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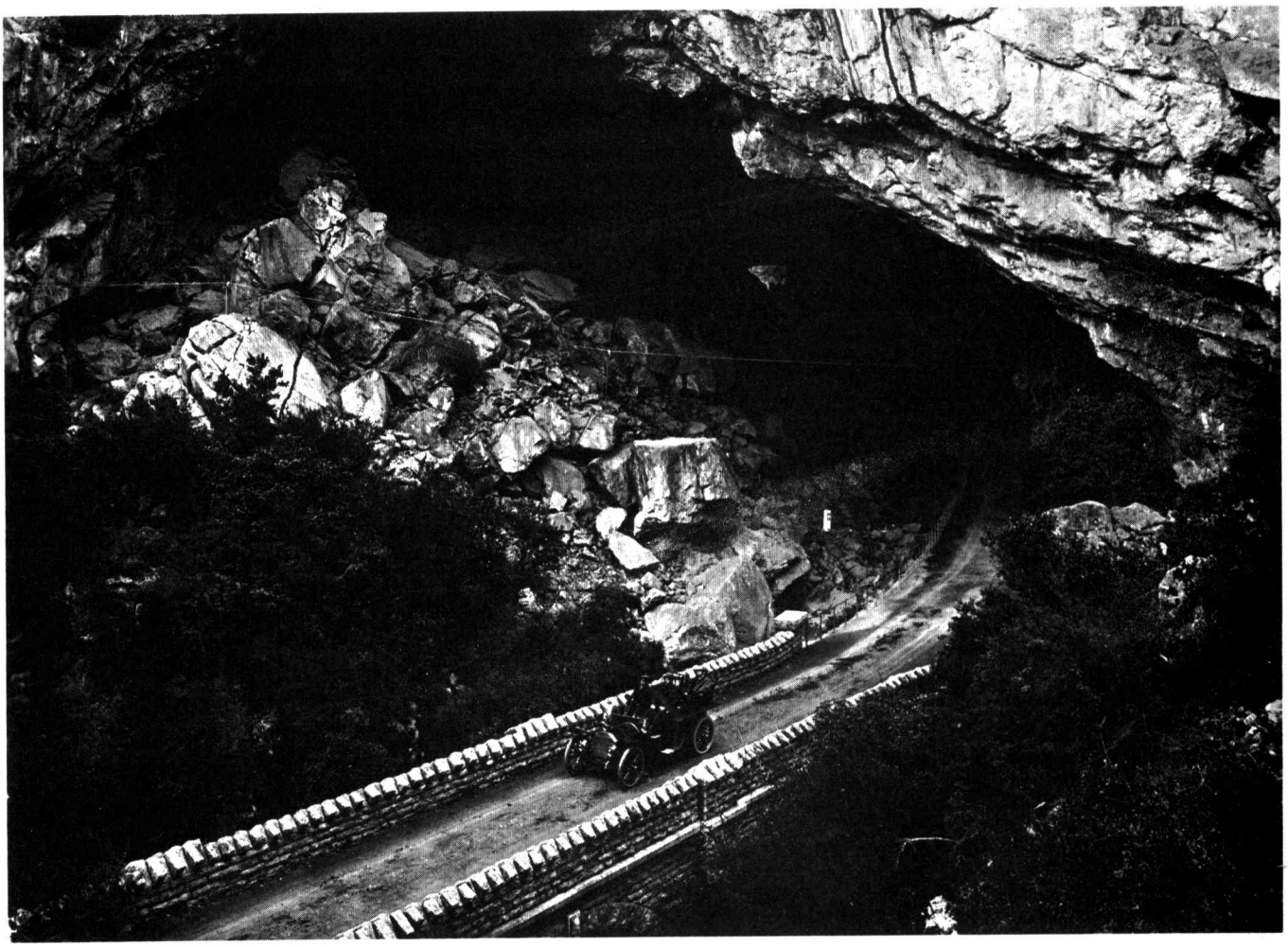

The Grand Arch, Jenolan, N.S.W. c.1905. The mile post near the bridge reads MV 36 on one side and J O on the other.

(Photo from the E.A. Lane Historical Collection)

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Edited by Edward A. Lane and Aola M. Richards

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JENOLAN CAVES HISTORY

The historical outline beginning on the opposite page was written by Mr. B.T. Dunlop in the late 1940s for inclusion in his book, Jenolan Caves, New South Wales, Australia (First edition, 1950 : pp. 96). However, to reduce the size of the volume, the chapter was replaced with a four-page "Historical Summary", comprising chief dates annotated more fully than here. The Editors have added some additional points from further unpublished material written by Mr. Dunlop in the 1950s.

Mr. Dunlop, during most of his life, has been interested in the exploration, history and scientific study of caves, with special reference to Jenolan. In much of the work he was associated with the late Ward L. Havard. Mr. Dunlop has kindly given the Editors of Helictite permission to publish his paper in this issue.

A B S T R A C T S

"BELL HOLES" IN SARAWAK CAVES. By G.E. Wilford. Bull. Nat. Speleo. Soc., 28 (4), 1966 : 179 - 181.

Vertical roof cavities, designated "bell holes", have developed in Sarawak caves such as Niah Great Cave, northeast Sarawak, and Selabor Cave, West Sarawak, with apparent disregard for structural features of the limestone. The bell holes vary from saucer-shaped indentations in the roof to cylindrical or slightly tapering cavities six feet high and about one foot wide. Less common complex forms consist of cavities five feet across and six feet high lined with vertical grooves. The holes terminate in solid limestone and have no connection with surface topography. The lack of fissures at the upper end of the bell holes mitigates against the possibility that they were formed by descending aggressive water, the main agent responsible for the formation of superficially similar, but much larger domepits. It is suggested that the mode of formation could be solution by eddies or currents in the original water fill of the cave.- E.A.L.

ISOTOPIC DATING OF THE NEWER VOLCANIC OF VICTORIA, AUSTRALIA, AND GEOMAGNETIC POLARITY EPOCHS. By I. McDougall, H.L. Allsopp and F.H. Chamalaun. J. of Geophysical Res., 71, 1966 : 6107 - 6118.

Twenty whole-rock samples of Newer Basalt from Victoria were dated by the potassium/argon method. Volcanic activity commenced at least 4.5 m years ago. Two samples from a quarry 4.2 km NNW of Panmure are probably from the same flow that contains the Panmure lava cave. The age is 0.57 + or - 0.03 m year. No other samples can be related to lava caves at all directly, but the samples from west of Melbourne and at Ballarat suggest that the Parwan cave may be over 2 m years old. - C.D.O.

AN HISTORICAL SKETCH OF THE JENOLAN CAVES, NEW SOUTH WALES, FROM DISCOVERY TO 1932

B. T. DUNLOP*

Summary of Chief Dates

Before 1838 : Discovery of caves by cattle stealers.
(?) 1838 : Discovery of caves by James Whalan.
1845 : Discovery of Nettle Cave.
1846 : Discovery of Arch Cave.
1848 : Discovery of Elder Cave.
1860 : Discovery of Lucas Cave.
1866 : Caves reserve created.
1867-96 : Jeremiah Wilson first "Keeper".
1877 : Discovery of Glass Cave and Frenchman's Cave.
1878 : Discovery of Bottomless Pit.
1879 : Discovery of (Right) Imperial Cave.
: Road from Oberon continued right into the caves
: valley.
1880 : First permanent settlement. J. Wilson leased two
: acres and erected first accommodation house. First
: general improvements in caves.
1880-81 : Left Imperial Cave discovered.
1882 : Mammoth Cave discovered.
1884 : Name "Jenolan" applied. Bridle track from Katoomba.
: Wilkinson Branch discovered.
1887 : First permanent electric lighting.

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* 34a Middle Harbour Road, Lindfield, New South Wales.

Late 1880s: Road from Mt. Victoria completed to within one
: quarter mile of Grand Arch.

1890 : Jersey Cave discovered.

1892 : Passage from Grand Arch to Lucas Balcony discovered.

1893-94 : Jubilee Cave discovered (opened 1897).

1896 : Limestone bridge and road through Grand Arch
: completed. Wilson's lease cancelled and land
: resumed.

1896-1903 : F.J. Wilson, Caretaker.

1897 : Aladdin Cave discovered.

1897-98 : Oliver Trickett surveyed the caves (other surveys
: by Trickett followed 1903-4, etc.).

1898 : Present entrance to Imperial Caves cut. Central
: section of present Caves House completed and
: leased. Post office erected.

1900 : Mafeking Cave discovered.

1901 : Short tunnel cut to Lucas Cave from Balcony, be-
: coming main entrance to all south-side caves.

1903-1932 : J.C. Wiburd, Caretaker.

1903 : River and Skeleton Caves discovered. Motor cars
: began to arrive.

1904 : Temple of Baal and Orient Caves discovered.

1907 : Northern wing Caves House commenced.

1908 : Dam constructed.

1914 : Four-storey section Caves House commenced.

1916 : Caves House under State Government control.
: Electric light in Caves House.

1917 : Electric light in grounds.

1920 : Power house completed.

1923 : Tunnel from Left Imperial Cave (Chifley Cave) to
: Grand Arch cut. Path built beside Styx, River
: Cave. Staff quarters built.

1932 : A. Bradley appointed "Chief Guide". Position of
: "Caretaker" lapsed.

Discovery and Early History

The caves were known to the Aborigines and the bones of at least one are preserved within them. O. Trickett (1) records that the caves and limestone ridges were known to the blacks as "Binoomea".

For 25 years after the opening of the first road from Sydney across the Blue Mountains to Bathurst, the caves, hidden in wild country unattractive to settlers, remained undiscovered. Then, not earlier than 1838, perhaps as late as 1841, James Whalan, a pastoralist who lived on the Fish River near Tarana about 12 miles from the caves, with two mounted police and tracking a bushranger named McKeown, saw the open arches and passed through the great open cave now called the Devil's Coachhouse.

"James McKeown was an escaped convict...whose presence on the Main Western Road was for years excessively irritating to the settlers, on whose stores he laid an oppressive toll... . Whalan set out to track McKeown and followed him up hill and down dale for miles. After they had covered about 20 miles the bushranger suddenly disappeared... . The tracks led up to a wild cavern and into it...and burst again into open day, and the route lay along a rugged gorge for some three miles. Here the bushranger again disappeared... . All about were evidences of careful cultivation, the bushranger having laid out quite a nice little farm. Satisfied that he had run down his bird, Whalan retraced his steps (2)... . When he returned home he told his brother Charles of the strange country he had wandered into. 'I have been through the Devil's Coachhouse,' he said. Next day a party was made up, and with the aid of troopers McKeown was captured. His hiding place was a huge hole in the mountain-side, known as McKeown's Hole... . McKeown lived to return from a long term of exile on Norfolk Island and to re-visit the scene of his former exploits." - "Argus" (3).

McKeown of course, and possibly other cattle thieves, knew the caves before this discovery. Unfortunately, the story is not based on contemporary written records and is therefore without historical proof. However, there seems no reason to question its validity. The earliest literature consists of newspaper articles beginning in 1848. These tell nothing of the discovery. Credit for the discovery was first claimed, as far as is known, in the 1880s for both James and Charles Whalan by their sons, but both stories agree that James saw the caves first. C.S. Wilkinson in The Railway Guide of N.S.W. (1886), attributed the discovery to James in 1841 and has been followed by Cook, Foster and Trickett (4). W.L. Havard (5) considers 1838 the more probable year of discovery.

Thus, James Whalan seems to have been the discoverer of the caves and his brother Charles their first explorer. Immediately after the initial

discovery, Charles visited and explored the great arches.

"He soon went out again and whenever he could contrive to spare the time he prosecuted his researches until he had penetrated many of those underground 'crystal palaces'...and nothing gave him greater pleasure than to conduct his friends to the halls of matchless loveliness which he had discovered. Visitors came from far and near, for the fame of the caves soon spread... . They made his house (6) their stopping-place going to and coming from them... . Until his sons were old enough...he was the only guide to the caves, and either himself or some member of his family continued (of course gratuitously) to act in that capacity until the appointment of a guide and caretaker by the Government (1867)" (7).

Contemporary accounts confirm much of this and, though Whalan was probably not the only guide, there is little doubt that for many years he performed the important service of bringing the caves into public prominence.

Throughout the 'forties and 'fifties there is little else to report. The Arch Cave was discovered in 1846 and the Elder in 1848. These were the first dark caves and must have added immeasurably to the interest of those known. In addition, the Elder was the first cave discovered containing sparkling formations and was rich in cave coral.

The 'sixties began with a major event - the discovery of a great cave on January 4 by George Whiting, tutor to Charles Whalan's children, and Nicholas Irwin (8). Known as the New Cave till 1878, it was then named the Lucas Cave after John Lucas M.L.A. who visited the caves in 1861 and several times subsequently. Lucas was instrumental in bringing the caves under Government control. A Caves Reserve was created in 1866. It extended from Centre Tree (above the Devil's Coachhouse) for 2½ miles east-west and 3½ miles north-south, covering more than 4,000 acres (6 1/4 sq miles). An official "Keeper", Jeremiah Wilson, was appointed in 1867.

Charles Whalan's part in the story was then complete. To him the caves had been a hobby, and he had rendered valuable voluntary service. He held no official position and exercised no authority. For these reasons no developmental work is recorded, and damage by souvenir hunters in these years was considerable. Whalan, of course, had no monopoly. Others were free to take an interest in the caves, as the discovery of the Lucas shows. Jeremiah Wilson was no stranger to the caves before his official appointment having re-discovered the Elder Cave in 1856. Also, throughout the 'fifties and 'sixties, parties came from Hartley and Bowenfels by way of Binda Station, eight miles north of the caves.

Early Names for the Caves

The caves had become generally known as the Fish River Caves, though early references in the Bathurst Free Press (9) had used the name McKeon's

Caves. Lucas, in recommending the appointment of Wilson, used "Bendo Caves", and the Government Gazette of March 8, 1867, in announcing Wilson's appointment as Keeper of the Caves, named them "Binda Caves" which was thus their first official title. Both names, however, Binda Caves and Fish River Caves appear subsequently in official references. The history of Jenolan from this period until 1932 is best considered in terms of Caretakers.

Jeremiah Wilson, 1867-1896

The appointment of Wilson in 1867 did not bring about any immediate improvements. A system of management for the Government's new responsibility was not hatched overnight; it evolved slowly. The appointment was really a recognition of the value and necessity of Whalan's work. People had to be conducted through the caves, and Wilson was now the official guide. That little was expected of him is indicated by his salary - £25 a year and a small allowance for expenditure on the caves. There was no thought yet of accommodation for the keeper or visitors to the caves. Wilson continued to live at his farm on Fish River Creek nearly 20 miles away. Intending visitors to the caves were required to notify him well beforehand and were met at Tarana railway station. They were driven as far as possible in buggies, but were obliged to make the steep descent into the caves valley on foot. At night they camped in the Grand Archway. These arrangements continued for 13 years until 1880, except that tents were available towards the end of the period. Travellers from Sydney spent 24 hours on the journey and then spent a night in the Grand Archway before commencing to inspect caves. The following is part of a quaint but typical account of a trip at this time:

"Myself and five others started (from Sydney) one evening by the eight o'clock train for Tarana, the nearest station to our destination... . We had provided two hampers full of creature comforts of all sorts... . It was three o'clock in the morning before we arrived at Tarana... . Leaving our hampers at the station we marched to a little inn close by. Having roused up the landlord we found there were only two spare beds, for these we went odd man round with coins of the realm; the lucky winners took possession, and the others slept on the floor anyhow... . Next morning, for the first time, we depended on our own resources for breakfast, which we had at the railway station...after which we found our guide in attendance with two buggies.

"That day was not a prosperous one at all, rain prevailing a great part of the time... . About two o'clock we reached Oberon, where we dried ourselves by a large wood fire. Pack horses were then put in requisition. As only one buggy was going on, most of our party rode. Another ten miles, the road hitherto a good one, became a mere wheel track through the bush... . We got to the place where a descent of five or six hundred feet was to be made, down which no buggy could go, even in broad daylight. The remainder of the gear was put on horseback, and now began the most wearisome and disagreeable walk it has ever been my lot to undertake. Forming a long line,

we set forward, all leading our horses; in places it was rocky, when we barked our shins...the guide in front with lantern carefully picking out the way... . After the longest mile and a half of this sort of thing that I ever knew, we got to the bottom of the ravine and soon found ourselves in the welcome shelter of the caves. The first cave we entered was the usual camping one...we could see skylight both ends.

"We soon refreshed our dirty and tired selves. Some slight attempt at comfort had been made; a large platform had been erected on the floor of the cave with high poles at either corner... . At one side were some planks which we made into tables and seats. How very comfortable we were on that and other nights! One man looked after the billy on the fire for tea, another put out tin plates and pannikins, while a third grilled the ham and cold fowl... . The acme of enjoyment was afterwards; we got a good screen round the weather side of the fire, which we heaped up high, and then when we had washed up, every man sat with his pipe and glass of hot grog, and we could afford to laugh over the mishaps of the day.

"The regulation way of sleeping on these occasions is to lie round the fire heads out, feet in, like the spokes in a wheel, we could not do so, however, the draught was too great...so still keeping inside the cave we mounted up the rocks to a little nook, where some hay had been laid down, and we slept as best we could, merely removing collars and boots. Next morning, after performing our ablutions in a clear, icy cold stream running through the cavern, and partaking of a plentiful breakfast, we set out with the guide on our subterranean tour..." - F.L. Warleigh, of H.M.S. Wolverine, October, 1878, in The Australian, Volume 1.

These were picturesque times according to W.L. Havard (10). "For recreation purposes...a dancing platform (was) erected in the Grand Arch in 1869. Many were the scenes of revelry while the cavern was filled with the disconsolate notes of an accordeon, or the music of some village fiddler, or that of a brass band from Bathurst. Many were the dances held by bramble flare and lantern light, and many were the times at midnight and later that 'Jerry' Wilson cracked his stockwhip to signal the revel's end, till a party dispersed to rest, with saddles or cave boulders for pillows and 'possum rugs for covering against the keen night air."

Within the caves there were no wire-netting fences or wire handrails, paths were almost unmade and although there were extensive areas of good floor where progress was easy, there were also points difficult to negotiate, as in any unprepared cave. Describing the Elder Cave inspection in 1880, a visitor wrote:

"Crawling, crouching, slipping, sliding, we laboriously drag our bodies through the awful passage" (11). Visitors today are shown the Slide in the Lucas Cave as a reminder of these times. Special clothing was necessary, and was brought apparently by the visitors themselves.

While underground, each visitor carried a candle, probably in a special holder designed to catch the melted grease (12), and the guide illuminated features by holding aloft a strip of burning magnesium ribbon. In later years, a special lamp (13) was used for burning magnesium. The ribbon was unwound by clockwork and burned at the centre of a polished reflecting surface.

In 1872 the Government made it a punishable offence to mutilate stalactites. The then known caves had all suffered considerably at the hands of souvenir hunters and today must present a very different appearance from that beheld by the earliest visitors. Fortunately, only two of the many caves now regularly inspected by visitors were known at the time. In his book on Jenolan, Cook said: "At one time there were in the Grand Arch five pillars as perfect as the one which remains, but in 1860 they were destroyed by a Goth from Bathurst."

Stalactites removed from the caves were displayed quite freely and handed about as objects of interest. Even Lucas "brought back to Sydney some hundred specimens of the caves, some being four feet long." F.C.T. Mann (14) estimated that "a quarter of the beauty of the caves has been wantonly destroyed." It was even said to be possible to find the way through the bush to Bathurst by following "the specimens discarded by visitors who wearied of their loads" (15).

Discoveries during the period were the Glass Cave (1877), Frenchman's Cave and Bottomless Pit (1878), and the (Right) Imperial Cave (1879). The last-named, always acclaimed one of the finest caves, was found by Wilson who descended a 50-foot vertical drop from the Elder Cave to enter it on February 16, 1879. Havard in The Romance of Jenolan Caves (J.R.A.H.S., 1934: 19-20) shows that the surveyors Lamont Young and Henry Cambridge actually pre-dated Wilson by entering part of the Imperial Cave in 1878.

Towards the end of the 1870s preliminary steps to development were taken A road into the caves valley from the Tarana road was begun in 1878, surveys of the caves were made, protective measures were suggested and Wilson was granted a two-acre lease adjacent to the caves on which to erect an accommodation house. The opening of the road in 1879 now provided easy access and greater numbers of visitors began to arrive. That same year Wilson began to build a single-storey, wooden accommodation house on the same site as the presentday Caves House.

The caves were closed down during the first three months of 1880 while improvements were carried out. In 1887-8, he added a separate two-storey, wooden structure accommodating 30 guests. Thus, from 1880, Wilson filled the dual role of Keeper-of-Caves and guest-house proprietor.

P.C. Glover, an English traveller who visited the caves in 1884, has left an interesting picture of the versatile Wilson and inspection condition

(16). Glover walked with his party from Mt. Victoria taking from 9.30a.m. one day till 2.15p.m. the following day. He found "the means of getting to the caves very primitive and the journey through them so rough that comparatively few even of the New South Welsh knew of the marvellous fairyland so near them." Despite the long journey, the party inspected the Nettle and Arch Caves in the afternoon. On coming out they "found Jerry giving orders to drive the cattle into the entrance of the Grand Arch. The sudden influx of guests had taken him by surprise. Beef was wanted and slaughter was in the air. We stood on the slope overlooking the cavern to witness the execution, which was ornamentally picturesque. Jerry, in his bush hat and shirt-sleeves, stood against a rock with his rifle in hand, waiting for a fair shot at the victim, a fine white bullock with brown spots. For a long time ...the bullock contrived to mix himself up with his comrades... . At last ...crack went Jerry's rifle, and the fine white bullock dropped down like a stone.

"Next morning at 9 o'clock we all entered the Imperial Cave with Jerry for a guide. Each carried a candle in a spring holder, with a reserve of three more in his pocket. Jerry was armed in addition with a magnesium wire lamp. We were all in shirt-sleeves in anticipation of rough and dirty work, and the next few hours had plenty in store for us... . At each halt Jerry gave the word to 'douse candles' and then, when we were all standing in the dark on the tiptoe of expectation, turned the dazzling light of the magnesium wire on such a wonderful series of fairylike scenes as none can imagine who have not seen them...

"The travelling in many places is none of the easiest. We were often on all fours, or even flatter, with the roof little more than two feet from the ground, and in one place the only way of getting through was to lie flat on your back with your arms tight to sides and be drawn through by the heels. The Fairy's Retreat could only be seen by two at one time. It was reached by a crawl on all fours and a short progress feet foremost lying on the back, after which you found yourself in a cramped little chamber where Jerry sat waiting..."

Glover's picture of cramped positions would be true of very few points in the Imperial and Lucas caves ten years later. Steady progress was made with path cutting and the construction of steps and it is probable that the caves named could be walked by the early 'nineties. "Cave costumes" were still necessary for some inspections and could be hired at the house. The charge in 1892 was 2/- a day. A charge was made also for magnesium ribbon used. One grumbler in the 'eighties complained that he was charged 12/- for magnesium wire for four days and 8/- for the loan of a dungaree suit costing only 3/6. F.C.T. Mann (17) discovered that all the costumes were of the same size, fitting a man about 5 ft 8 in. tall. He himself was 6 ft 2 in.

In 1884, Surveyor W.M. Cooper, who had the same year defined a bridle track from Katoomba, pointed out that the name Fish River Caves was a

misnomer, the Fish River being on the western side of the Dividing Range and the caves on the eastern side. On his suggestion, the caves were officially named "Jenolan Caves" after the parish in which they are situated (18). Trickett states that Jen-o-lan is a native name signifying a high mountain, and Havard has ascertained that it was the native name for a hill on the Cox River (19).

Lighting the Caves

The year 1880 saw a successful experiment in lighting a cave with electricity. On July 22, E.C. Cracknell, Superintendent of Telegraphs, set up apparatus weighing 15 cwt. In Cook's words, "to the admiration of all present Cave Margherita was illuminated by electric light. A photographic apparatus was then placed in position, the plates were exposed, and in 15 minutes the first negatives were produced and said to be all that could be desired."

The first permanent lighting was installed in the Imperial Cave in January, 1887. This consisted of passage lights arranged in circuits containing 25 incandescent lamps. Special features were still illuminated by burning magnesium wire. The Lucas Cave was similarly lit by 1894, and subsequently the Nettle and Arch Caves, but not the Elder. Current was supplied first by a steam-driven dynamo in the Grand Arch, and later by a water-driven wheel downstream.

Discoveries

Many important cave discoveries were made during the 'eighties and early'nineties. Early in the period, Wilson, by degrees, found the extensive Left Imperial Cave. The Mammoth, the "largest and wildest" cave, was discovered in 1882 and Wilson spent much time exploring it.

In 1892, Frederick Wilson found the passage from the Grand Arch to the Lucas Cave, a discovery put to use in 1897. Previously a climb over the top of the limestone ridge was necessary to reach the Lucas entrance leading to the Cathedral. Finally, in the 'nineties (February 20, 1893, and February 16, 1894), Jeremiah Wilson discovered the two branches of the Jubilee Cave. "I have made a grand and extensive discovery of another cave, which I have named 'Wilson's Delight," wrote the Keeper. His report on the discovery describes 17 chambers, one of which he called "Wilson's Despair" because "this is the chamber where I had the misfortune to be left in darkness, and as I thought at one time, had little hope of ever seeing the daylight again."

Access to Jenolan

The road from Tarana via Oberon was the main caves route throughout the period. People also came from Hartley and Bowenfels via "Binda" station

eight miles north of the caves. After the railway reached Mt. Victoria in 1868, the hotelkeepers of that district constructed a buggy track to within two miles of the caves. Those miles, however, involved a descent of more than 1,000 feet and the track was not much used.

In 1884, W.M. Cooper spent ten days surveying a route across the Kanimbla and Cox River valleys and over three spurs of the Main Dividing Range to the caves, a distance of about 26 miles. Some climbing is indicated by the heights: Top of Megalong cleft, 3,280 ft; Cox River, 940 ft; Main Dividing Range, 3,980 ft; Caves, 2,540 ft. The route was used for many years as a bridle track, but never further developed.

In the late 'eighties the road from Mt. Victoria was completed to within a quarter of a mile of the Grand Arch. Tourists could then reach the caves in rather less than 24 hours from Sydney. Woolcott's Tourist's Guide gave the following schedule: "Leave Sydney by 5 p.m. train; stay night at Mt. Victoria. Leave next morning at 9 for caves; lunch en route, arriving in the afternoon. Passengers walk the final 200 yards to the house, their baggage being carried on horseback."

The final section of the road, which includes the beautiful limestone bridge near the Grand Arch, was completed in 1896. Since then the Mt. Victoria route has been used almost exclusively. "This shortening of the distance, coupled with the establishment of a Government hotel, at once made Jenolan Caves one of the principal tourist resorts of New South Wales" (20). The railway from Tarana to Oberon, which was opened in 1923, was of no significance as an approach to the caves.

On March 14, 1895, J. Wilson's older building and its contents were destroyed by fire. In June, 1896, the Government resumed the remaining building and terminated his lease. He was succeeded by F.J. Wilson, his brother and assistant, but was retained with the title of Explorer until 1900.

Jeremiah Wilson held office at Jenolan Caves for 33 years. When he came the caves were isolated and undeveloped. When he left they were a highly organised tourist resort. A Government-owned house had been built; the caves were easily accessible; they were safe and easy to inspect; their precious contents were protected, and many more caves were known. Wilson had not only witnessed these changes but had devoted his life and energies towards bringing them about.

F.J. Wilson, 1896-1903

The new caves house, built of limestone on the site of the one destroyed by fire, was completed by 1898. This is the central portion of the present structure, plus a portion up the creek. The new house was built and owned by the Government and leased to Harry Smith from July 1, 1898. The caretaker's

cottage and the Post and Telegraph office were built during the same year. Postal facilities had existed since 1889.

The passage from the Grand Arch to the Balcony and the Lucas Cave, discovered by F.J. Wilson in 1892, was opened for use in 1897. Following surveys by Oliver Trickett in 1897-98, a short tunnel was cut in 1901 from the lower level of the Lucas Cave to the Balcony to provide an exit eliminating the need to make a return journey after tourist inspections. With the opening of the Skeleton, River, Baal and Orient Caves later, however, this cutting became the main southern entrance and became the starting point for the new caves. On the north side of the Arch the present convenient entrance was cut in 1898. The older entrance was higher in the Arch and was reached by a wooden ladder.

In addition to these developments, the Jubilee Cave was named and opened for inspection in 1897, and Wilson added his name to the list of discoverers by finding the Aladdin Cave on November 10, 1897, and the Mafeking Cave in May, 1900. The latter, a branch of the Lucas, was electrically lit and opened in 1902.

Having accomplished much in a short period, Wilson resigned in March, 1903, to superintend the opening of caves in Western Australia. He was succeeded as Caretaker by J.C. Wiburd.

J.C. Wiburd, 1903-1932

James Wiburd had been a guide at the caves since 1885. He was destined to be Caretaker for 30 years and to fill the position with great distinction. Like each of his predecessors, he made notable discoveries soon after taking charge. Within little more than a year he had, in company with guides J.C. Edwards and R.I. Bailey, discovered four magnificent caves, the "River" branches of the Lucas Cave, totalling more than half a mile in length.

The first of this great series of discoveries was made on June 6, 1903, when the River Cave was entered. A stalactite deflected from the vertical near a small crevice under the huge boulders of the Exhibition Chamber, was sufficient evidence to Wiburd of a considerable draught such as would come from a large cavern. For six weeks the three men worked at enlarging the crevice, and reached the top of a dome 50 feet high, from the base of which a narrow passage led to the River Cave. Progress through the cave was rapid in the circumstances, only the spare evening time being spent in exploration. In October, 1903, Wiburd and Edwards found the Skeleton Cave. Here the evidence of a cave was river drift - red mud and pebbles - filling a tunnel. This was cut through for a distance of 30 yards until the new cave was reached. The many passages at the far end of the River Cave were next explored systematically and led Wiburd and Edwards in February, 1904, to the Temple of Baal, and five months later, with Bailey, to the Orient Cave.

Preparation of these caves for the public took some years, but interest in them was so great that from 1904 parties were conducted through the River Cave, long before improvements were complete. Visitors found the scene "with the exception of ladders and here and there a rough-hewn track, just as nature formed and left it - dark and silent... . A flat bottom boat is used for crossing the river, and the reflection of the light upon the water, and the peculiar swish as the boat is being pulled across by means of a wire rope forms a strangely fascinating picture which one cannot easily forget." - Bathurst Advocate, October 12, 1904.

Oliver Trickett, L.S., M.S., Superintendent of Caves in New South Wales, whose "plans have never since required amending", surveyed and built models of the new discoveries. Wiburd supervised path construction and the installation of electric light. The Skeleton Cave was opened in December, 1905. The Temple of Baal was opened with ceremony by C.W. Oakes, Honorary Minister, on October 30, 1909. This was the first cave in New South Wales to be "dignified with an official opening." The Orient Cave was officially opened on December 28, 1917, by Miss Gwen Fuller, daughter of the Chief Secretary, and its Ribbon Branch was opened on August 22, 1931, by Sir Philip Game, Governor of New South Wales.

Great Expansion

Partly because of the interest created by the new discoveries, but more especially because of the coming of the motor car and organised motor tours, the resort expanded greatly during the "nineteen noughts". Cars began to arrive in 1903 and by 1912 had displaced the horse coach. In the early 1890s the number of visitors annually was 1,500. In 1904 it was 3,800 and 10,000 inspections were made. In 1906, 5,000 visitors made more than 11,000 inspections and in 1909 there were 7,000 visitors. Extra accommodation was necessary. In 1907 the two-storey wooden structure built by J. Wilson was removed and partly re-erected as a cottage up the creek. On its site the present two-storey stone wing was begun the same year and finished in 1909. A private guest house, "Kia-Ora", was built by E.J. Cooke at the five-mile post, just outside the caves reserve, in 1903 (21). To supply electricity to the caves, the dam forming the Blue Lake was constructed in 1908.

Other measures brought about by the demand, but contributing to further expansion, were the opening of the caves for inspections on Sundays and the introduction of regular evening inspections. In the 19th Century nobody gave the possibility of Sunday inspections a thought - if we judge by the written accounts of the period. Thus, when through delays, a certain party (22) arrived in time for a Saturday afternoon and then recognised that they could see no more caves before their departure on Monday morning, they considered it a favour to be granted a special inspection of the Lucas on Saturday evening, starting at 8 o'clock. They spent Sunday exploring along McKeown's Creek and on Monday morning had the good luck to be shown the Left Imperial before the departure of their coach. In 1909, after some controversy, reg-

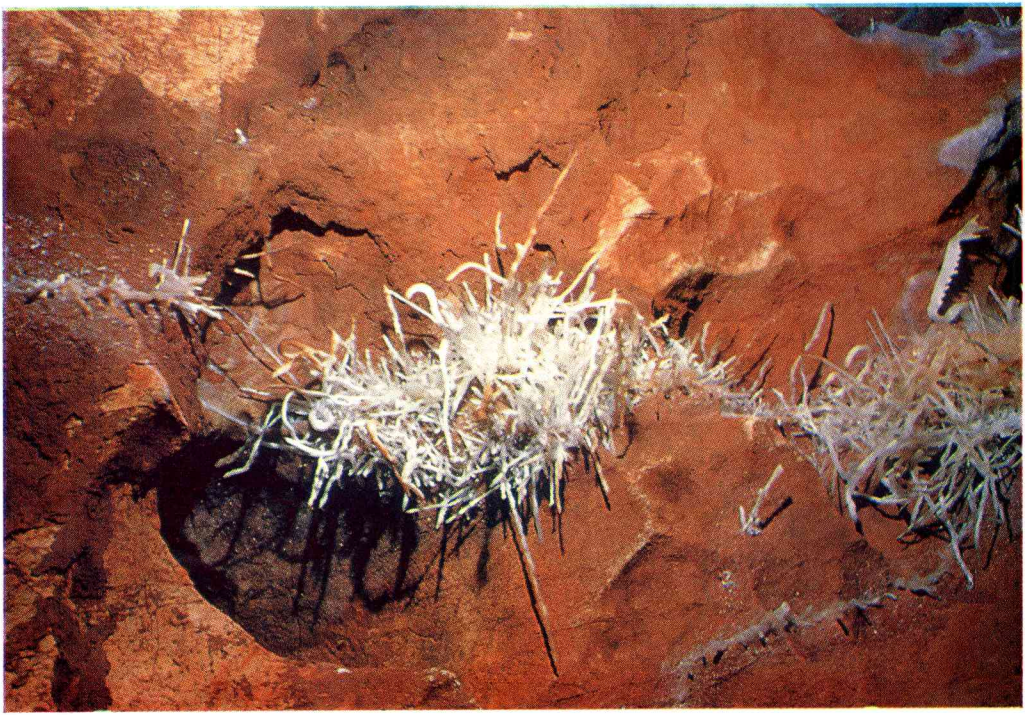

Photo: E. A. LANE

HELICTITES, TEMPLE OF BAAL, JENOLAN, N.S.W.

ulations were published announcing inspection hours as 10 a.m., 3 p.m. and 7.30 p.m., Sundays included. Inspection of the remote and more difficult Elder Cave was discontinued.

Throughout the next decade expansion continued, despite the World War of 1914-18. In the year 1911, 8,460 visitors made 21,325 inspections; 1912, 9,223, 26,553; 1913, 9,499, 26,788; 1914, 10,467, 29,447. In 1918, 45,017 inspections of the caves were made, and 37,762 inspections in 1919.

The lower figure in 1919 reflected two events of the year - the world-wide influenza epidemic, and a local disaster in the form of a cloudburst on February 26. The latter flooded part of the ground floor of Caves House, swept hillside logs and house furniture as far as the Grand Arch, and deposited thousands of tons of mud and rubbish on this short length of road. Caves House was closed during March and April.

The four-storey portion was added to Caves House between 1914 and 1918, and in July, 1916, the house reverted to Government control. Electric lighting was extended to the house in 1916, and to the grounds in 1917, the year in which the power house was built. A 42,000 gallon reservoir to supply the house and grounds was completed in 1920.

Inspection figures showed further expansion between 1920 and 1929, e.g., 1920, 64,245 inspections a year; 1925, 75,568; 1926, 83,985; 1927, 78,755; and 1929, 62,693. During the depression years inspections fell to between 30 and 40 thousand a year. To meet the thriving conditions in the early 'twenties, a three-storey concrete building was erected for the staff (1923) and more additions were made to the Caves House. To reduce travelling time, a tunnel was cut from the Left Imperial Cave to the Grand Arch in 1923 and in the same year the "ferry" across the Styx in the River Cave was replaced by a concrete walk along one wall. The portable reflecting lamps for special features were replaced with fixed floodlights. A 380 ft tunnel from the Orient and Temple of Baal Caves to a point at the rear of the Caves House was proposed by Trickett in 1904 and a plan prepared. The tunnel was not cut, however, because it was feared that the resultant air draughts would affect the cave decorations (23).

Owing to the moist air in the caves the cotton and rubber covering of the electric wires was short-lived and visitors frequently received 110 volt shocks. The wires were therefore replaced gradually during the 'twenties by wires in lead conduits (24). All these activities indicated a busy staff and account in part for the absence of fresh discoveries after 1904.

Wiburd succeeded Trickett as Superintendent of Caves in New South Wales and made visits to other cave systems in the State. His advice on the development of caves was sought by other Australian States, all of which he visited, and his own interest in caves took him abroad. His interests, especially scientific interests, were many. A Sydney newspaper declared in

1925: "He has learned Jenolan with a thoroughness that is appalling. He can tell you the scientific name and its popular equivalent of every tree and shrub that grows on the hills, every tuft of grass that hangs precariously to the rock faces; every bird and animal that inhabits those vast solitudes tucked away in the gorges of the Great Dividing Range, and the limits of its habitat and the reasons for the limitation."

Wiburd was much sought by visitors and in time became known far beyond Australia. While in office he conducted many distinguished visitors through the caves, among them the Duke and Duchess of York in 1927, later to become King George VI and Queen Elizabeth.

Wiburd retired in 1932 and up to the time of his death ten years later, was always ready, especially by lantern lecture, to foster appreciation of Jenolan Caves.

After Wiburd's retirement, the Caves House, the caves and the guiding staff were placed under single control - Mr. S.W.M. Stilling, who had been manager of the House since 1924. The title of Caretaker, last held by Wiburd, then lapsed, and A. Bradley succeeded him in 1932 as Chief Guide.

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1. O. Trickett. Guide to the Jenolan Caves, New South Wales. 1899, page 18.

2. The Australian Encyclopaedia (1925-26, Sydney, two volumes. Ed. A.W. Jose and H.J. Carter. Pub. Angus and Robertson) says that Whalan entered the valley at this end and followed it down to the Coachhouse.

3. "Argus". The Jenolan Caves and the Blue Mountains. 1899.

4. S. Cook. The Jenolan Caves: An Excursion in Australian Wonderland. 1889. J.J. Foster. The Jenolan Caves. 1890. O. Trickett, see (1).

5. W.L. Havard. The Romance of Jenolan Caves. J.R.A.H.S., XX, Part 1. 1934. Also reprinted as a booklet by Havard.

6. "Glyndwyr", Bullock Flat, near Oberon.

7. Sydney Daily Telegraph, August 29, 1888.

8. Here I have followed Havard. Trickett and the tablet set in the Grand Arch attribute the discovery to N. Wilson, C. Whalan and G. Falls in 1858.

9. Bathurst Free Press, April 30, 1856, and January 11, 1860.

10. The Romance of Jenolan Caves. J.R.A.H.S., XX, Part 1. 1934.

11. "Maori" in The Australian, Vol. 5. 1880.

12. This appliance was in use in the early 'eighties.

13. Invented by James Cummings about 1890.

14. Through the Jenolan Caves. 1894.

15. Havard, 1934.

16. In his memoirs, Self Discipline, page 201.

17. Through the Jenolan Caves. 1894.

18. Government Gazette. August 19, 1884.

19. J.R.A.H.S., XX, Part V, 1934 : p 280.

20. The Australian Encyclopaedia. 1925-26.

21. Destroyed by fire in 1942.

22. Notes on a Visit to the Jenolan Caves. By F.C. Barnard. Vict. Nat. 1889.

23. This passage ("Binoomea Cut") was constructed in 1954. Draughts are reduced by the use of double doors to seal the passage.

24. Plastic-covered wires were introduced in the 1950s.

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A B S T R A C T

TWO NEW WESTERN AUSTRALIAN COCKROACHES. By K. Princis. Roy. Soc. W. Aust., 46, 1963 : 11 - 12.

Two new species of cockroaches are described. Shawella douglasi Princis was collected from limestone caves at Jurien Bay, Western Australia, where it was found in association with the guano of Eptesicus pumilus. It is considered a guanobite, although the weak pigmentation and chitinization of the integument, as well as the reduced eyes, may indicate a tendency towards the development of troglobitic characters. Paratemnopteryx atra Princis was collected deep in mines at Marble Bar, Western Australia. It occurred on piles of guano from Macroderma gigas. Princis considers it is a true guanobite. - A.M.R.

THE CAVE SPRING CAVE SYSTEMS, KIMBERLEY DIVISION OF WESTERN AUSTRALIA

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Abstract

Three cave systems are developed along the course of a seasonal stream that has been superposed on a range of Devonian limestone in north-western Australia. The cave system furthest upstream has the greatest known development of cave passages in the region (more than 2,300 yards) and is controlled by two sets of vertical joints approximately at right angles to each other.

Introduction

During the winters of 1962 and 1963, the writer examined several caves in the Limestone Ranges that lie to the southeast of Derby in the Kimberley Division of Western Australia. In 1963, low-grade mapping of some of the caves was carried out with the assistance of M.C. Davis.

Despite the large area of limestone (the Ranges stretch for about 160 miles), there are few notable caves. Most of them have been known for many years, and it is unlikely that many more will be found. Descriptions of several of the important caves can be found in Basedow (1918), Jennings (1962) and Jennings and Sweeting (1963a, 1963b, 1966).

This paper describes a series of three cave systems (here termed the Upper, Middle and Lower Cave Spring Systems) developed along a single drainage course. The systems have a greater development of passages than other cave systems of the Limestone Ranges, and are worth the attention of any speleologist visiting the Kimberley region. Jennings (1962, p. 32 - 33) and Jennings and Sweeting (1963a, p. 25 - 26) gave brief descriptions of the cave systems, and the latter publication includes a sketch map of part of the Upper System. These accounts are inadequate in that the authors did not record the existence of the extensive network of passages of the Upper System, and only refer to it as 250 yards long.

Cave Spring is a well-known permanent spring on Christmas Creek Station and is best reached by four-wheel drive vehicle in the dry winter months. A sandy track leads off the Fitzroy Crossing-Halls Creek highway, three-quarters of a mile east of the junction of the highway with the road to

Figure 1. Location diagram

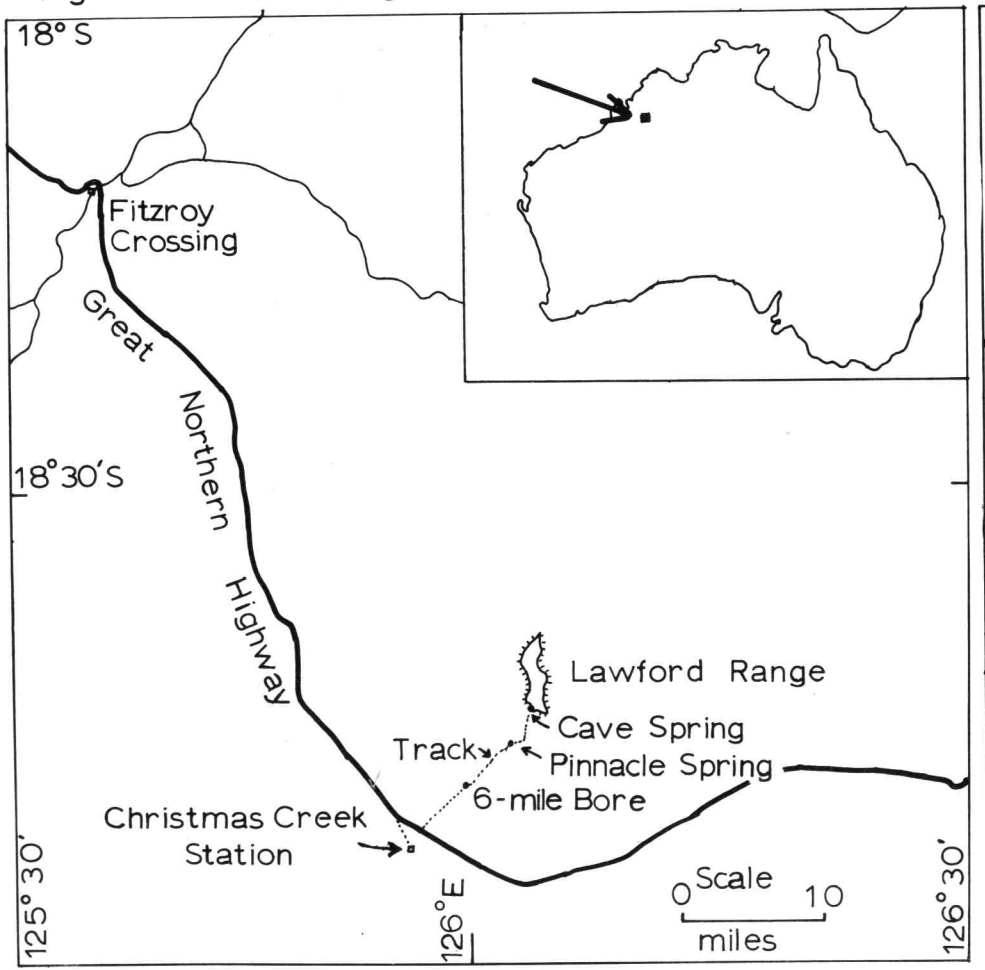
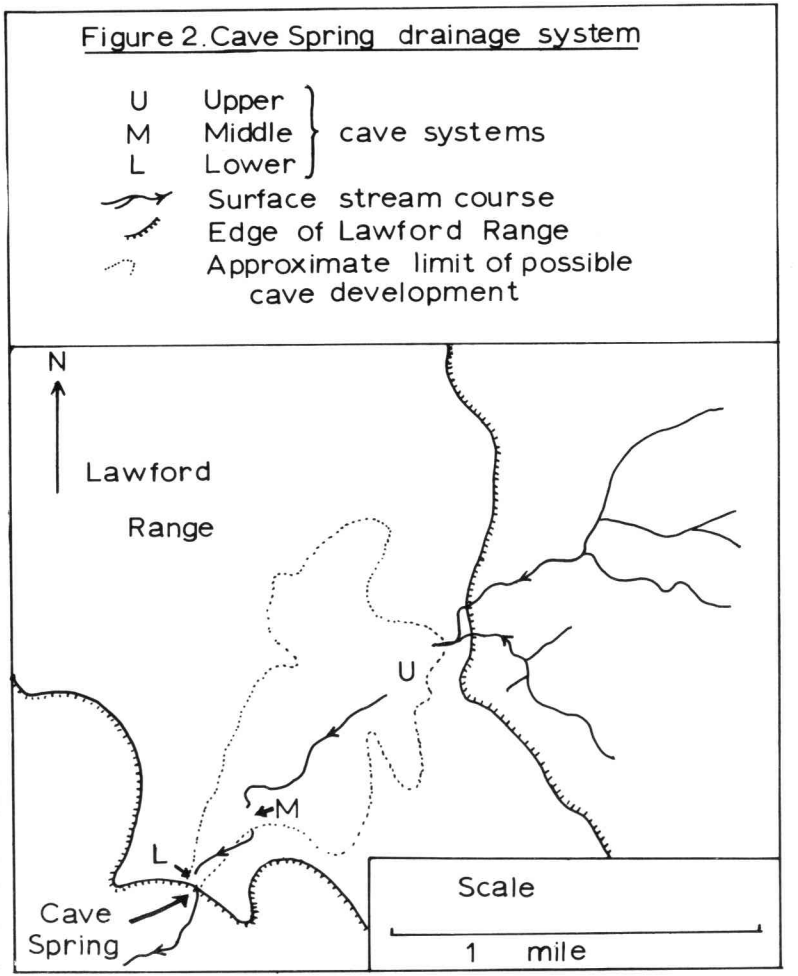


Figure 2. Cave Spring drainage system



Christmas Creek Station, and approximately 50 miles from Fitzroy Crossing. This track leads to 6-Mile Bore and then to Pinnacle Spring. From there, a vague track leads to Cave Spring; a total distance of about 15 miles. Cave Spring lies at the downstream end of the Lower System, and the Middle and Upper Systems can be reached on foot (Figure 1).

The three systems are developed along a seasonal creek that flows through the Lawford Range. The Upper System occurs where the stream flows into the Range, the Middle System lies in the middle of the Range, and the Lower System is developed where the stream emerges from the Range (Figure 2). Between the systems, the stream flows in canyons and enclosed valleys. The entrances of the Middle and Upper Systems lie about 950 yards apart, and those of the Middle and Lower Systems about 320 yards.

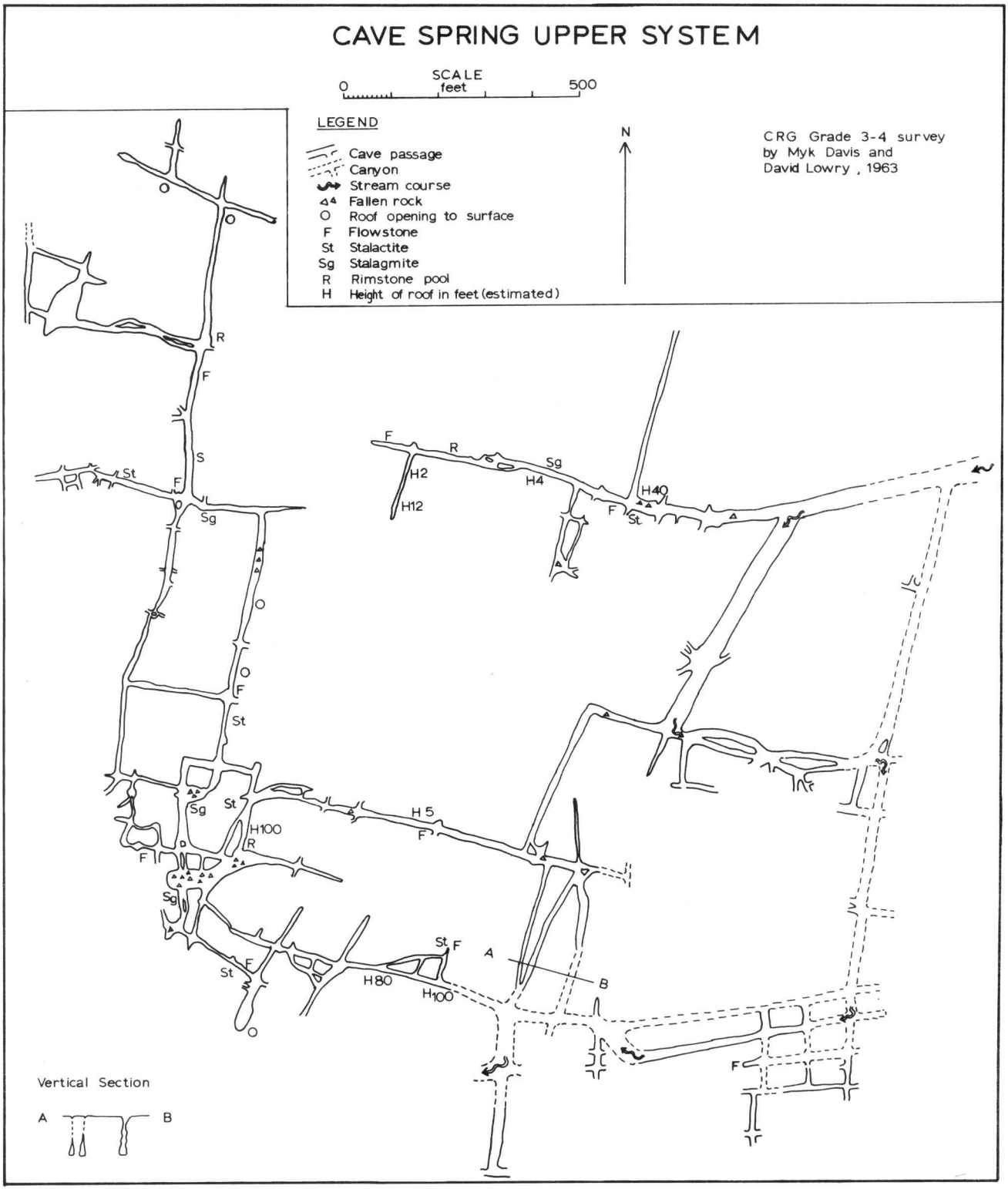
The Upper System (Figure 3)

During the survey of the Upper System 1,563 yards of passage were taped, and a further 805 yards paced. It thus forms the second most extensive mapped cave system in Western Australia. The limestone is cut by a series of vertical joints in two directions approximately at right angles, and the cave system has been developed by solution along them. The Lawford Range stands about 100 ft above the surrounding plains, and the enlargement of the joints may occur over the entire thickness. Thus the cave passages are typically high and narrow, and commonly are open at various points to the surface of the Range. Where these surface openings are long, the cave passages have in fact become canyons.

Passages and canyons carrying the main stream are floored with gravel and drift wood, but in most other passages there is a floor of dry sand and clay, indicating that in times of flood most of the cave is filled with a foot or two of water which rises and subsides quietly. In cross section, the passages show fluctuations in width, but it is not certain whether this is due to lithological differences in the horizontally bedded limestone, or whether it is due to solution controlled by a watertable that fluctuated. The cave has been modified in several parts by collapse, and several large chambers have been formed.

The Upper System has the greatest abundance and variety of decoration of any cave in the Kimberley district. Large masses of old, discoloured calcite flowstone plaster the walls, in places reaching 30 to 40 ft in height. In some cases flowstone on opposite walls has coalesced to partly or completely block the passage. There are active stalactites and stalagmites, usually with an opague white coralline surface. The common development of a coralline surface on the decorations is a feature of this cave, but the cause is not clear. Rimstone pools have developed in a few places, and crude cave pearls were found in one of them. The rimstone pools were dry at the time of exploration and it is not certain whether they are active at present. Bats, cave crickets and two green frogs were the only fauna seen.

Fig. 3


CAVE SPRING UPPER SYSTEM
SCALE
0
feet
500
LEGEND
Cave passage
Canyon
Stream course
Fallen rock
O Roof opening to surface
F Flowstone
St Stalactite
Sg Stalagmite
R Rimstone pool
H Height of roof in feet (estimated)
N
CRG Grade 3-4 survey
by Myk Davis and
David Lowry, 1963
R
F
S
St
Sg
O
H2
H12
H4
H40
H5
H100
H80
A
B
Vertical Section
A
B

Stream course
Pool of water
Fallen rock
Direction of slope
A– –B Vertical section

Fig. 4

Scale 0 100 feet

C.R.G. Grade 2 - 3.
D. Lowry and M. Davis, 1963

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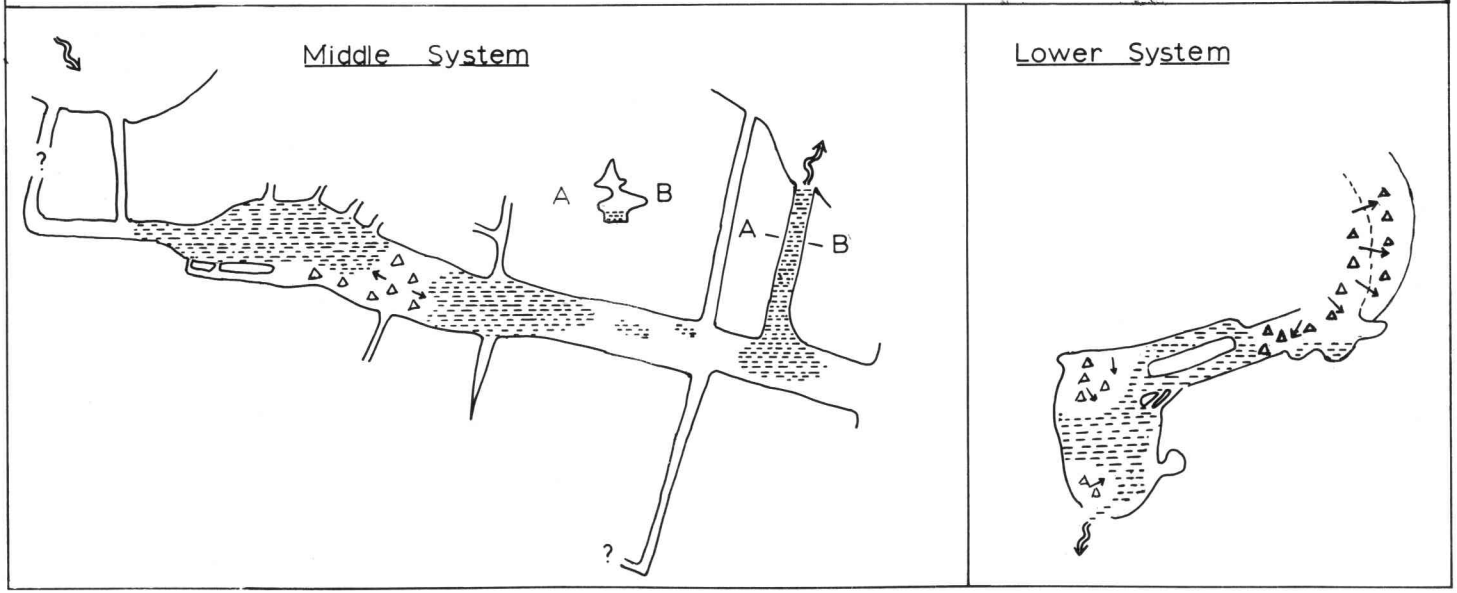

The Middle System (Figure 4)

The Middle System is not as extensive as the Upper System. It comprises a large main cavern with a number of deep pools, and a few small side passages. The most direct method of entry from the downstream side is to follow the stream course into the cave; this necessitates swimming the first pool. Inside the main cavern is a series of large rimstone pools which are filled by the stream during the wet season, and are gradually emptied by evaporation during the rest of the year. When we examined the pools in July and August, 1963, the water was two to three feet deep, and the surface was covered by sheets of floating calcite. The small passages leading off the main chamber were not fully explored, but it seems unlikely that there are any further major caverns to be found.

The Lower System (Figure 4)

The Lower System has a main chamber about 80 ft by 50 ft wide and a few minor side passages. The cave contains a pool three to nine feet deep which is inhabited by frogs and at least three kinds of fish, including cat fish three inches long. The roof varies in height from eight feet near the downstream entrance to about 30 ft above a rockfall on the north-western side of the cave. The pool forms a permanent spring (Cave Spring) which flows out onto the plain. The spring is used as a watering point for cattle, and the presence of paintings on the walls of the cave point to its use by Aborigines in the past.

Origin and Development

The limestone mass of the Lawford Range was formed as an atoll during the Middle and Upper Devonian. The Upper and Middle Cave Spring Systems developed in flat-bedded crystalline biostromal limestone of the lagoon, and the Lower System is developed mainly in the more massive limestone of the fringing reef (Playford and Lowry, in press).

At present there is insufficient information to compile a comprehensive account of the origin and development of the Cave Spring Systems and only an outline can be suggested.

Cave development is believed to have begun with phreatic enlargement of joints, probably at a period when the limestone range was buried by sandstones of the Lower Permian Grant Formation. As the sandstone was eroded, a stream flowing to the southwest was superposed on the Lawford Range. When the sandstone cover was breached, the stream occupied certain joint passages, widening them to as much as 30 ft by abrasion and solution.

Future Work

Besides the obvious scope for future faunal and geomorphological studies,

there is a great opportunity for future exploration. There are at least ten large passages that M.C. Davis and I did not enter because of lack of time, and there are several dozen passages that could be followed with only minor difficulty. (During surveying, any passages that required more than a yard or two of crawling or chimneying were abandoned in favour of passages where progress was faster). Our exploration was concentrated in the western portion of the Upper System. Exploration could be continued in the northern part, and in the passages leading to the south and east of the main stream course. The area containing the three cave systems has a distinctive dark photo pattern on aerial photographs due to the fissuring of the surface along joints, and the extent of the pattern (see Figure 2) indicates that there are many acres of limestone where a network of passages may exist.

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