CONSERVATION OF MT. ETNA AND DISTRICT CENTRAL QUEENSLAND

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Presented by: L. Johnson **

Ladies and Gentlemen,

I have prepared this lecture with **the aim in mind of completely** examining the issue of the conservation of Mt. Etna in Central Queensland as known to me at this time. It will necessarily duplicate some of what other persons and myself have previously written; I believe this is justified in order to 'get it all under one roof'. Thus this treatise will be complete on its own but will make frequent references to publications listed in its addendum. I therefore request the indulgence of those of you already familiar with the case.

The treatise shall for convenience be divided into sections very much along the lines of the University of Queensland Speleological Society's Bulletin No. 3 which I prepared in September 1967 and is now almost out of print.

INTRODUCTION

My knowledge of and interest in the Mt. Etna conservation campaign dates from mid 1962 when the University of Queensland Speleological Society commenced activities which it has continued to date to secure this end. The mountain remained untouched until late 1965 when machinery was installed and later quarrying commenced. Subsequently very large amounts of limestone have been removed and quarrying continues. Already much damage has been done to the area, however, it still remains recoverable. I am strongly of the opinion that the total economic and social effects, both immediate and long term, of the destruction of the mountain will be very grave and impossible to rectify. This could easily become, dependent on official and other action, one of the worst examples of gross exploitation of natural resources, totally without regard of future development, natural beauty, rare Australian animals and plants, indeed regardless of the country and community in general - or an example of conservation in its widest and best aspect. The justification and elaboration of this opinion constitute the remainder of this treatise.

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LOCATION AND PHYSIOGRAPHY

Maps of the area indicating its location with respect to Fauna Sanctuaries and its position in Australia are included in the appendix. The mountain is situated about a mile north-east of Cammoo railway station on the main line seventeen miles north of Rockhampton. The cavernicolous area is determined principally by Recreation Reserve R444 and Portion 120 Parish of Fitzroy. Other important areas are 'Limestone Ridge' one mile south of Mt. Etna - Recreation Reserve R272 and Olsen's Caves Portion 2371 also in Fitzroy Parish. Other than the main railway communications are provided by Highway One, with Rockhampton, a major city eighteen miles south with a population of 46,052 at the 1966 census. The highway is the major longitudinal road connection between North and South Queensland and carries very heavy traffic. Locally, roads connect the area with 'The Caves' township and the local countryside.

The mountain is a substantially isolated peak which has highly cavernicolous limestone outcropping over its northern aspect. It rises about 800 feet from the surrounding plain to an altitude of 988 feet. The opposite 'Limestone Ridge' is about 300 feet above the plain. It is visible for many miles in any direction and provides a view of Rockhampton from its summit where a Trigonometrical station is established.

Mining leases number ML 281, 307, 326 and 340 have been let over the mountain and numbers ML 236, 243 and 306 over 'Limestone Ridge'. With one exception of ML 306 of Mt. Morgan Mines the leases are held by Central Queensland Cement Proprietary Limited.

HISTORICAL

The caves on Mt. Etna and in surrounding districts have been known since almost a century ago. The original owner of what are now Olsen's Caves recognised their great beauty and has since the last century had these caves open for public inspection. Publications describing early history and discovery of the caves have been prepared by the present owners.

The first commercial exploitation of the caves was the extraction of bat guano by early German settlers for use as a fertiliser from a small number of caves . Relics of this are provided by tramways, rusted buckets, navigation markers and in some cases names (Johansen's Cave, Flogged Horse Cave, an allusion to the method of powering the tramway, etc.). During the second world war the area was used for munitions storage and Commando training for activities 'behind enemy lines' under the guidance of Captain, now Professor S.W. Carey.

In 1920 the two recreation reserves were proclaimed to protect the cave areas and provide access for the people for purposes the name indicates. It is only during the last ten years that this action has been reversed by the present government and the mineral leases granted.

In late 1966 Cammoo Park Caves were opened to the public by Councillor J. B. Hinz of the Livingstone Shire Council. In his opening speech the manager mentioned the caves were found in 1886 by a young girl, Miss Charlotte Kohn, but were never opened to the public. Councillor Hinz in his address stated 'As time passes this area of Queensland will be host to a growing number of tourists...' and the success of the new caves venture has amply demonstrated this to be the case.

Prior to the closure of public access to the Recreation Reserves quite large numbers of persons regularly visited the caves on them, frequently during week-end days, and have continued to do so where possible.

CONSERVATION ACTIVITIES TO DATE

The first records available indicate that members of the University of Queensland Speleological Society, during exploratory investigation of the area in early 1962 about a year after the Society's foundation, heard locally about the threat to the mountain. I can recollect that apart from trying to obtain general information on the area, little specific conservation activity took place, as the possible exploitation was then fairly remote. Perhaps the most significant work in early 1963 involved discovery, mapping and biological collection. At the Australian Speleological Federation's 1964 Conference the first comprehensive report was prepared, and distributed. This provided a general case for the conservation of the still undamaged Mt. Etna, mainly on the basis of preservation of Macroderma gigas, a rare bat, to be described later, & initiated action which resulted in Mount Morgan Mines voluntarily ceasing its quarrying near Johansen's Cave in the interests of conservation. Early in 1965 the Rockhampton Naturalists Society and Central Queensland Research and Development Bureau became associated with the campaign.

The first contact with the cement company was in May 1965 with a reply to a letter to the Editor of the Courier Mail. The original letter by Mr. B. Kay stated that the cement company intended to quarry the mountain and thus cause irreparable damage to the caves. It went on to justify the opposition to this action. The reply is very important in this case. Mr. D. Woodcroft, Manager of the company, denied that 'quarry operations would destroy natural caves at Mt. Etna near Rockhampton' and further stated that 'areas in which there were

caves did not lend themselves to mining operations'. It is very interesting to compare this with what actually happened less than six months after these statements were made and in the light of an 'Application for Exemption' for a period of six months dated 19th May, 1965, in which it is stated that 'on 25th March, 1965 the company entered into a major contract with Noyes Bros. Pty. Ltd. for the erection of quarry equipment and installations on the leases.... Mining operations will commence after the installation of the equipment'.

The University of Queensland Speleological Society investigated legal proceedings about mid 1965 but found this avenue to be futile. On 12th May, 1965 the Morning Bulletin, Rockhampton, published a letter from the President of the Rockhampton Field Naturalists Club which ended 'This mountain should never be destroyed for its limestone'.

The first of a series of conservation bulletins published by the University of Queensland Speleological Society appeared in May 1965. It included a general description of the area and problem and stated in part 'why must the quarries be sited where they will do the maximum of damage?' On behalf of the society the following recommendations were made:

1. Mt. Etna be left undisturbed and preserved as a National Park.

2. The northern section of the ridge containing Johansen's Cave be preserved.

3. That quarrying be carried on in the site of Pilkington's Quarry (now unworked and leased to Central Queensland Cement Pty. Ltd.) where the existing caves have already been destroyed.

Pilkington's Quarry is situated in the southern end of Limestone Ridge and was purchased by Central Queensland Cement for $120,000.00. This circular received several letters expressing support and assistance.

On 5th August, 1965, Mr. P. Bridge of the Western Australian Speleological Group wrote a letter giving an excellent statement of the case to the two Companies, four relevant Queensland State Government Departments and the University of Queensland Speleological Society. It emphasised the precedents for such destruction of natural resources for ephemeral development and the betrayal of trust involved in selling parts of the people's heritage to business interests. I am unfortunately unaware of the results of this letter.

Mt. Etna

The University of Queensland Speleological Society Newsletter of August, 1966 contained a comprehensive article by Mr. M.J. Graham, one of the founders of the Society, and this together with the completion of the cement factory and commencement of quarrying marked the beginning of the most recent concerted conservation efforts. The University of Queensland Speleological Society commenced active enlistment of support by letter, with disappointing results. Two further bulletins were prepared, No. 2 on the bat population by Dr. P.D. Dwyer and No. 3 by myself.

On Thursday, 27th July, 1967 at 7.45 p.m. the Central Queensland Speleological Society was founded as a result of a public meeting called by the Mayor of Rockhampton. This society has been quite active as regards conservation and has very great advantage in its location.

During July and August, 1967 two major newspaper items about the problem were published while Dr. Dwyer and myself broadcast over the A.B.C. in the matter. This resulted in several more organisations including the Queensland Trades and Labor Council becoming interested and actively pursuing the aim, all somewhat independently. Dr. McMichael of the Australian Conservation Foundation later contacted the Cement company requesting them to refrain from mining certain sections of limestone which are considered to be important for the preservation of caves and the substantial bat populations inhabiting them, they are proceeding with the matter. On 4th October, 1967 I received a telegram from Dr. Everingham, the newly elected A.L.P. Member for Capricornia expressing support and requesting further information, and he has subsequently been of great assistance in the matter at Federal level.

The Australian Conservation Foundation held a Symposium at the University of Queensland on 14th and 15th October, 1967. The registrar gave permission for Dr. Dwyer, Mr. Shannon and myself to give an hour long lecture and slide show on the problem. This was very well received and gave more impetus to the programme. Similarly, the Humanist Society of Queensland received a lecture and expressed support in December, 1967 and various branches of the Australian Labor Party have done likewise.

One result of this increase in activity was the establishment by the Queensland State Government of a Departmental Committee consisting of Officers of the Lands, Forestry and Mines Departments to investigate 'the future of Mt. Etna Caves system and the question of mining thereon' and the first meeting took place towards the end of December, 1967. The University of Queensland Speleological Society was able to submit a report, photographs and maps to the Committee which also made an

inspection of the area. The Committee continued to examine the problems and discuss it with the Cement Company with a view to obtaining surrender of parts of the leases immediately surrounding the caves. Several days ago the Society was advised by the State Government that the Company was not prepared to surrender any of the lease. Despite this unfortunate result the Committee obtained several important undertakings from the Company, notably that it would 'leave a barrier of not less than 66 feet between their workings and known caves'. Also 'workings are being directed to keep clear of possible cave structures'. Regular inspections by the local Inspector of Mines were instituted and as at 16th October will continue to be made.

In October of this year the U.Q.S.S. was advised that quarrying had been extended around the mountain to the north in dangerous proximity to Bat Cleft. As a result of this intelligence the Society wrote again to the State Government Departments and contacted Mr. Sherrington, the State Minister for Salisbury, who has taken a great interest in the matter. I also telegraphed Dr. Everingham in Canberra who was able to speak during adjournment in the House of Representatives at 2 minutes past midnight, 10th October, 1968. He referred to a six week old unanswered question and made many allusions to the value of pure science, he referred further to the actions of the Cement Company as being 'high-handed, contemptuous and specious in their arguments' and that the matter was very urgent if worse consequences are to be avoided. Dr. Everingham's excellent statement was reported over the A.B.C. National News and in National, Queensland and local newspapers. Following this, Mr. Shannon of the University of Queensland Speleological Society, Mr. Young of Central Queensland Speleological Society and myself commenced writing to various editors of newspapers.

To date, this virtually sums up the matter although each day is bringing more developments. The Queensland Government Mining Journal No. 805 gives some interesting data about the quarry:

'Limestone mined during quarter (to Nov. 1968) 38,456 tons
Value $133,500;
Production and development concurrently on 3,4 and 5 levels;
No. 6 has been prepared for initial drilling;
Average number of employees - 15.'

This issue is, I believe, one of sufficient importance to transcend any political boundaries; however great assistance has been lent by Mr. Sherrington the State Member for Salisbury and Dr. Everingham, the Commonwealth Member for Capricornia, both of the Australian Labor Party. Because of

this I think that it is of interest to quote two sections from the A.L.P.'s 'Platform' VII Science and Technology; Natural Resources 'Australia's future, and the wellbeing of its people, depends on the scientific development of its natural resources. Development is not mere exploitation; it means wise use of natural resources'. 'Enough of both kinds of resources, (renewable and non-renewable) and particularly of our natural landscapes, must be reserved for social, cultural, educational and scientific purposes.'

CONSERVATION - REASONS AND JUSTIFICATION

The reasons why I deem conservation of the mountain to be of very great importance have for convenience been divided previously into five categories and I shall again follow this division. This is to be regarded as purely arbitrary and by no means are the compartments 'watertight'. It is very important to remember throughout the very great importance of cement to the economy, about which I will say more later. I have designated the categories i. Aesthetic, ii. Geological, iii. Biological, iv. Economic, v. Tourism and Recreation, and will discuss them in order of those headings.

AESTHETIC

Caves are very rare in Queensland. The two major areas other than Mt. Etna, Chillagoe and Camooweal, are separated from major centres of population by large distances and roads of doubtful quality. The third area near Texas in the south east, is of a far smaller nature, fairly inaccessable and may be innundated by a new dam in the near future. Apart from smaller outcrops the nearest interstate caves of note are at Kempsey, 300 miles south of the border in New South Wales. Thus the only example of significant cave development over two thousand miles of Australian coast and about seven hundred miles inland (limited by Kempsey, Kathrine and Cape York). The caves on the mountain provide the best examples and most highly developed formations of all the caves in the area.

Apart from the intrinsic fascination of these subterranean recesses themselves, they contain most beautiful examples of decorations of crystalline carbonate of lime. These take the form of stalactites, stalagmites, helictites (stalactites going sideways, etc.), straws (stalactites hollow, 3/16 inch thick and up to six feet long), flowstones, columns, terraced gour pots and many unclassifiable varieties, many glistening in a perpetual film of water and still growing. Owing to the very slow rate of formation and changed climatic conditions these decorations are for all practical purposes totally irreplaceable in common with all similar cave structure. They have already been seriously damaged and are continuing to be

damaged by blasting. They have been compared favourably with the best of the formations of the Southern wetter caves although on a much reduced scale and are, as far as is known, the only example of this phenomena in Queensland.

To pursue the description of formations and their claim for protection is, I believe, not justified in an address to this body whose members will commonly be far more familiar than myself with the matter.

GEOLOGICAL

These caves are formed in a vertical pattern rather than the more frequent horizontal one and as such they warrant special study as to the general origin of caves. Their nature and formation has been suggested as being due to reactions occurring during leaching from organic detritis from a rain forest equivalent through a pluvial period of a glacial cycle. I regret that as I am not a geologist I cannot amplify this rather interesting theory.

BIOLOGICAL

The most numerous species inhabiting these caves is the bat Miniopteris schreibersii which I shall discuss under the heading 'Economic'. Other bats do occur which are dependent on these caves both for breeding purposes and normal activities. Australia has among its placental (non-marsupial) mammals very few which are indigenous. One of these is the bat Macroderma gigas. The genus Macroderma is not found outside Australia and is one of only two genera of bats that are uniquely Australian in their origins. Macroderma gigas is peculiar amongst bats in its carnivorous habits. At one time it was widely distributed over the Australian continent; today it is only known as small colonies from a few scattered localities in Northern Australia. Observations at the Rockhampton caves have shown that a breeding colony of about 100 Macroderma gigas recurs annually in spring and summer in Johansen's Cave. During the rest of the year these bats are dispersed in small numbers through the larger caves of Mt. Etna, being found most commonly in caves that have several large entrances and hence relatively well lit interiors. No populations of Macroderma gigas are known south of Rockhampton and none of the recorded colonies appear to be as large as that found in Johansen's Cave. The rarity of this species within Australia generally, combined with its being a uniquely Australian mammal of a class very rare in Australian indigenous mammals merits its conservation at all times. The presence of a relatively large and apparently well-established colony of Macroderma gigas based on Mt. Etna caves and adjacent systems calls for the conservation of these caves. Evidence,

to date, suggests that populations of Macroderma gigas may be highly localised and dependent upon particular areas that are appropriately cavernicolous. In contrast to Miniopteris - to be described later - conservation of Macroderma gigas is not dependent soley upon conservation of specific caves; rather it depends upon conservation of entire cavernicolous areas.

Numerous anthropods - notably insects - occur in the caves. Most tend to be anomolous and consequently interesting. A cave which, except near the entrance, is perpetually dark, has a high humidity, constant temperature, little air movement, differs very greatly from the environment outside it. Consequently cave inhabiting animals are very differently adapted to those on the adjacent surface. Often they are unable to live outside caves. The food chain series of cave animals is notable, in the closed community that exists in caves there is little interchange of material with the outside. What there is, however, is utilised many times by different animals and plants (fungi) before being reduced virtually to gasses. Their ecology (environmental study) ethology (behaviour) and morphology (form) is usually very specialised; its study gives information about the actual adaptions which all animals, including man, make changing environments.

Cave adapted animals can rarely live outside their caves in the very different environment; thus destruction of the caves will render many of them extinct. Little study of the Mt. Etna caves fauna has yet taken place; enough however to show it is very important. It is hoped it will be preserved long enough for suitable investigations to take place. Much similar work has been done in Southern cave faunae and has proven very significant.

To what extent other species in the region (i.e. bats such as the eastern horse-shoe - Rinolophus megaphyllus, and the sheath tailed bat - Taphozous, the dense population of brush-tailed rock wallabies, the marsupial native cats, the scrub turkeys, etc.) are dependent upon this particular area cannot at present be ascertained. It is of significance, however, that the Mt. Etna area represents a moderately rugged coastal upthrust of cavernicolous limestone that has no equivalent elsewhere in Central Queensland. This topology has permitted development of an unusual rain-forest habitat (semi-evergreen vine thicket) in a latitudinal range where rain-forests of any type are poorly represented. It is possible that this habitat is the underlying factor permitting continued co-existance of several of the local animal species.

ECONOMIC

To many persons, notably those involved in primary industries, this will be the most important reason for conservation of the area and involves the bent-winged bat Miniopteris schreibersii.

Previous studies on bent-winged bats in Australia have been carried out in south-eastern Australia (in New South Wales, Victoria, and South Australia). These studies have revealed that the survival of Miniopteris schreibersii in south-eastern Australia is dependent upon a few caves that are re-visited year after year by huge colonies of bats (10,000 to 200,000) for purposes of rearing young. These breeding caves are of special structure, with enclosed chambers or domed ceilings, such that they retain air that has been warmed by the constant activity of the bats themselves and in this way can be converted into giant incubators within which the young of each year can be reared through to independence. Any damage to these caves which prevented them from retaining warm air would prevent survival of the young and would ultimately lead to extinction of large populations of bent-winged bats. Banding studies have shown that the bent-winged bats of many different caves and mines, scattered over a relatively large area (typically a major watershed area) rely upon a single traditional breeding cave. Destruction of any given breeding cave would therefore mean ultimate extinction of all the bent-winged bats in a much larger area than that of the immediate environs of the cave itself.

In New South Wales the Willi Willi Caves (near Kempsey) serve as a breeding cave for populations of Miniopteris schreibersii and Miniopteris australis inhabiting the Macleay River watershed area. Knowledge of the significance of breeding caves for these bats, and of the implications of destroying or damaging such caves, was sufficient to prevent a mining lease being granted for phosphates in 1963.

Work to date at Mt. Etna has revealed that a cave known as 'The Bat Cleft' serves as a major breeding cave for both Miniopteris schreibersii and Miniopteris australis. Estimates of colony size indicate that about 100,000 adult females of these two species move to the Bat Cleft each year to give birth to, and rear, their single young. This means that in late December, after the young are born, nearly 200,000 bent-winged bats occupy the one cave. The structure of the cave is, as in southern latitudes, such that it may be warmed by the activity of the bats and thus reach temperatures appropriate to the rearing of young. No other caves are known upon Mt. Etna, or in the general area, that provide a

similar structure and nor are other major cave systems known anywhere within 400 miles of Rockhampton. Even if suitable caves did exist elsewhere, however, it is unlikely that they would be used as breeding sites in the event of the Bat Cleft being desroyed. Experience with a variety of animal species (e.g. seals, penguins, egrets, passenger pigeons) has shown that species relying upon traditional breeding grounds may be inherently unable to abandon them for another place no matter how intensely they are exploited by man. Conservation of species such as these can only be achieved by rigid protection of their breeding places. Mining activities currently under way at Mt. Etna are about ¼ mile from the Bat Cleft. If mining continues then destruction of this cave is inevitable. Even at the present distance it is possible that blasting may lead to collapse, or partial collapse, of the cave. One rock-fall is known to have occurred since mining began. Destruction of or excessive damage to the Bat Cleft will mean extinction of the breeding colonies of bent-winged bats. This in turn will mean extinction of the entire populations of these two species which are dependent on the Bat Cleft for reproduction. These populations probably number between 400,000 and 500,000 bats.

Much of the area surrounding the mountain, indeed most of Central Queensland is dependent on agriculture and grazing industries and is thus engaged in constant battle with insect pests destroying crops, grasslands and forests. Many varieties of insects are involved, the most important being the moths (Noctuidae, etc.) owing to their larvae caterpillars. The moths, the reproductive phase of the pest, fly principally at night and generally remain concealed during the daylight periods avoiding birds and numerous other predators. Control of many of these pests is maintained in cultivated areas by insecticides, however in large rural areas this is uneconomic and frequently impossible. Thus natural predator-prey relationships become the most important population control. The bent-winged bat is exclusively insectivorous, it catches insects in flight, and furthermore it is active only at night. Thus it is seen to be the major predator of moths. It has been reliably estimated that over one ton of moths amounting to perhaps six million individual moths are eaten by the bats each night.

The extinction of the bat would very rapidly remove this very powerful control on moth populations and could very probably lead to a cataclysmic increase in their numbers. It is to be expected that this would severely affect all primary production and could well make the difference between success and failure in some of the borderline primary industries. These industries are of much greater importance to the State and directly affect far more people than does the quarrying of limestone.

TOURISM AND RECREATION

The tourist potential of caves in the area is indicated by the success of present caves open to the public. These (Olsen's Caves and Cammoo Park Caves) have had access made easier, have been fitted with lighting and as a result prove very popular. The area is situated very close to the main northern road, the Bruce Highway and within convenient distance of the City of Rockhampton. As previously described, there is virtually no cavernicolous area so accessibly located in Queensland. The caves thus present a very unusual tourist attraction to the area. In beauty and form parts of them are easily comparable to the Great Barrier Reef. It has been mentioned above that the caves on Mt. Etna are far superior to those at present open to public inspection. Numbers of them are however of slightly difficult accessibility, although as in the tourist caves this may be eased. It would be an important and irreparable loss to the district if this notable tourist attraction were to be destroyed at a time when the very important tourist industry is undergoing rapid expansion. The permanent population of the statistical division of Capricornia is 96,030 (1967).

Caves as a source of recreation apart from tourism appeal mainly to a minority of the population, such as members of this Society (UQSS). In Rockhampton the newly established Central Queensland Speleological Society, the Rockhampton Naturalists Society, the Boy Scouts and numerous members of the general public have shown interest in the caves and their conservation. With more publicity as can probably be expected more persons will become involved and realise the asset these caves are to Rockhampton as well as their individual beauty.

PROBLEMS ARISING FROM CONTINUATION OF QUARRYING

The quarrying of cavernicolous limestone is in itself a dangerous occupation. Blasting into rock which is not known to be reasonably homogeneous has led to many serious and misdirected blasts. One may refer to an incident at Ashgrove, a Brisbane suburb, where houses were virtually shelled with rock from a quarry - some of the houses were up to half a mile away, and similar instances not unlike this involving 'shelling' of houses have been reported near Mt. Etna. Collapse of caves may, if in a quarry face, precipitate very large amounts of limestone from the mountain above on to the plant and workers below. Similarly it is possible, especially when higher levels are worked, for collapse of the quarry floor owing to blasting and weight of machinery. It is noted that Mt. Morgan Pty. Ltd. experienced great difficulties in its quarry near Johansen's Cave. Enough limestone 'leaked'

into caves to prove an economic problem, and explosions proved embarrassingly large. Fortunately the dangers of continued blasting were realised and operations ceased.

Quarrying of cavernicolous limestone often results in the separation of very large blocks of the rock - too big generally to handle. Further reduction of these - by blasting - on the quarry floor may be necessary. This is also a dangerous process and is quite uncontrollable, apart from its being of doubtful economic value.

It is considered that these factors may, especially when more cavernicolous areas are encountered, result in serious personal injury or perhaps death to the workers at the quarry. This may not necessarily coincide with an explosion but could occur after personnel return to the unstable quarry following blasting. The stimulus of machinery may initiate it.

Very good evidence for these hazards was provided by the Manager of the Cement Company in 1965, who previously quoted 'Areas in which there were caves did not lend themselves to mining operations'.

ALTERNATIVES

The development of a cement industry in Central Queensland has been a particularly important factor in the economic development of the area. The Company has expended large amounts of money in building its Parkhurst factory seven miles north of Rockhampton. It is very important for me to indicate that conservation of Mt. Etna will not stop the availability of limestone for cement production. There are many other sources of limestone available which are far less cavernicolous than Mt. Etna and even Limestone Ridge and hence far safer and more desirable to quarry.

The publication by the Queensland State Department of Mines - Limestone Resources of Queensland - lists several areas which could be considered as alternatives for limestone supply, some closer to the factory than Mt. Etna, which is ten miles distant. The only advantage to compensate for the dangers of quarrying is its superior bulk and physical shape. However, the bulk is far below the total of other limestone resources in the district.

Examples are provided by the Glenmore outcrop only four miles from the factory, which is classed as a major deposit of ready accessibility. It has a width of 450 feet and an exposed length of fifteen chains, the estimated tonnage available to a depth of 100 feet is of the order of five million tons. Quarry operations removing 2,000 tons have previously been

carried out at Glenmore. A larger area of limestone occurs beside the Fitzroy River at Limestone Creek Siding. It is twenty-seven chains in maximum width and is believed to contain immense quantities of limestone, reserves are however somewhat limited by the river level. Quarries in this deposit were worked many years ago. Numerous other areas more distant are recorded such as Ulam Marmor, Raglan and Ambrose. Other cement factories have found it possible to economically utilise limestone from fairly large distances (Calcium to Townsville - 29 miles rail, Mud Island to Darra - 24 miles boat, 2 miles continuous belt).

Much of the alternative supplies may not prove quite as easy and convenient as Mt. Etna to quarry and may seem less attractive to the Cement Company despite considerations of blasting cavernicolous areas. However, the disadvantages resulting from this will be, in my opinion, far outweighed by the advantages accruing to the people and industries, indeed country and community of Central Queensland and thus Australia, both present and future.

Some restricted parts of Mt. Etna have been found to be less cavernicolous than others; there appears to be increasing cavernicolousity as one moves north from the present quarry areas (The quarry is at present moving in that direction). It has been suggested that quarrying can continue on the extreme southern section of the outcrop yielding at least enough for the Company to recover expenditure for the existing installations and preserving the remainder of the mountain. This has not been well investigated but may form a possible ground of compromise bearing in mind the destruction already extant.

CONCLUSIONS

I have described what I know of the conservation of the mountain and surrounding area and endeavoured to justify my opinions on the matter. In summary, I believe conservation is justified by the economic and scientific/aesthetic considerations. I recognise that the production of cement is vital to the economic development. However, the necessity for utilisation of Mt. Etna for this purpose is mitigated by other limestone outcrops known to be available. Unfortunately large amounts of data and information are lacking hence the hypothetical aspect of many of my suggestions must be remembered. I remain convinced that the continued destruction of the mountain will lead to very grave and serious problems for the district. I am particularly mindful that now (December 1968) the female bats are congregated in Bat Cleft giving birth to their offspring and so doing whilst blasting, quarrying, etc. continues on the mountain.

For the reasons stated above I believe in the public interest the quarrying of Mt. Etna should cease permanently and immediately, the area being declared a National Park.

I remain of the opinion that the matter is in a very late state.

Ladies and Gentlemen, Thank you.

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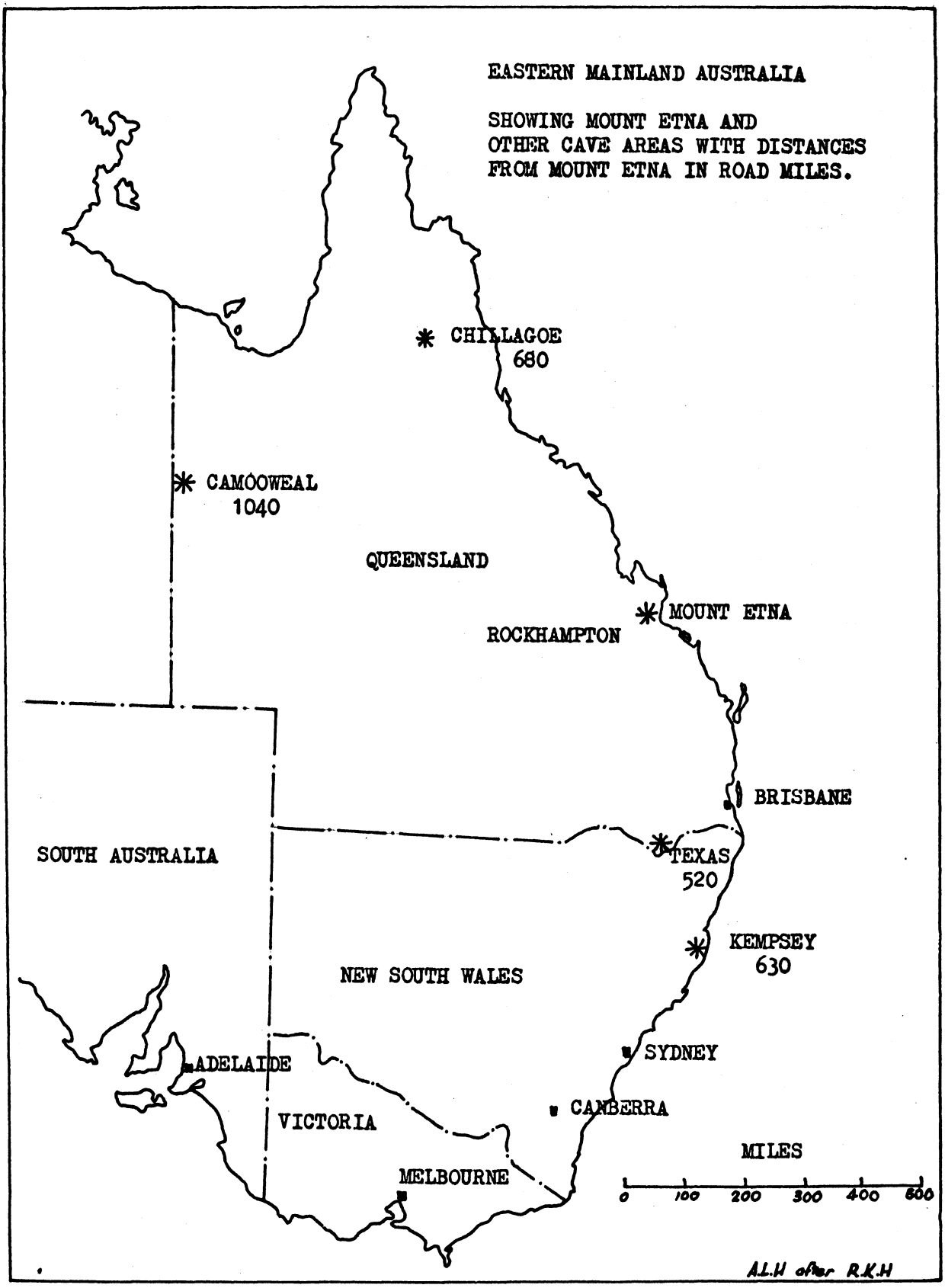
EASTERN MAINLAND AUSTRALIA
SHOWING MOUNT ETNA AND
OTHER CAVE AREAS WITH DISTANCES
FROM MOUNT ETNA IN ROAD MILES.
CHILLAGOE
680
CAMOOWEAL
1040
QUEENSLAND
MOUNT ETNA
ROCKHAMPTON
BRISBANE
SOUTH AUSTRALIA
TEXAS
520
KEMPSEY
630
NEW SOUTH WALES
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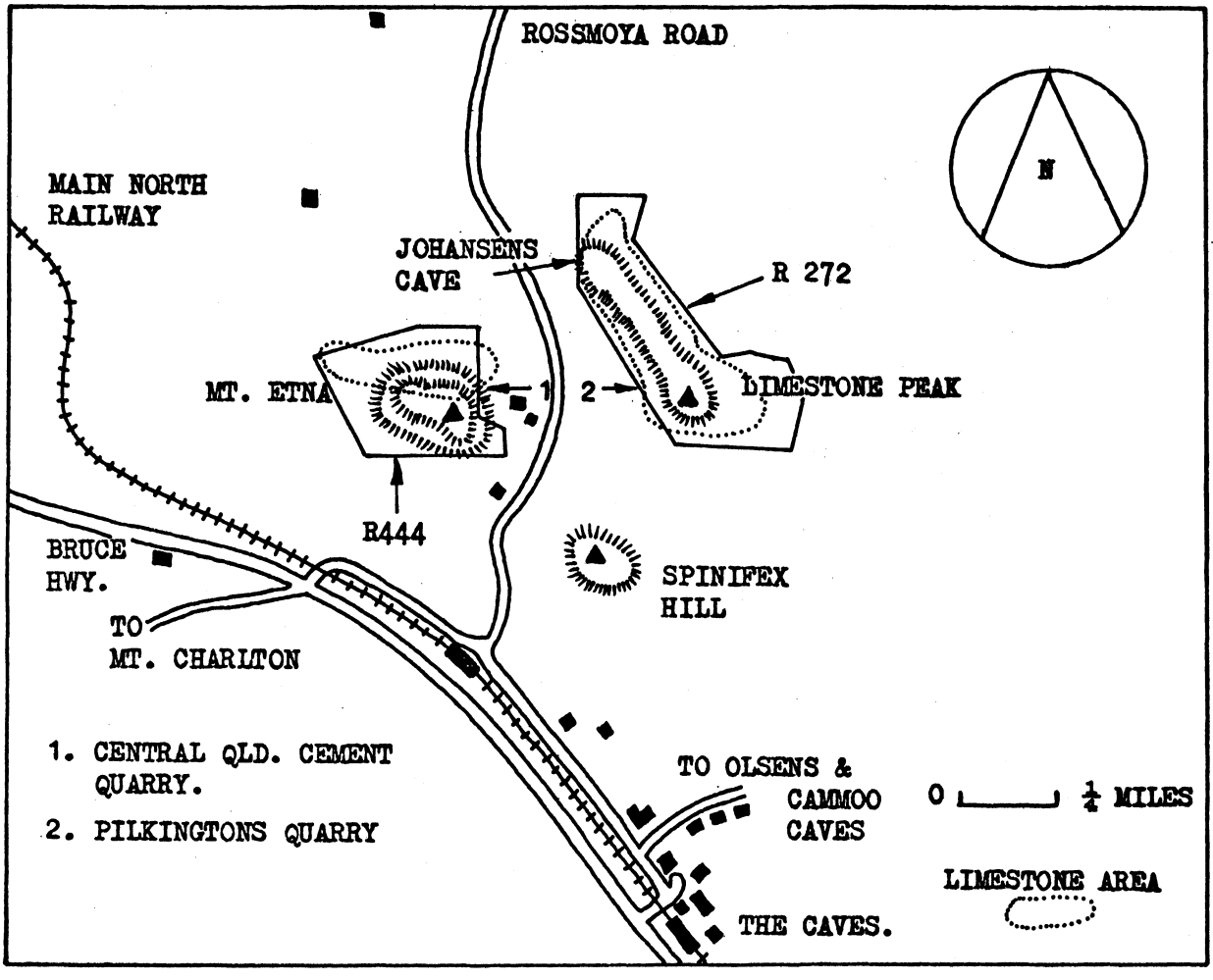
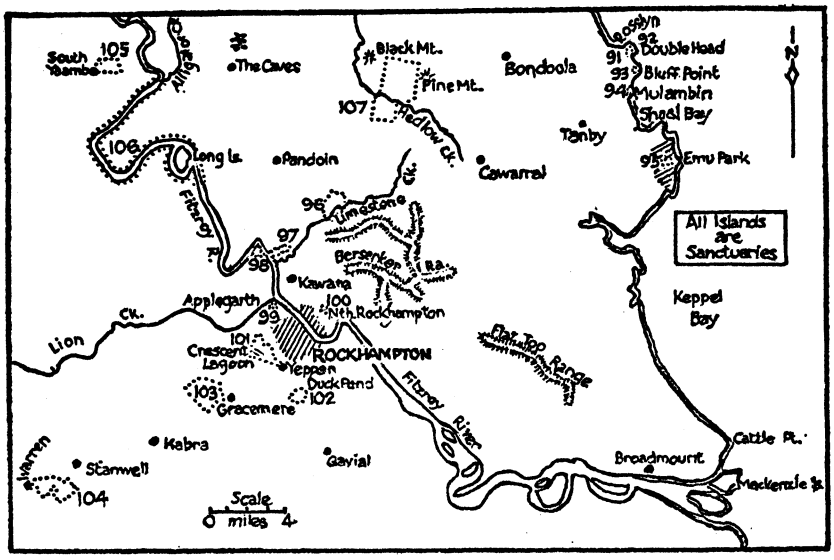


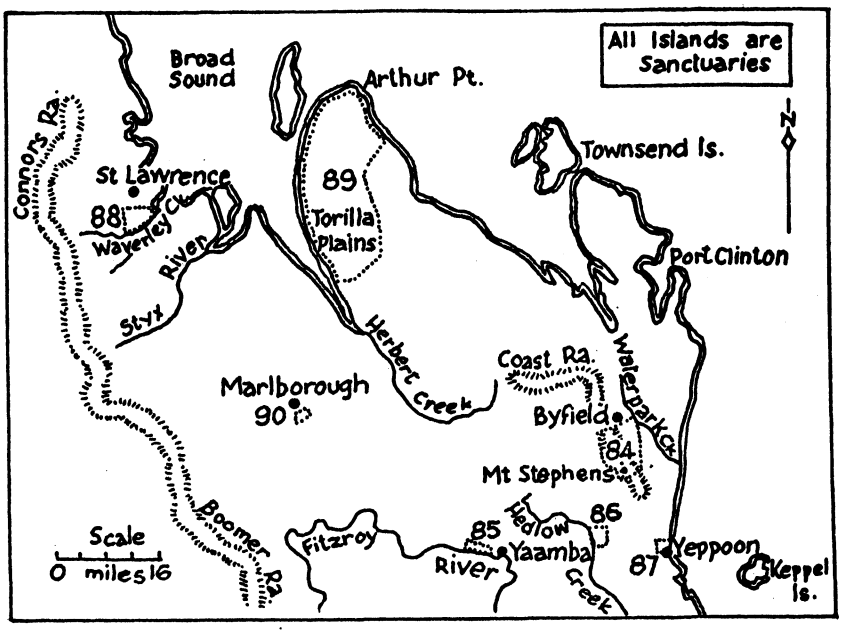
MOUNT ETNA AREA



The sanctuary boundaries (as at December 31, 1957) are delineated by dotted lines.

SANCTUARY INDEX

No.	Sanctuary	Area in Acres
91	National Park Reserve 642, Parish of Hewittville, Rosslyn Head	100
92	National Park Reserve 641, Parish of Hewittville, Double Head	28
93	National Park Reserve 643, Parish of Hewittville, Bluff Point	122
94	National Park Reserve 644, Parish of Hewittville, Mulambin	20
95	Sanctuary at Emu Park Water Reserve, Emu Park	68
96	Seeonee Park, Rockhampton	585
97	Hunter's Farm, Glenmore, via Rockhampton	349
98	Picnic Point Reserve, Rockhampton	145
99	The area previously known as Jardine's Lagoon, Rockhampton	20
100	Subdivision 11,Section 10,Parish of Archer, North Rockhampton	10
101	Diggers' Park, Rockhampton	96
	Murray's, Yeppen and Crescent Lagoons, Rockhampton	600
102	Duck Pond, Gavial, via Rockhampton	320
103	Native Birds Reserve, Gracemore	1,400
104	Property of S.F. Roberts, Warren, via Rockhampton	1,216
105	"Waterview," South Yaamba	570
106	Part of Fitzroy River, Belmont Creek to Alligator Creek, via Rockhampton	2,880
107	Mount Hedlow, via Rockhampton	2,137



The sanctuary boundaries (as at December 31, 1957) are delineated by dotted lines.

SANCTUARY INDEX

No.	Sanctuary	Area in Acres
84	State Forest Reserve 20, Parishes of Maryvale and Byfield, via Byfield	28,135
85	Yemeappo Station, Yaamba	3,020
86	Hedlow Creek, via Rockhampton	3,600
87	The Grounds of St. Faith's School, Yeppoon	54
88	Property of C.W. Wright, via St. Lawrence	10,752
89	Torilla Plains, via Marlborough	149,200
90	Police Reserve, Marlborough	48