, near **Mt Garnet**, **Bartle Frere**, **Mulgrave River** (near Little Mulgrave River junction), **Mt Peter** (near Gordonvale), **Mt Consider** (near Mt Molloy), **Mobray River** (close to Pt Douglas) and **Kings Plains** (towards Cooktown). Of these the only ones with significant caves is Mt Consider which is being actively mined for limestone and the known caves may soon exist only on Club records. Some half a dozen small caves were tagged on Kings Plains limestone.

Volcanic: The Great Dividing Range from Cape York to Victoria has a series of Volcanic Provinces and a number of these have lava caves which are remnants of lava tubes associated with the eruptions of basalt. In the Far Northern region there are **Atherton, McBride, and Chudleigh Provinces,** all of which have recorded lava caves. There is also the small province of Walleroo on the Herbert River which has not been investigated. Of these Provinces the most significant lava caves appear to be those of Undara eruption on McBride Province. In that Province there are some 90 recorded caves while at Atherton Province only two have yet been recorded. (Scrubby Creek and Palmerston Highway)

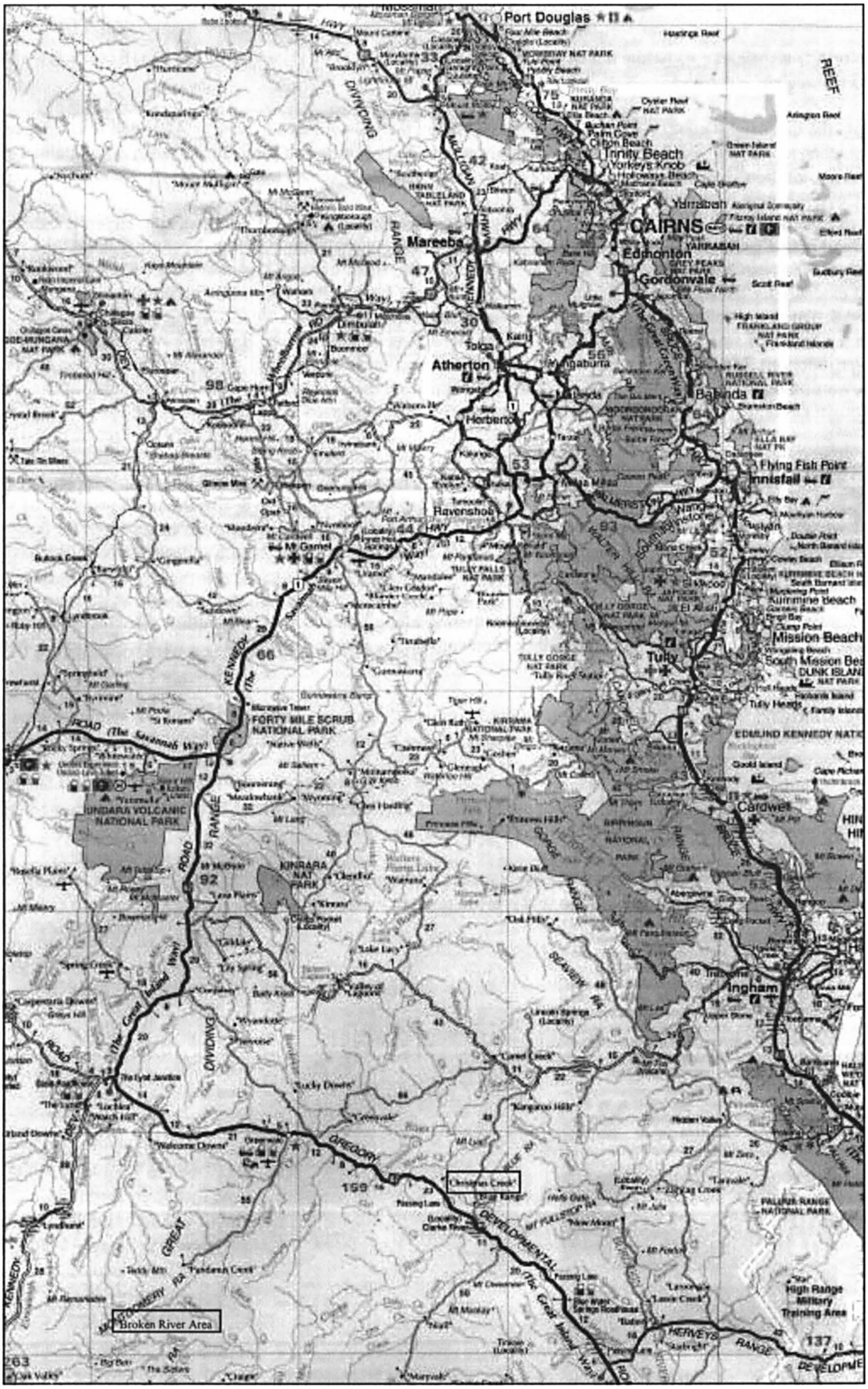
Granite: Caves in granite appear to be caused by weathering along joints to form a boulder pile. Numerous boulder caves exist on Bartle Frere but only one has been recorded. Black Mountain on the way to Cooktown is a massive boulder pile and is probably one large interconnected cave system.

Sandstone: Extensive areas of sandstone occur in the Laura area which have become famous for the aboriginal art that some caves and overhangs contain. No systematic cave recording is known to have occurred in this area although Percy Trezise has recorded much of the cave art.

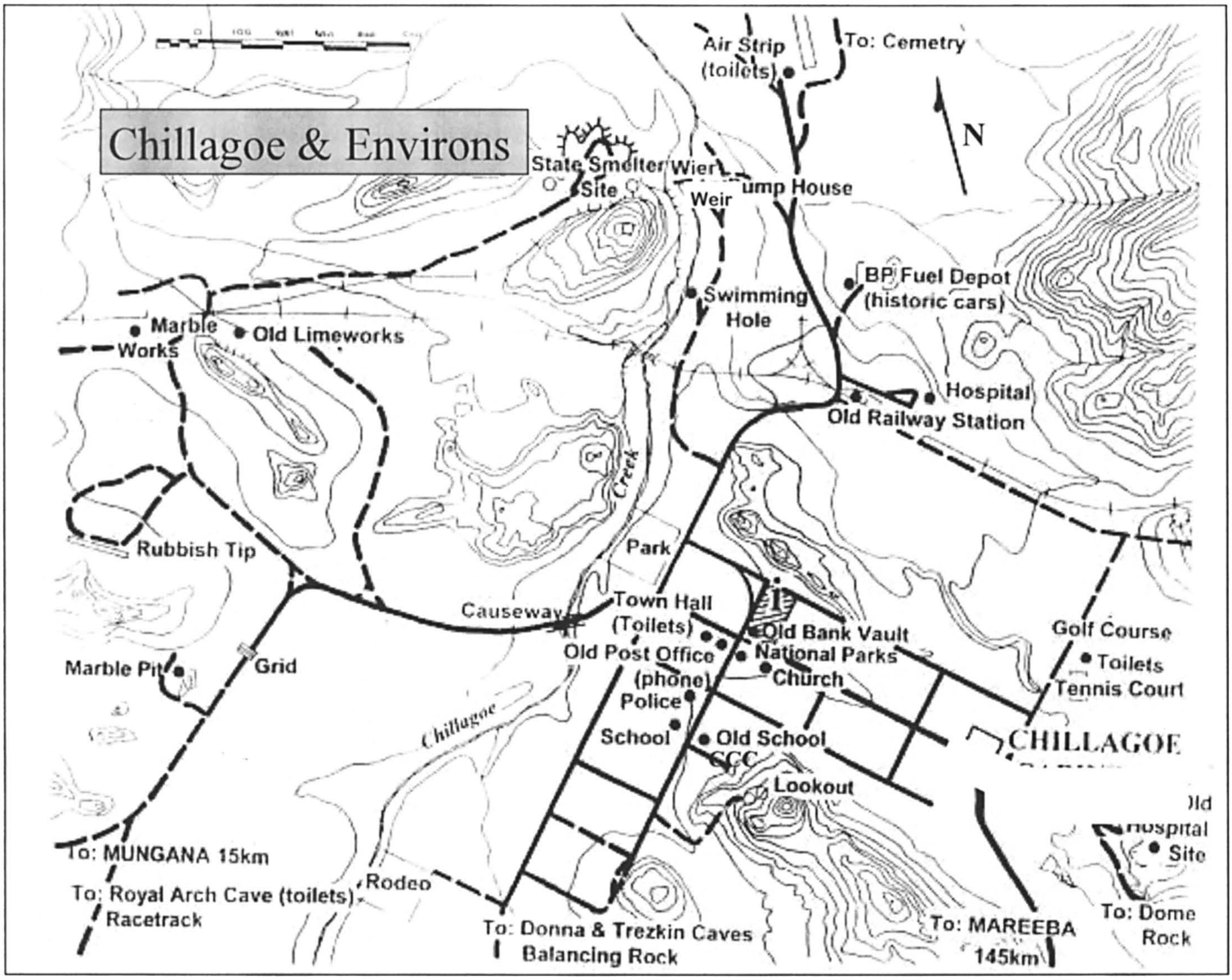
Sea Caves: Sea caves have been recorder on Double Island, off Taylor Point at Trinity Beach, and caves containing swiftlet colonies have been reported on islands off the coast between Cairns and Innisfail.

Pseudo Karst: The old Barron Falls Power Station is perhaps the most significant in the area but access is restricted and in any case is difficult as the power authority have tried to seal it off to prevent visitation.

Hughies Hole - a lava tube cave in the Murronga Lava Flow on Lynwater Station



North Queensland Map showing caving areas



Chillicon Conference Venue

Chillagoe is an old mining town with the remains of a lead/copper smelter that closed down during World War II. Many of its population had enlisted for war service or just moved away seeking work. The town slowed down and there remained a Post Office, two hotels, a Jack & Newell Store, Hospital, Court House and School. At that stage the Aboriginal camp was across Chillagoe Creek. The original airstrip was on the western bank of Chillagoe Creek, but was less than satisfactory due to poor access and also the Smelter chimneys may have been a hazard to aircraft. A cemetery was provided, but its records were not kept for the period 1908 - 1912, apparently the Court House lost responsibility for keeping these records in 1908, when Chillagoe Shire was formed, but the Shire only started recording burials in 1912.

The town remained as a centre for the cattle industry in the area until mining companies returned to investigate the mining potential of the area. The mining teams came and went and eventually Red Dome Mine was established by Elders Resourses in the mid 1980s (after reconstruction of Mungana Mines) who established an open pit mine with heap leaching for recovery of gold. In addition substantial amounts of copper ores were mined and railed to Mt Isa for treatment. The mine had a limited life of about 10 years and closed down - a blow to the town. However further mining investigation confirmed that the area was not exhausted and Kagara Zinc became interested and established an adit to the ore body and currently are transporting zinc and copper ores to Mt Garnet by road for treatment there. Chillagoe prospers while the various mining groups are involved in the area.

Chillagoe has also has 20 or more marble quarries established in the area. Originally limestone/marble was mined, crushed and burnt to yield quicklime for use in the agricultural industry. Subsequently Vince Bellino formed a company to mine and export Chillagoe marble to Italy. While his operation gave employment and a period of prosperity to the town his activities totally ignored any consideration of the environment. When his operation eventually failed he has left some 20 abandoned quarries in the area. The CCC even attended a Mining Warden's Court to stop further quarries being established and to deter his exploration work which involved moving heavy plant driven all over the country with no concern for damage done to the environment and gouging to expose the marble with no thought of restoration. Marble mining has resumed on a smaller scale with several quarries in use. Calcium silicate is also mined for agricultural use.

Mareeba Shire, over a period approaching 30 years, have improved the road between Dimbulah and Chillagoe and except for a few sections between Almaden and Chillagoe have constructed a good bitumen road which has more than halved travel time from Cairns to Chillagoe to less than 3 hours.

Facilities available in Chillagoe are:

Store	Post Office	Chillagoe Tourist Village (Caravan Park)
Hardware Store	The Hub	Chillagoe Guest House
Hotels (2)	Eco Lodge	Chillagoe Cabins
Caravan Parks		BP Fuel Depot

When the original Chillagoe School, built in 1902 was no longer required by the Education Department, who built a new school on a new site, the old school site was acquired by the Chillagoe Caving Club as a base for caving in Chillagoe. Over time the old principal's house has been altered to a Caretakers living quarters and a club house with limited accommodation for cavers. The school building in recent times has bee refurbished, painted and concreted and enclosed underneath. The upper floor is ideal for use by schools, youth groups and other caving groups, going to Chillagoe for caving. To cater for such groups we needed to provide a new toilet and shower block. To complete this by the Conference has proved a daunting task - but it will be ready.

Abstracts for Papers

Beattie, J. W. and Haygarth, N. - The thin edge of utilitianism

In 1914, almost 70 years before Tasmania's Gordon-Below-Franklin Dam Blockade, people power stopped development of the lower Gordon River. The focus of the proposed development was karst — a limestone deposit known as the Marble Cliffs. Its principal defender was Hobart photographer and conservationist John Watt Beattie, who wanted a Gordon River national park. He was not only the most important figure in 19th and early 20th-century Tasmanian tourism but an early champion of its karst and caves. This was recognised in 1918. In the same year that Beattie campaigned for protection of the Hastings Caves, he was appointed to a Caves Advisory Board to assist the government take over the King Solomons and Marakoopa tourist caves.

Burnett[1] S., Webb[1] J.A. and White[1] S. -Karst features and remnant dune systems on the Nullarbor Plain, Australia

[1] Environmental Geoscience Department of Agricultural Science, La Trobe University, Melbourne, VIC 3086, Australia

The Nullarbor Plain covers an area of ~200,000 km², which makes it Australia's largest karst area and one of the world's great karst areas. This semi-arid environment is famous for its low relief, lack of vegetation and lack of surface water. This karst landscape is often considered featureless, but many karst landforms can be found including dolines, blowholes, dongas, relict river courses and caves, which contain a variety of speleothems (Davey et al, 1992; Lowry & Jennings, 1974).

Karst features (blowholes, dolines, shallow and deep caves) are not concentrated along the coastline, with a gradual northwards decline, as previously postulated. Instead they are concentrated in two bands running roughly parallel to the cliffed coast and the Hampton scarp. A ~20km wide coastal band of features is seen only when all karst features are plotted on the one map. However the main band is a larger, higher concentration of predominantly blowholes, dolines and shallow caves between ~50-85km inland in the east and ~45-80km inland in the west. The shallow caves were probably formed by mixing corrosion associated with the seawater/freshwater interface along a Miocene coastline. Any deep caves have been formed by extensive modification by collapse processes.

Blowholes are the most numerous karst feature on the Nullarbor; they have an average density of 0.11/km² in the intensely searched areas, giving possibly ~22,000 for the entire area of the Nullarbor.

References *Davey, A.G., Gray, M. R., Grimes, K.G., Hamilton-Smith, E., James, J.M. and Spate, A.P., 1992, World Heritage significance of karst and other landforms in the Nullarbor region: Canberra, Commonwealth of Australia: Department of the Arts, Sport, the Environment and Territories, 202 p.*

*Lowry, D.C., and Jennings J.N., 1974, The Nullarbor karst Australia: Zeitschrift für Geomorphologie, **v. 18**, p. 35-81.*

Cramb[1,3] Jonathan, Price[2], Gilbert and Hocknull, Scott[1] - Fossils from the Chillagoe Caves

[1] Qld University of Technology
[2] University of Qld
[3] Qld Museum

Scientifically important fossils were first found in the Chillagoe region approximately a century ago during quarrying operations. Since then only a few isolated discoveries have been reported in the technical literature. Noteworthy studies during the twentieth century include the descriptions of Propleopus chillagoensis, Quinkana fortirostrum, and the most easterly record of Chaeropus ecaudatus. Numerous additional samples were collected by palaeontologists and cavers, but only in the past five years has there been any systematic study of the Chillagoe fossils. The majority of samples are small and seem to be relatively young; probably Pleistocene or Holocene in age. However some samples contain several extinct species adapted to arid environments, indicating a drier climate at some point in the past. Radiometric dating of speleptherm from one of these sites suggests a maximum age of 200 000 years for that deposit. This agrees with studies of other cave fossil sites at Broken River and Mount Etna, which contain evidence of a dry climate at that time. Ongoing study of the Chillagoe fossils aoms to date more sites and describe new species.

Consequently, we find that different workers looking at the same area of, say, sandstone caves, might class it as either "karst" or "pseudokarst', or might take a middle road and call it "parakarst". Some of those who class all solutional landforms as karst make a distinction between slow and fast solution and use the adjectives "brady-" and "tachy-", respectively for the two types.

Ruiniform landforms *are erosional features which have a strong structural control by joints, bedding, etc. (e.g. grikefields and stone cities). They occur within karst areas, but are also common on other rocks, especially the sandstones. The important thing is the structural control rather than the erosional process. Thus grikefields should not be considered karst-like, but rather as ruiniform.*

I recommend restricting "karst" to landforms formed by solution of carbonates, and using "parakarst" for solutional landforms on other rocks, with an optional division between "tachy-parakarsts" for features on gypsum or halite, where solution is fast and the dominant process, and "brady-parakarst" for the silicate rocks, where solution is slow, and only partial.

Dunkley John - Tham Din Phieng, Thailand: an unusual maze cave in sandstone

Although about 4,000 caves are now recorded in Thailand, its north-east region has only a few, mostly small and in massive continental sandstones (up to 3,000m thick) of Jurassic to Cretaceous age. Many are nevertheless significant sites locally because of an association with the Buddhist community for centuries. One such, Tham Din Phieng or Tham Si Mongkhon is entered from a doline and developed in a very hard quartz conglomerate sandstone bed in either the Phra Wihan or Phu Phan Formation, Khorat Series, with cave passages typically 1-2m wide, 2-3m high, producing a dense network maze with cross-passages at intervals of 3 to 5 metres and cross-sections suggesting epiphreatic development possibly in a confined aquifer. There are 2 active streams, minor carbonate decoration, and colonies of a species possibly related to arachnocampa sp. A rough survey produced about 500m of passage, but a schematic map above the entrance suggests somewhat more. The cave is significant both for its maze development and its passage length. Some analogous features occur in Phu Hin Rong Kla National Park, 140km to the south-west, but there the bed outcrops at the surface, producing deep karst crevasses.

Dunkley John - A typology of sandstone caves in NSW

Quartz sandstones are found worldwide and caves exist in north-east Thailand, in South Africa (particularly Table Mountain), the renowned quartzite karst of Venezuela and Brazil, and in Arnhem Land, Kimberley, central Queensland and elsewhere. The Permian & Triassic sandstones of the Sydney Basin particularly display a wide range of karst-like landforms such as towers, grikes, bedrock arches, solution basins (kamenitsa), caves and occasional silica or (rarely) carbonate speleothems. Small caves are widespread, many were well-known to the aboriginal community and have been documented since the early years of European settlement. Many do not conform to speleological definitions of a cave but are noteworthy when warranted because of their size or historical or archaeological significance. Often described erroneously as wind-eroded and/or pseudo-karst, most sandstone caves initiate or develop at least partly by processes of dissolution, and are properly regarded as karst features. A largely descriptive and genetic classification is suggested.

Grimes[1], K.G.: Microkarren - Regolith Mapping

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Microkarren (also known as Rillensteine) are the smallest class of visible karren. They are finely-sculptured solutional forms on bare limestone surfaces, recognisable within a one centimetre grid. They form various patterns, the commonest being linear microrills 1mm wide and several decimetres long.

Laudermilk & Woodford (1932, Amer. J. Sci., ***23:*** *135-154.) described four types, but their descriptions are confusing and don't cover the full range. A broader terminology was suggested by Grimes (2007, Helictite,* ***40(1):*** *21-23):*

Microrills: narrow, parallel grooves; straight, sinuous or tightly meandering. The crests can be sharp or rounded. Some crests can break up into lines of elongate teeth. With increasing branching density, they grade to...

Micro-networks: branched rills form a network. With increasing branching they grade to...

Micro-teeth: a dense network of grooves separating isolated sharp, conical or faceted teeth.

Micro-pits: hemispherical to conical pits occur in a wide range of sizes (1 - 20 mm wide, approaching normal "rain-pits"). Possibly polygenetic, and not all microkarren.

Micro-pans: Shallow pits, 5-10 mm wide. Flat to curved floors contain fine pits or teeth. Scattered clusters are superimposed on prior microkarren. An unconfirmed origin might be solution beneath faecal pellets.

Micro-notches: irregular V-section notches following cracks in the rock (a micro-splitkarren) – a broad range of sizes is seen.

Micro-tessellations: networks of U-section notches disrupt prior microkarren, apparently etching a superficial crazing pattern.

Micro-decantation rills: run down vertical sides of cobbles, becoming smaller as they descend.

The genesis of microkarren is uncertain, but may involve solution by thin films of water (dew, sea-spray or light rain) with surface-tension effects. Some forms, e.g. micro-pits, may be polygenetic. Simple etching of rock structures is best regarded as a separate process. There seems to be a preference for fine-grained rocks, but a few examples have been found on the coarse-grained marbles at Chillagoe.

In Australia their best development seems to be in tropical monsoon (seasonally dry) and arid areas. They are particularly extensive and well-developed in the Gregory-Judbarra karst of the NT. Elsewhere, they have been recorded from the arctic (Greenland) to the tropics (Philippines) and from dry to humid (2500 mm) rainfalls. However, these cryptic forms are poorly recorded and it is too early to make definite statements about their distribution.

Grimes, K. G.[1]: The terminology of karst, pseudokarst and ruiniform landscapes

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When dealing with karst-like features on non-limestone rocks, there is a lack of agreement on the terminology and classification.

The term "karst" is used to refer to both the distinctive landforms that occur on limestones, and also the process (solution) that forms then. When discussing classifications we need to distinguish between:

Karst landforms: *caves, underground conduit drainage, sinkholes, karren, etc.*

Karst processes: *dominantly solution; but other processes can also contribute, such as hydraulic erosion in stream caves or gravity in sinkholes.*

Karst rocks: *the carbonates (limestone and dolomite), but other strongly soluble rocks such as gypsum and halite (salt) need to be considered in the following discussion.*

Karst*, in the strict sense, involves all three of the above.*

The carbonate rocks are the main ones that produce karst. Where karst-like landforms occur on other rock types, or form by processes other than solution, different workers have called them "karst", "parakarst" or "pseudokarst", with or without qualifying adjectives to indicate the differing lithologies or processes involved, e.g. "Silicate (para)karst", "laterite (para)karst", "volcanic pseudokarst", "piping pseudokarst".

Parakarst *is generally defined as karst-like landforms formed by solution of non-carbonate rocks.*

Pseudokarst *is defined as karst-like landforms formed by processes other than solution.*

Most people are agreed on the usage of "pseudokarst" for non-solutional features such as lava tubes, sea caves, glacier caves, or badlands produced by piping.

The main concern of this paper is in classifying karst-like forms on non-carbonate rocks which are strongly soluble (gypsum and salt) or weakly soluble (mainly the silicate rocks: sandstones, granites, laterites etc). The situation is particularly difficult in the case of the weakly soluble silicates where solution is only one step in the weathering and erosion of the landform, and it is often difficult to assess just how big a role it played.

Grimes[1], Ken, Wray, Robert [2] A.L. Spate,[3] Andy: Caves and Ruiniform features in Sandstones of Northern Australia – Regolith Mapping, G.
[1]ken.grimes@bigpond.com
[2]School of Earth and Environmental Sciences, University of Wollongong,– Optimal Karst Management,
[3]Ian Houshold – Tasmanian Department of Primary Industries, Parks, Water and Environment.

The flat-lying sandstone areas of tropical north Australia have a range of interesting landforms that include caves, dolines, and other karst-like features, and also spectacular ruiniform terrains. These landforms can be classed as silicate karst, parakarst, pseudokarst and non-karst (but the last have ruiniform areas that have considerable scenic and scientific interest). Caves range from small rock shelters through small tunnels and large tubes which may have dark zones, to larger stream caves (both active and abandoned) and complex maze systems. Dolines are mainly collapse or subsidence features, and some may be due to subjacent karst effects. Blind valleys and stream sinks are associated with the stream caves. Small-scale features include solution pans and runnels, sculptured walls that resemble karren, and sandstone pillars within some caves or exposed in cliffs. The pillars appear to be a type of diagenetic cementation by focussed vertical water flow.

Ruiniform features are giant grikefields, stone cities and stone forests which result from structurally controlled weathering and erosion. At the edge of a plateau developed on flat-lying sandstones one finds that erosion first attacks the joints, widening them to form grikes which grow larger and deeper to become giant grikefields. As the grikes enlarge further they widen at the expense of the higher areas between them to make stone cities. Eventually the low ground dominates and we get a stone forest and finally scattered pinnacles on a low-level pavement. Stone cities are referred to by the tourism industry as "lost cities". These features are analogous to karst grikes, pinnacles and towers, but solution is not the main process involved. Whilst solution of silicate cement may be involved in the original weathering process (along with oxidation of iron and aluminium compounds, and clay mineral formation), the majority of material is subsequently removed by fluvial processes, or, less commonly, by wind. Grikes etc on both limestone and sandstone are best classed as ruiniform, rather than "karst-like", as the structural control is more important than the processes of chemical and physical weathering that are involved.

Many important sites have developed in Proterozoic sandstones and quartzites. Whalemouth Cave in WA is a particularly large and spectacular stream cave in sandstone. On the plateau above the cave several blind valleys and stream sinks can be seen from the air. In the NT there appear to be large and complex horizontal maze cave systems at Kakadu and possibly at Bunju, but these have not been studied in any detail and access is difficult. Also in the NT, large collapse dolines, some with water-table lakes (i.e. cenotes), occur in sandstones of eastern Arnhem Land, near Borroloolaand on the Newcastle Range in the Gregory/Judbarra NP. Again, access is difficult and the genesis is uncertain as the host sandstones either have a carbonate cement or are underlain by limestone units. In Queensland, Widdallion cave in the Lawn Hill (Boodjamulla) NP is a stream cave similar to, but much smaller than Whalemouth. Further east in Queensland, Mesozoic sandstones have a range of features. A surface stream within the grikefields of Cobbold Creek Gorge has several underground segments. In the sandstone ranges of central Queensland there are many rock shelters, and also large tubes and small tunnel caves. The main interest there is in the extensive small horizontal tubes, and three-dimensional networks of smaller tubelets, even though they are too small for human access.

Grimes, K.G.,[1] & Spate A.P.[2]: Laterite parakarst - [1]Regolith Mapping, [2] Optimal Karst Management

Laterite karst or parakarst refers to karst-like landforms formed in deep weathering profiles (especially laterites, but also in bauxite and silcrete profiles) by a combination of silicate solution (parakarst) and other chemical and physical processes (pseudokarst).

Deep weathering involves the intensive chemical weathering of the minerals in a rock over a long period of time. The minerals are converted to new forms which may be soluble, and can be removed in solution; or may be softer, such as clay minerals; or crumbly, such as residual sand grains, and can be washed out of the rock by flowing water, or removed by wind or gravity – producing cavities and other karst-like forms. Localised precipitation of the dissolved material forms duricrusts – these generate mesas and scarps (occasionally ruiniform), and provide a solid roof beneath which caves can form.

Laterite karst is most common in tropical regions but examples can also occur in temperate climates if deep weathering profiles exist.

Laterite karst shows a particularly strong analogy with the syngenetic karsts (in soft porous calcarenites) as both have simultaneous solution and cementation of the "rock" and show the influence of caprocks (duricrusts) on cave development and of focussed flow through porous materials.

The karst-like landforms range through all scales: Broad-scale features include fields of shallow dolines, or pans ,up to 2 km across, which may grade into dambos (flat-floored valleys); together with rarer collapse dolines. Care is needed to distinguish the laterite hollows from other types formed by deflation or by subjacent karst subsidence. Meso-scale features include caves (mostly small rock shelters, but some longer tunnels and complex mazes), and fields of solution pipes and pinnacles, and irregular "epikarst" surfaces. At the smallest scale one finds centimetric tubelets and vughs, and breccias in pipes, pockets or horizontal bands.

Haygarth, Nic: Quest for the Mole Creek master cave

The allure of unraveling three 'master cave' systems- at Mole Creek, Ida Bay and in the Junee-Florentine – has helped drive Tasmanian cave exploration. The full extent of the wet cave system intrigued early European visitors. Locals believed the Mole Creek caves had a hydrological connection to the Beaconsville gold mine, 50 km away. The search for the true Mole Creek master cave split Tasmanian caving asunder in 1965. Soon after, the newly formed Southern Caving Society broke through the rockfall separating Wet Caves from Georgies Hall. Spectacular discoveries followed in Herberts Pot. Reserving this unusual hydrological system has proved just as challenging as exploring it.

Martini[1] , J. E. J. and Grimes [2] K.G.: Epikarstic maze cave development: Bullita Cave System, Gregory-Judbarra Karst, tropical Australia
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In the monsoon tropics of northern Australia, Bullita Cave is the largest (120 km) of a group of extensive, horizontal, joint-controlled, dense network maze caves which are epikarst systems lying at shallow depth beneath a well-developed karrenfield. The Judbarra Karst and its caves are restricted to the outcrop belt of a thin bed of sub-horizontal, thinly interbedded dolostone and calcitic limestone – the Supplejack Member of the Proterozoic Skull Creek Formation. Karst is further restricted to those parts of the Supplejack that have escaped a secondary dolomitisation event.

The karrenfield and underlying cave system are intimately related and have developed in step as the Supplejack surface was exposed by slope retreat. Both show a lateral zonation of development grading from youth to old age. Small cave passages originate under the recently exposed surface, and the older passages at the trailing edge become unroofed and /or destroyed by ceiling breakdown as the, by then deeply-incised, karrenfield breaks up into isolated blocks and pinnacles and eventually a low pediment surface.

Vertical development of the cave has been generally restricted to the epikarst zone by a 3 m bed of impermeable and incompetent shale beneath the Supplejack which first perched the watertable, forming incipient phreatic passages above it, and later was eroded by vadose flow to form an extensive horizontal system of passages 10-20m below the karren surface. Some lower cave levels in underlying dolostone occur adjacent to recently incised surface gorges.
Speleogenesis is also influenced by the rapid, diffuse, vertical inflow of storm water through the karrenfield, and by ponding of the still-aggressive water within the cave during the wet season – dammed up by "levees" of sediment and rubble that accumulate beneath the degraded trailing edge of the karrenfield. The soil, and much biological activity, is not at the bare karren surface, but down on the cave floors, which aids epikarstic solution at depth rather than on the surface.
While earlier hypogenic, or at least confined, speleogenic activity is possible in the region, there is no evidence of this having contributed to the known maze cave systems. The age of the cave system appears to be no older than Pleistocene.
The full paper will appear in Helictite volume 41.

Moulds, Timothy & Bannink, Peter: Biology of the Bullita Karst
Bullita Cave is situated in the Jutburra Gregory National Park, west of Timber Creek, Northern Territory. The cave is a shallow depth, joint controlled maze cave, situated in a tropical climate, experiencing dry winters and wet summers. Biological investigations for fauna, both vertebrate and invertebrate, have been undertaken at several different times. This paper will concentrate upon the invertebrate fauna collected by Peter Bannink (TESS) during the early 1990's and Timothy Moulds (WASG) in 2006. All collecting was undertaken in the northern dry season (April – September) and consisted predominately of opportunistic collecting. A single episode of pitfall trapping (Baited and unbaited) was undertaken in 2006 in moist areas, near the Bullita efflux and in separate karst located on the north side of Limestone Creek, with limited success. Three different caves have been examined for invertebrates (BAA04, BAA35, and BAA38) within the Bullita area and some environmental variables recorded, showing temperatures (16° – 24°) and humidity (45% – 90%) varying between deep in the cave and near entrances. Collecting has recorded over 200 individuals between the two collections, and comprises of seven (7) classes, 18 orders, 42 families and 53 species. The majority of taxa do not exhibit any troglomorphisms and are found in the vicinity of cave entrances and twilight zones. Six potential troglobiontic and stygobiontic species have been collected including a hydrobid snail, a scorpion, a polydesmid millipede, a platyarthrid isopod, an amphipod, and a meenoplid planthopper. This is a significant number of troglomorphic taxa to be found from limited collecting in an extensive tropical cave, and further collecting, especially if undertaken in a co-ordinated and systematic manner will undoubtedly reveal additional species. Few meaningful comparisons can be made with nearby karst areas as biological knowledge is absent apart from Cutta Cutta Cave in the Tindale limestone near Katherine, although some troglomorphic taxa may share affinities with the Tindale karst area. The further identification and description of new taxa from Bullita remains important so the significance and degree of endemism can be more accurately determined.
The vuggy and conduit porosity can host significant shallow aquifers, which might exhibit problems similar to karst aquifers.
*See also: Grimes, KG & Spate, AP., 2008: Laterite Karst (Andysez No 53). ACKMA Journal, **73:** 49-52.*

Osborne, Armstrong - Cave Science Sri Lanka
Presented by Penney Osborne
The island of Sri Lanka consists mostly of ancient metamorphic rocks with an extensive area of low-lying karstified limestone along its northern margin. Caves are abundant in the metamorphic rocks, mostly gneiss, of the central highlands; many are used as temples or contain important archaeological sites. There are no caving clubs in Sri Lanka and there has been little scientific study of Sri Lankan caves. Cave Science Sri Lanka began in 2008 to develop a local team with skills in cave science and to begin development of a Cave Science course at the Postgraduate Institute of Archaeology at Colombo.
There are at least seven different types of caves in Sri Lanka. The gneiss caves are extensive and only their outer sections are explored and mapped. They contain a range of unusual minerals and speleothems. They are solution caves, rather than simple parakarst features, but a great deal of work will be required to determine how they formed.

Pearson, Les – A brief history of Chillagoe caving
Presented by Alan Cummins
A summary of events relating to caves and caving at Chillagoe from prehistory to the present based on newspaper reports and other records.

Silverstru, Emil – Paleokerst – An alternative view
The study of ancient karsts has always been a challenge for the karst scientist (a.k.a. karstologist), especially for the one approaching the topic without a solid geological (especially sedimentological) training. From terminology to mineralogy and from sedimentology to geomorphology, interpretations keep shifting and changing according to the investigator's bias(es). This text provides some clues to a better understanding of syndepositional conditions and reviews some recent discoveries of seafloorprocesses that could generate paleokarst-like features.

Silverstru, Emil - Karst on Vancouver Islsnd – an icy history
Vancouver Island has the highest density of caves anywhere in Canada although karstic rocks do not represent a significant part of its geology. While all karst areas in Canada have been covered by ice during the last glaciation, Vancouver Island karst has had a number of peculiar glacial conditions during the Fraser Glaciation (Late Pleistocene equivalent to Late Wisconsinian in North America) which have allowed a better understanding of karsting processes beneath the Cordilleran Ice Sheet. Many caves, even the ones at high elevation, have preserved very coarse rounded allochthonous sediments, including blocks in excess of 1 m in size, which are clear indication of paroxystic subglacial aquatic transportation. It is thus inferred that subglacial karst was repeatedly submitted to high pressure, chemically aggressive water flooding followed by flushing which significantly enlarged the caves and established the karst drainages that are still in place today. Sediments in known caves on the island provide no indication of glacial episodes prior to the Fraser Glaciation which, corroborated with the scarcity of speleothems and the general juvenile aspect of the caves strongly advocates for a recent (Wisconsinian) age of the Vancouver Island karst.

Smith, Graeme[1] - Silverfish in Australian Caves- 34 years on!
[1]Highland Caving Group

Silverfish from all three families present in Australia have been collected in caves but only the Nicoletiidae are considered as a cave-dwelling family. They are preadapted for life in caves, having no eyes or pigment and being detritus feeders. Forty one species of cave-dwelling Nicoletiids/Protrinemurids have been described since I last presented a paper of the same name in 1976, five of these from Australian caves. Recent extensive sampling of rock deposits in Australia prior to mining is revealing an extensive and diverse Nicoletiid fauna inhabiting the mesocaverns suggesting that the cave fauna may just be an extension of the mesocavern fauna.

Molecular biology is beginning to be used to supplement the morphological taxonomy of this primitive insect group.

Tarburton, Mike - Predatory Defence Mechanisms in Cave-nesting Swiftlets

This paper illustrates how cave-nesting swiftlets in the South Pacific vary their breeding behaviour to resist different redatory offensives. When they have the opportunity, swiftlets nest in totally dark parts of caves. This prevents most predation on eggs, young and incubating adults. Most swiftlet species can echolocate so nesting in totally dark sections of caves is not a problem. However, a few predators are able to either reach the nests or prey on birds flying to and from nests. In response, swiftlets have developed anti-predatory behaviour. To reduce predation of adults flying into and through the cave: the birds enter and exit caves in groups, increase flight speed at the entrance (where most predators attack), and feed their young less frequently than comparable species that do not nest in caves. Where there have not been predators at entrances in the long-term the birds do not form groups but fly singly and slowly. In most colonies a few birds use alternative entrances. Predation at the nest is reduced by adults clumping their nests on high, smooth, overhanging rock surfaces. When such safe surfaces are not available or predators are able to climb the walls, swiftlets respond by spacing nests widely, reducing the chance that a predator will find them. The Glossy Swiftlet, which cannot echolocate tends to breed in entrances to caves and mine shafts and increases its chances of survival by nesting in many locations, and particularly in caves used by echolocating species.

White [1,2], Susan and White[2], Nicholas - Karst in Mid-Proterozoic dolomite, Pungalina Station, Northern Territory, Australia
[1]Environmental Geoscience, Latrobe University, Bundoora 3068 Australia
[2]Victorian Speleological Association Inc.

In the published literature, karstification in dolomite (dolostone) is not as well documented as for limestone and as it is less soluble in natural waters than limestone, cave development is generally less. However extensive karst is reported from several places in the Northern Territory, Australia (White & White, 2009) and the Transvaal (Martini, 2004).

The Victorian Speleological Association has been exploring and documenting a relatively little known Northern Territory karst area on Pungalina Station, previously a safari camp but now an Australian Wildlife Conservancy property. The Mid Proterozoic stromatolitic and cherty Karns Dolomite contains significant karst, over 50 caves(several over 1 km in length), 20 significant dolines, 2 poljes and several karst springs with high discharge rates.

The caves are generally shallow phreatic, joint and/or bedding plane controlled passage networks. Two cave levels can be identified: a dry upper series in the high grounds and residual hills, and an active lower one in the pediplain and valley bottoms. The caves contain aragonite and/or calcite speleothems, sometimes with chert breccia, which show evidence of repeated phases of deposition and re-solution. Initial U-Th series dating has identified speleothems from two periods.

The region has a hot monsoonal climate dominated by distinct wet and dry seasons but the cave temperatures are higher (29-34°C) than the expected yearly average (26.4°C) plus a humidity close to 100%. This is possibly due to a combination of summer rain temperature and effect of soil heated up by the sun. Water floods into the caves during the summer monsoonal rains and remains as lakes for much of the dry season.

Much of the karst has the characteristics of a highly eroded landscape where the present features are the relics of previous conditions. Two periods of karst development can be identified; an upper/older one, preserved as remnant streams, dolines and caves on ridge tops and a lower/ younger one with currently active caves. These caves contain areas of calcite speleothems, interspersed with extensive areas of solutional features. There is extensive evidence that the area was a more impressive karst landscape in the past.

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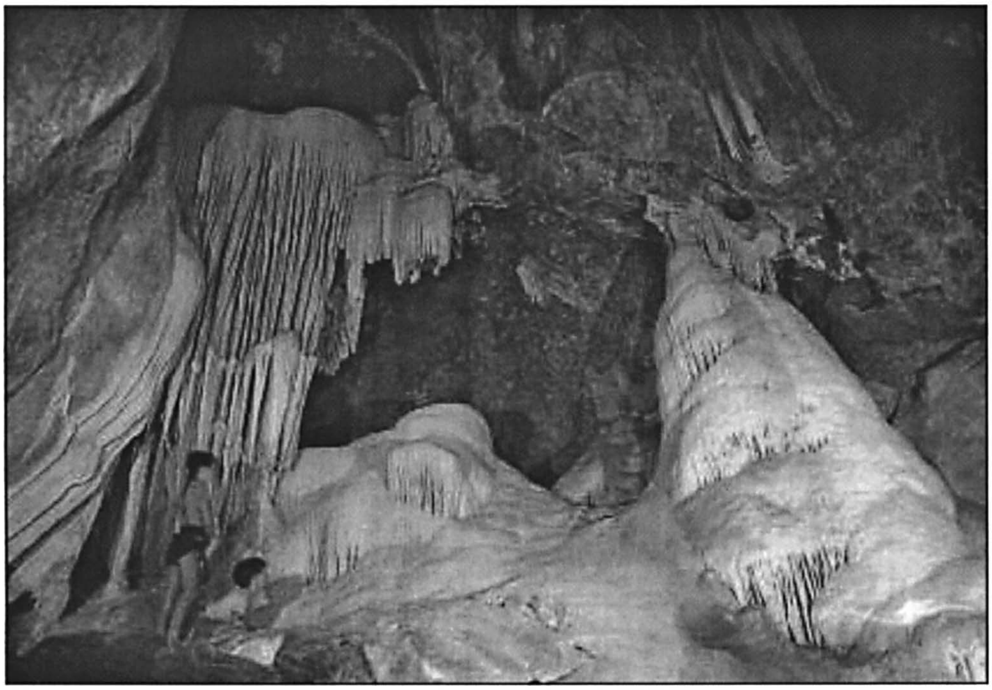
White [1,2], Susan and White[2], Nicholas - Lava caves of Hawai'i: Cave Conservancy of Hawai'I Field Season 2011
[1]Environmental Geoscience, Latrobe University, Bundoora 3068 Australia [2]Victorian Speleological Association Inc.

The Cave Conservancy of Hawai'i (CCH) is a Hawai'i non-profit corporation whose aim is to acquire and manage caves for scientific study, educate individuals interested in speleology, and conserve cave resources on the islands of Hawai'i. Many Hawai'i caves are sensitive or fragile and are mostly on private property. This means that caves have little protection and threats to the caves are very real. By managing the land surrounding caves, the Cave Conservancy of Hawai'i can ensure that surface development has minimal impact to a cave system.

The Conservancy has bought some 47 acres of lava flow with caves during the approximately 10 years since it formed. Members and friends of the Conservancy own a further 53 acres with land on it. Most of this land is in small parcels of 1 or 3 acres as this is the size of the subdivision blocks.

*The 2011 annual meeting for the Cave Conservancy of Hawaii was held in February and associated with this was a **three- week field** season with exploration, documentation, conservation and scientific activities. A travelogue of the caving and the associated scientific conservation issues are presented. This included assisting Dr Diana Northup (University of New Mexico, Albuquerque) with her research on bacterial mats and slime in lava caves. The rest of the trip was spent exploring and mapping new caves in several parts of the island.*



Crystal Chamber in Trezkinn Cave

COSTS FOR PURCHASING ITEMS AT THE CONFERENCE

BBQ Sunday night	*$18**
All morning and afternoon teas	*$5**
All lunches	*$12**
Caveman's dinner	*$35**
Conference mug	*$12**
Conference proceedings on USB	*$30**

Below are souvenirs available for purchase.

Conference T shirts	*$25*
Caps	*$9*
Stickers	*$4*
Empty USB flash drives	*$25*

**If you have paid the full $200 registration fee these items are included in the price..*