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Conservation of Geological Features in Peninsular Malaysia

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Abstract : Geological conservation is the protection from destruction of physical formations and geological phenomena of outstanding scientific value representing the different stages of the Earth's geologic history and its transformation through ongoing geological processes.

Conservaion takes into account the need for a proper and the most economical exploitation of the country's geologic resource in order to prevent undue waste of this depletive and non-renewable resource.

Various types of geological features may be conserved for the science and study of geology. These features are type sections/localities/areas of geological formations, fossil localities, karstic limestone hills and caves, rock forms, coastlines, hot springs, coral reefs and historical man-made mining structures.

In view of land and economic development, the selection of a geological feature for conservation must be pragmatic. The feature should significantly represent one or more aspects of geology and does not duplicate the geology of other features conserved. These features occurring in a state of Peninsular Malsysia may be conserved in a State Park (land and marine), Nature Reserve, Nature Monument and Geological Site (of special scientific interest). Geological Site is a new category of conservation area in this country, proposed in this study.

Geological features are studied in various earth science disciplines by various universities in the country. A *Code For Geological Fieldwork* is proposed for adoption to conserve geological localities for future field study from vandalistic "hammer-happy" fieldworkers and from indiscriminate wasteful collecting.

Geological features in Peninsular Malaysia that are worthy for conservation are evaluated.

INTRODUCTION

Concept of Conservation of Geological Features

Geological conservation is the protection from destruction of physical formations and geological phenomena of outstanding scientific value representing the different stages of Earth's geologic history and its transformation through ongoing geological processes. These geological features may also have exceptional scenic beauty, or educational, historical, archaeological, cultural, religious, recreational, and ecological values, considered collectively as heritage.

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The objectives of this study are to promote an awareness of the need for geological conservation and to identify potential geological features in Peninsular Malaysia for conservation. Such features include the type sections or representative rocks of geological formations, fossil localities, karstic limestone hills, rock exposures in hills , on islands and in coastal exposures, coral reefs, and others.

Conservation takes into account the need for a proper and the most economical exploitation of the country's geologic resources in order to prevent undue waste of these non-renewable resources. In the example of limestone hills in the country, according to a Geological Survey Department of Malaysia report in 1977 by P.C.Aw, these hills"*because of their physical and chemical nature, are of multi-purpose, both aesthetic and economic. However, indiscriminate quarrying has not only destroyed the natural beauty of some of the limestone hills, but the present practice also results in a lot of wastage of the valuable industrial raw material. Proper development of the limestone hills call for the preservation of hills with cave temples, and hills of environmental, tourist, scenic and scientific importance; while the remaining hills should be developed in the most economic manner, basing on their potential uses, so as to prevent extravagant waste.*"

Geological Features for Scientific Conservation

There are various types of geological features that may be conserved for the science and study of geology.

Classic geological profiles (type sections) are important as models for comparison of geological rock formations. These type sections/localities/areas have definite geological age ranges, palaeontological (fossil) composition and rock types characteristic of a given geological region. They are points of reference for studies carried out at different times and in other areas.

Fossils are important to determine the age of rocks, define their paleoecology and paleoenvironments, and provide evidence on biological evolution through geologic time. Fossils left embedded in the rocks and protected in their natural sites in the field allow further cognitive and conservative studies to be done on various aspects of paleontology, biostratigraphy and sedimentology. Paleontological sites important for conservation are the representative classic exposures (type locality) and holotypic specimens of fossils that are described for the first time. From these exposures topotypic fossils are used for comparative studies and for a paleontological revision of a given species. Other sites that present the same features as the type locality are also valuable. Biogenic rocks of fossil and living coral reefs, oyster shell layers and others are paleontological materials for Quaternary geology study. Limestone hills form distinctive karst topography with numerous interesting features e.g. caves. Single exposures of igneous extrusive rocks such as basalt and dolerite, deep-seated igneous magmatic rocks such as granite, syenite and gabbro, and metamorphic rocks such

as gneiss, schist, and slate may also be conserved. These rocks form characteristic elements of the scenery of the areas in which they occur.

Although some geological specimens or rocks, minerals, fossils, precious and semi-precious stones, meteorites and tektites may be conserved in museums, rare geologic materials uncovered on the earth's surface, sometimes in mines, merit conservation in their natural environment to preserve their interesting forms of occurrence and relationship with the adjacent rocks. Examples are calcite drip and flowstone in limestone caves, geodes with quartz and calcite crystals, and individual groups of quartz and calcite crystals.

Large rock forms meriting conservation in the field are distinguished by their exceptional genesis, internal structure and manner of developing individual mineral components e.g. basalt columns.

Tectonic movement causes structural deformation of the earth's uppermost crust layer. The physical relief of an area can be determined by geological events of faulting and folding. A single fault, fold, or flexure may be conserved in the field. Visible in rock formations are smaller tectonic structures (joints and cleavages), detached blocks and characteristic fragmented formations associated with tectonism e.g. breccia and cataclastic rocks that can be conserved.

Artificial manmade features closely associated with the activity and study of geology are ancient and historic mining shafts, galleries, chambers, equipment, and mining tools. These vestiges of mining and material cultural history with potential tourist attraction value may thus be conserved.

Strategy and Limitations of Geological Conservation

Geological features that are exploited for rock and economic mineral resources are present in mines, quarry and cement plants. The features can also be sites for land, industrial and commercial property development.

Tropical weathering and erosion may cause deterioration of the features, especially geological sections along roads cutting through hills. These features may also be covered by luxuriant tropical vegetation overgrowth.

Caves in limestone hills may be occupied by religious shrines and temples. The immediate land around these cave temples have cave temple reserve status. However quarrying near to these small reserves within the same hill may weaken and endanger the cave structure.

Quarries, in opening up the land, may facilitate the study of geology. conservation of geological features in quarries that are still operating is difficult. This may be done after the quarrying has ceased, or small areas in active quarry can be set aside for immediate conservation. Abandoned quarry and mine pits may be flooded by natural rainfall through time.

The geology of some remote areas under forest cover or in security areas is not yet fully elucidated and thus geological conservation status cannot be assigned at the present time.

In view of such limitations, the selection of a geological feature for conservation must therefore be pragmatic. Not every representative locality of each rock type or formation is to be conserved. The feature must significantly represent one or more aspects of the country's geology and must not duplicate the geology of other features considered for conservation. In this study a geological feature in a State of Peninsular Malaysia is recommended for conservation by the State in one of the following status : State Park (land and marine); Nature Monument, Nature Reserve and Geological Site of special scientific interest. Geological Site is a new category of conservation area in this country proposed in this study.

A State Park is an area of considerable extent to conserve scenery, flora and fauna for human recreation and education. A Nature Reserve is smaller than a State Park in area but has similar qualities. A Nature Monument is an outstanding physical geological feature of aesthetic and scientific interest. A Geological Site (of special scientific interest) is a small area important for geologic studies, e.g. a road section, foreshore beach, or coastal cliff and islands.

A geological feature can be maintained in its conservation area for public benefit and education through periodic inspection, supply of display notice material explaining the character and origin of the feature and publication of booklets describing its scientific value . This may perhaps be achieved through the Geological Society of Malaysia, the geological departments of local universities and the Geological Survey Department of Malaysia in co-ordination with the Wildlife and National Parks Department of the Ministry of Science, Technology, and Environment.

Geological features are studied in the various disciplines of earth science (geology, geography, soil science, geophysics, geotechnical engineering, petroleum engineering, and environmental science) by various universities in the country. A code of geological fieldwork should be observed to conserve the geological localities for future field study from vandalistic "hammer-happy" or "drill-happy" fieldworkers.

Indiscriminate collecting is wasteful and destructive to a locality. The specimens collected may later be disposed of and the geologist who collects to do research may find it difficult to get good samples. He may decide not to publish details of such localities in excursion and field guides later.

A code of geological fieldwork that may be practised by Malaysian earth scientists and students should include the following clauses as adopted by the Geologists' Association, London, England:

1. Students should be encouraged to observe and record but not to hammer indiscriminately.
2. Keep collecting to a minimum. Avoid removing in situ fossils, rocks or minerals unless they are genuinely needed for serious study.
3. For teaching, the use of replicas is commended. The collecting of actual specimens should be restricted to those localities where there is a plentiful supply, or to scree, fallen blocks and waste tips.
4. No research worker has the special right to 'dig out' any site.
5. Excavations should be back filled where necessary to protect vulnerable outcrop from casual collecting.

METHOD AND PRESENTATION OF STUDY

This report is based on field study, review and compilation of literature data, and discussions. Field studies of over three years since 1982 were partly conducted during the author's undergraduate course at the Geology Department, University of Malaya, Kuala Lumpur. Certain areas of potential geological conservation value were not studied the field because of logistic, inaccessibility and security constraints.

Geological features in Peninsular Malaysia are discussed on a state-by-state basis. Geological features that are (i) in the process of destruction or (ii) not studied in the field but important for conservation are also included in this study. For practical reasons, geological features that are (i) already conserved in present by existing conservation areas or (ii) already destroyed or submerged through flooding are not discussed in this study.

Guidelines for the boundary of a conservation area may be as follows : generally the conservation boundary for a solitary limestone hill or an uninhabited island follows the sides of the hill and the coastline for the island respectively. When the entire hill or entire island cannot be set aside for conservation, certain section of the hillside, or the coastline is considered. A road or river by the side of a geological feature may also mark the boundary of the area for conservation.

POTENTIAL GEOLOGICAL FEATURES FOR CONSERVATION IN PENINSULAR MALAYSIA

The potential geological features for conservation in Peninsular Malaysia are listed in Table 1 and shown in Fig.1.

Table 1: Potential Geological Features for Conservation in Peninsular Malaysia

STATE	AREAS	STATUS	LOCATION
PERLIS	1.1 WANG TANGGA	Potential nature monument	Kaki Bukit
	1.2 BUKIT CHUPING	In the process of destruction	Chuping
	1.3 BUKIT TENGKU LEMBU	Recommendation not possible in this study	Beseri
	1.4 BUKIT TEMIANG	Recommendation not possible in this study	Beseri
KEDAH	2.1 Exposures of MACHINCHANG FORMATION	Potential geological site	Northwestern Coastline, Pulau Langkawi
	2.2 PULAU LANGGUN, P. ANAK TIKUS, P. TANJUNG TEMBUS DENDANG	Potential geological site	Northeastern Kepulauan Langkawi
	2.3 TASEK DAYANG BUNTING area	Potential nature monument	Southern Kepulauan Langkawi
	2.4 PULAU SINGA BESAR	Potential geological site	Southwestern Kepulauan Langkawi
	2.5 BUKIT KODIANG	In the process of destruction	Kodiang
	2.6 GUNUNG KERIANG	In the process of destruction	12 km Northwest of Alor Setar
	2.7 MERDEKA WATER FALL area	Potential geological site	Near JKR Quarry, Gurun
	2.8 TANJUNG JAGA	Potential geological site	North of Tanjung Dawai
	2.9 BUKIT BALING - GUNUNG PULAI	Potential nature monument	Baling town
PERAK	3.1 BUKIT KEMUNING	Potential nature monument	Sungai Siput (North)
	3.2 GUNUNG TASEK	Potential nature monument	Ipoh
	3.3 GUNUNG RAPAT - GUNUNG IDONG	Potential nature monument	Ipoh
	3.4 GUNUNG PANJANG	Potential nature monument	Tambun
	3.5 TAMBUN HOT SPRINGS	Potential nature monument	Tambun
	3.6 GUNUNG TEMPURUNG	Proposed nature monument	Sungai Siput (South)
	3.7 KELIAN INTAN	Vestige object of ancient mining	Rahman Hydraulic Tin Ltd

(Continue)

Table 1: Potential Geological Features for Conservation in Peninsular Malaysia(Con't)

STATE	AREAS	STATUS	LOCATION
SELANGOR	4.1 KLANG GATES RIDGE	Potential nature monument	Ulu Kelang
	4.2 BATU CAVES	Proposed nature monument	Batu Caves
	4.3 BUKIT TAKUN	Proposed inclusion into Templer Park	Just outside Templer Park
	4.4 PULAU ANGSA	Recommendation not possible in this study	
KELANTAN	5.1 GUNUNG RENG	Potential nature monument	Batu Melintang
	5.2 BATU GUA MUSANG	Potential nature monument	Next to Gua Musang Rail way Station
	5.3 GUA MADU	Potential nature monument	6 km South of Gua Musang town
	5.4 GUA PANJANG	Potential nature monument	South of Gua Musang town
TERENG-GANU	6.1 PULAU REDANG	Potential Marine State Park	Northwest of Kuala Terengganu
	6.2 PULAU KAPAS	Potential geological site	6 km offshore Marang
PAHANG	7.1 TANJUNG BATU HITAM	Potential geological site	Coast 11 km north of Kuantan
	7.2 TANJUNG TEMBELING	Potential geological site	Southern side of Teluk Chempedak beach, Kuantan
	7.3 BUKIT CHARAS	Potential nature monument	Panching
	7.4 GUNUNG SENYUM	Potential nature monument	East of Kuala Kerau
	7.5 KOTA GELANGGI	In the process of destruction	32 km east of Jerantut
	7.6 SUNGEI LEMBING UNDERGROUND LODE TIN MINE	Vestige object of ancient mining	42 km Northwest of Kuantan
	7.7 KAMPUNG AWAH QUARRY	Difficult to conserve in the field	JKR Quary, Kampung Awah
	7.8 JENGKA PASS	Difficult to conserve in the field	27 km east of Temerloh
	7.9 PULAU TIOMAN	Recommendation not possible in this study	
JOHORE	8.1 TANJUNG KEMPIT	Potential geological site	East of Kuala Endau
	8.2 TANJUNG PENYABUNG	Potential geological site	Coast northwest of Mersing
	8.3 GUNUNG PANTI	Potential geological site	North of Kota Tinggi

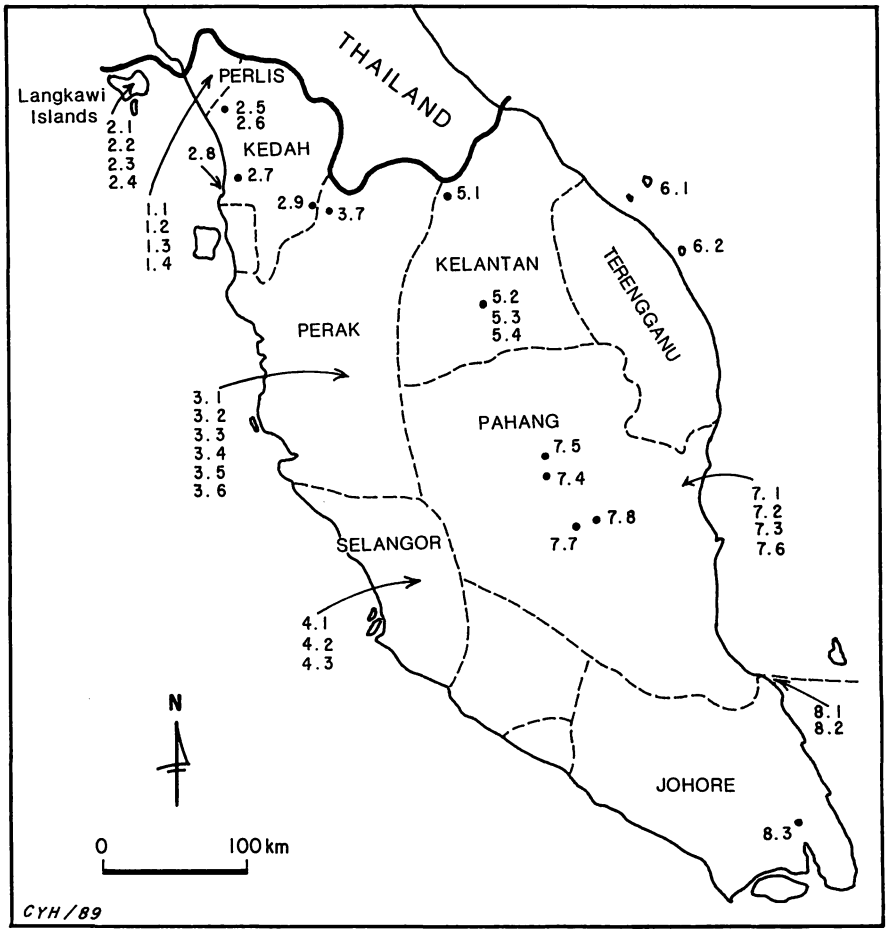

Figure 1: Potential Geological Features for Conservation in Peninsular Malaysia
Sites discussed in the text indicated by numbers:

PERLIS : 1.1 Wang Tangga, 1.2 Bukit Chuping, 1.3 Bukit Tengku Lembu, 1.4 Bukit Temiang.

KEDAH : 2.1 Machinchang Formation, 2.2 Pulau Langgun (including P.Anak Tikus) & P.Tg. Tembus Dendang, 2.3 Tasek Dayang Bunting area, 2.4 P. Singa Besar, 2.5 Bukit Kodiang, 2.6 Gunung Keriang, 2.7 Merdeka Waterfall area, Gurun, 2.8 Tanjung Jaga, 2.9 Bukit Baling-Gunung Pulai.

PERAK : 3.1 Bukit Kemuning, 3.2 Gunung Tasek, 3.3 Gunung Rapat, 3.4 Gunung Panjang, 3.5 Tambun Hot Springs, 3.6 Gunung Tempurung, 3.7 Kelian Intan.

SELANGOR : 4.1 Klang Gates Ridge, 4.2 Batu Caves, 4.3 Bukit Takun

KELANTAN : 5.1 Gunung Reng, 5.2 Batu Gua Musang, 5.3 Gua Madu, 5.4 Gua Panjang.

TERENGGANU : 6.1 Pulau Redang, 6.2 Pulau Kapas

PAHANG : 7.1 Tanjung Batu Hitam, 7.2 Tanjung Tembeling, 7.3 Bukit Charas, 7.4 Gunung Senyum, 7.5 Kota Gelanggi, 7.6 Sungei Lembing underground lode tin mine, 7.7 Kampung Awah quarry, 7.8 Jengka Pass.

JOHORE : 8.1 Tanjung Kempit, 8.2 Tanjung Penyabung, 8.3 Gunung Panti.

PERLIS

1.1 WANG TANGGA limestone cave passage northwest of Kaki Bukit, Perlis (fig. 2)

- Potential Nature Monument

Historic cave (alluvial tin) mining in this limestone cave passage in the Setul Boundary Range started about 1920. The horizontal cave passages more than 2 km long are the only cave mines in Peninsular Malaysia. A some 530 m-long wooden suspension bridge inside Wang Tangga built in 1935 is still in use today to cross the river inside this passage.

Spectacular fresh limestone cave features of dripstone and flowstone are still forming in Wang Tangga because the Setul Boundary Range more than 300 m in height has large rain catchment areas to maintain the necessary stream flow (above the water table in the vadose zone) inside the mountain. This range of the Ordovician - Silurian Setul Formation is the largest limestone outcrop in Peninsular Malaysia and forms the Malaysia (Perlis) - Thai border. The range extends from the west coast of Perlis to Kaki Bukit (10 km northwest of Kangar), some 29 km inland, and continues into Thailand for several tens of kilometres.

1.2 BUKIT CHUPING, Chuping, Perlis (fig. 2)

- Geological Feature in the Process of Destruction

This huge limestone outcrop located 10 km northeast of Kangar is quarried by the CIMA Cement Company. The limestone is also used for making carbide fuel, and bat guano is extracted from the caves high up in the hill for use as fertiliser. Bukit Chuping is the type locality of the Permian Chuping Formation. Some caves in the hill are archaeologic sites and have been suggested to this study for conservation by a Muzium Negara archaeologist, for example Gua Kurong Batang (having 10th-13th century Mahayana Buddhist votive clay tablets) and Gua Bintong (on the western foothill, where the first bone tools in Peninsular Malaysia were discovered).

The hill is visited yearly for geological study by the University of Malaya staff and students.

1.3 BUKIT TENGKU LEMBU, Beseri, Perlis (fig. 2)

- Geological Feature not studied in the field

This limestone hill of the Chuping Formation northeast of Kangar, between the 16th and 19th kilometre stones, Kangar-Padang Besar road, is an archaeologic site having Hoabinhian Mesolithic claypots, stone axe and sharpeners, and human fossils. The site was suggested to this study for conservation by a Muzium Negara archaeologist.

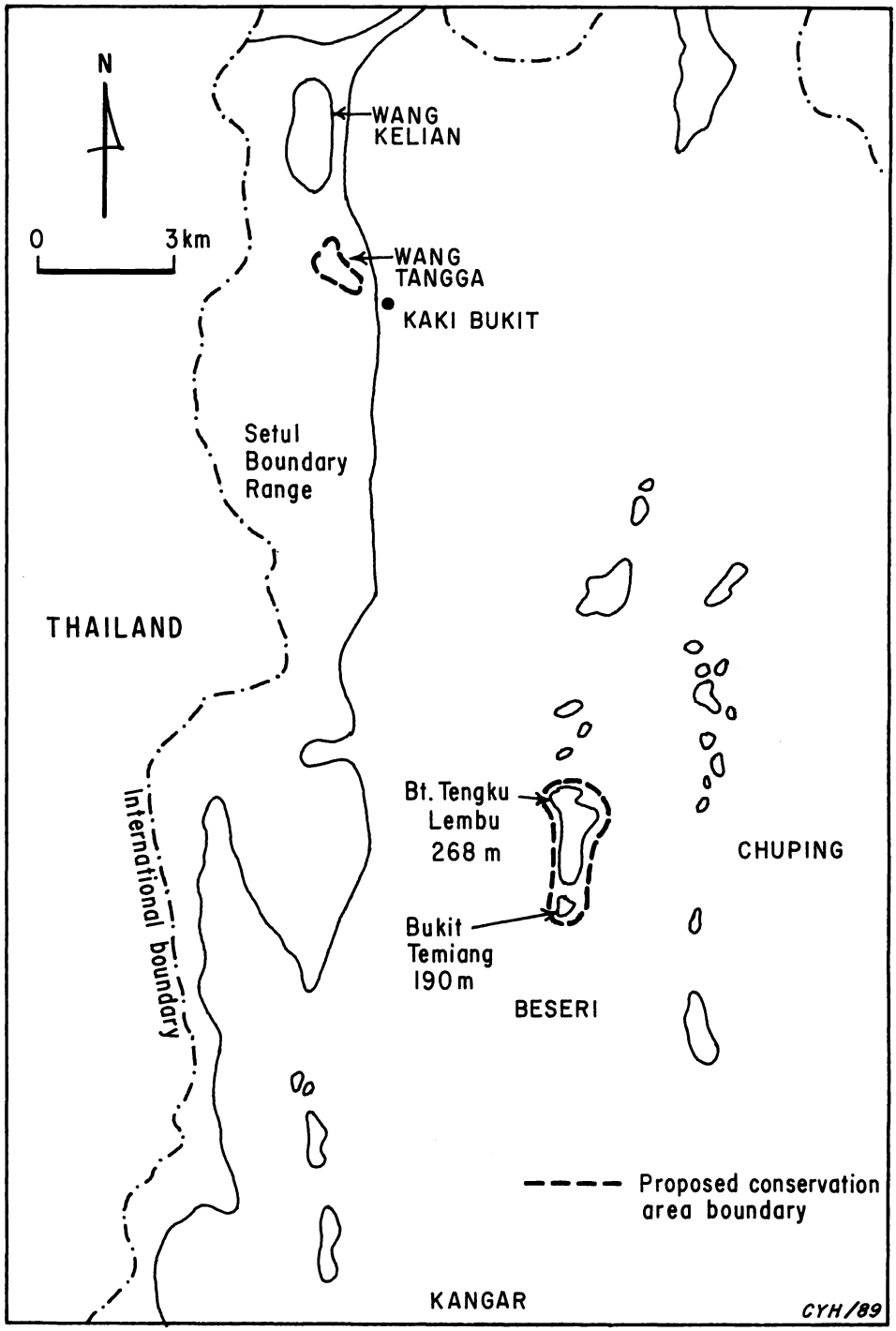

Figure 2: Wang Tangga & Limestone Hills in Perlis

1.4 BUKIT TEMIANG, Perlis (fig. 2)

- Geological Feature not studied in the field

This limestone hill of the Chuping Formation, off the southern tip of Bukit Tengku Lembu, Beseri, Perlis, is a fossil locality suggested for conservation in a 1977 report by the Geological Survey of Malaysia.

KEDAH

2.1 Coastal exposures of MACHINCHANG FORMATION, northwestern coastline of Pulau Langkawi from Tanjung Chinchin to Tanjung Hulor (figs. 3 & 4)

- Potential Geological Site

The oldest rock unit known in Malaysia, the Machinchang Formation is well exposed in this section of sea cliffs formed by steeply dipping sandstone beds containing Upper Cambrian fossils of trilobites and brachiopods. The rocks form a large antiform fold structure.

The locality is outside of the Pulau Langkawi Kedah Cement Plant area at Telok Ewa. lt is visited yearly for geological field study by staff and students of the University of Malaya and is also suggested for conservation by the Geological Survey of Malaysia.

Access to the locality is by boat.

2.2 PULAU LANGGUN (including Pulau Anak Tikus) & PULAU TANJUNG TEMBUS DENDANG, northeastern Kepulauan Langkawi, Kedah(fig. 5)

- Potential Geological Site

Pulau Langgun is an uninhabited limestone island. The islet Pulau Anak Tikus and Pulau Tanjung Tembus Dendang are on the southern tip and on the eastern side of Pulau Langgun respectively.

The limestone of these islands, belonging to the Ordovician-Silurian Setul Formation, has abundant and important fossils of gastropods *Teiichispira kobayashi* (the index fossil of the Formation) and *Malayaspira* sp., the trilobite *Dalmanitina* aff. *socialis*, nautiloids *Endoceras* sp. and *Actinoceras* sp., graptolites, conodonts and corals.

The locality is visited yearly for geological field study by staff and students of the University of Malaya. Pulau Langgun is also suggested for conservation by the Geological Survey of Malaysia. These islands, strongly recommended to this study by Prof. P.H. Stauffer for conservation are outside of the Langkawi Resort project area.

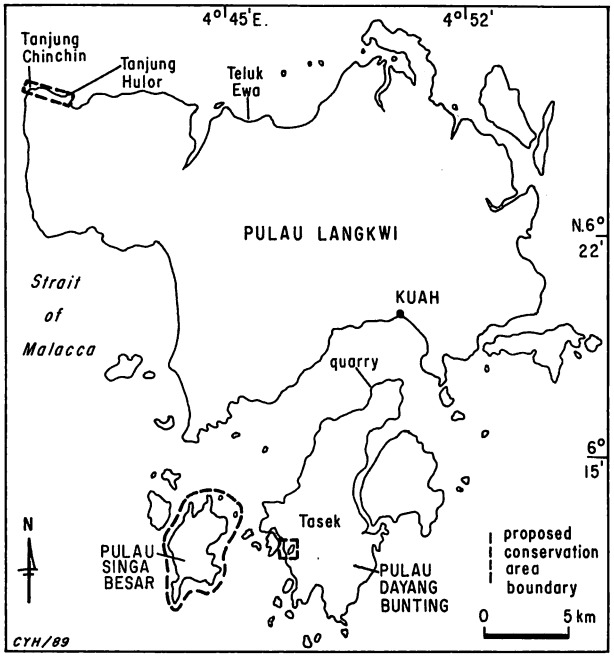

Figure 3 : Langkawi Islands, Kedah

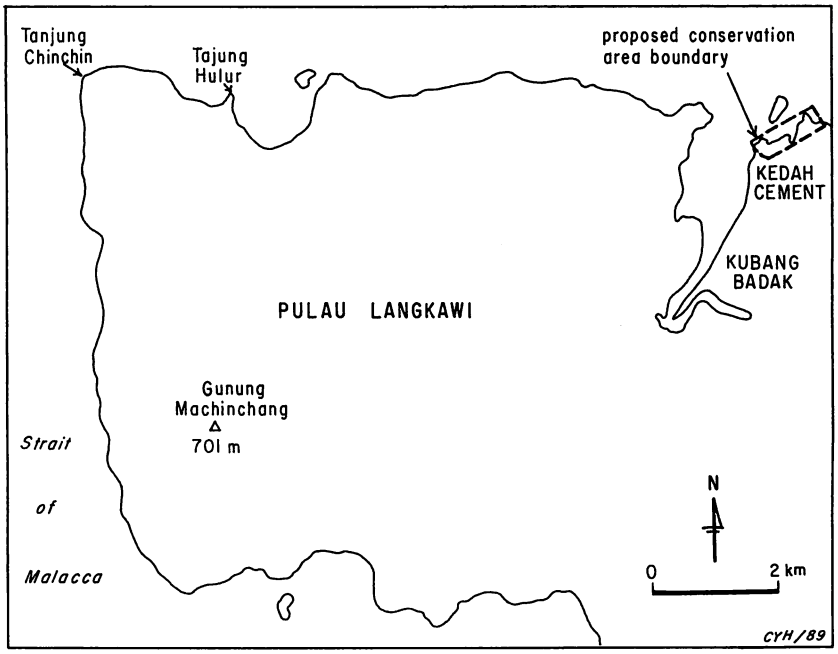

Figure 4 : Tg. Chinchin to Tg. Hulor Coastline, northwest P. Langkawi

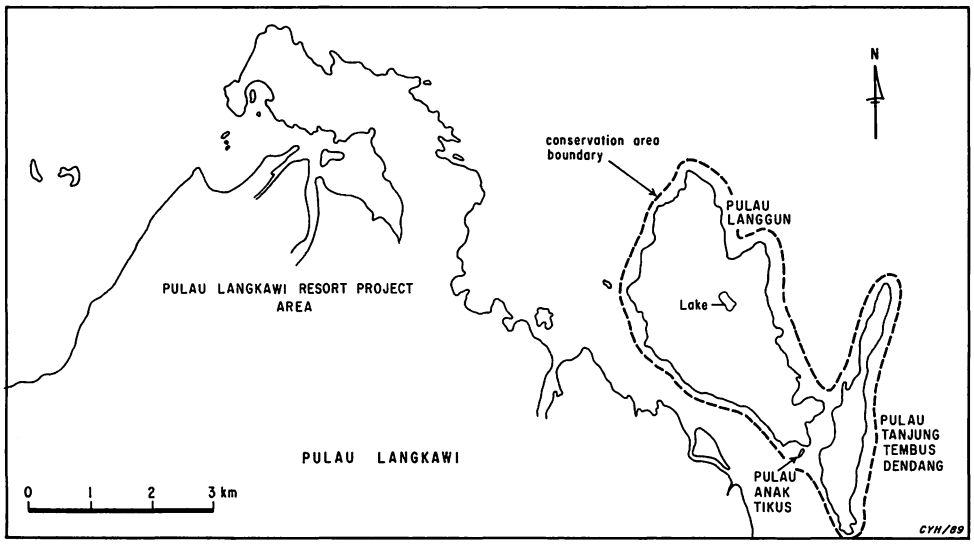

Figure 5 : P.Langgun, P. Anak Tikus, P. Tg. Tembus Dendang, northeastern Pulau Langkawi, Kedah

2.3 TASEK DAYANG BUNTING area, western coast of Pulau Dayang Bunting, southern Kepulauan Langkawi, Kedah (fig. 3)

- Potential Nature Monument

This oval freshwater lake in a limestone sinkhole on Pulau Dayang Bunting, the second largest island among the Kepulauan Langkawi Islands is 800 m long and 350 m wide.

The lake is in a brecciated, fault-zone area of the Permian Chuping Formation. Scenic karstic limestone topography is on the western coast of the island near the lake. Caves are present in the hillside e.g. Gua Langsir.

The lake is a popular tourist spot. The locality is visited yearly for geological field study by staff and students of the University of Malaya. A limestone (marble) quarry operates at the northern tip of Pulau Dayang Bunting and is away from the lake area. About 1 km^2 of coastal area including the lake (as suggested by the Geological Survey of Malaysia) is recommended for conservation.

2.4 PULAU SINGA BESAR, southwestern Kepulauan Langkawi, Kedah (fig. 3)

- Potential Geological Site

This large and uninhabited island is made up of thc Devonian-Permian Singa Formation with predominant mudstone containing bivalve fossils of *Posidonia* sp. and *Daonella* sp., abundant trace fossils of worm burrows, slump structures of boudin and ball and pillow, and pebbles possibly transported and deposited by glacier ice in the geological past.

The island is visited yearly for geological study by staff and students of the University of Malaya and is also suggested for scientific conservation by the Geological Survey of Malaysia.

2.5 BUKIT KODIANG, Kodiang, Kedah (fig. 6)

- Geological Feature in the Process of Destruction

This small limestone hill located 35 km northwest of Alor Star is the type locality of the Triassic Kodiang Limestone Formation. The limestone has stromatolite, conodont and sedimentary slump structures. Conodonts are minute tooth-like fossils valuable in time correlation of rock strata. There is a quarry operating in the hill that is visited yearly for geological field study by staff and students of University of Malaya. The hill is also suggested for conservation by the Geological Survey of Malaysia.

2.6 GUNUNG KERIANG, Kedah (fig. 6)

- Geological Feature in the Process of Destruction

This small limestone hill 234 m in height and 12 km northwest of Alor Star has well-formed sea notches along the hill base and raised oyster shells indicating former higher sea level in the region.

The locality is visited yearly for geological field study by the staff and students of University of Malaya and is also suggested for conservation by the Geological Survey of Malaysia.

Two quarries operate on the south and southeastern hill sides.

2.7 MERDEKA WATERFALL area, along Sungei Ketapan at the northeastern mountain foot of Gunung Jerai near the Jabatan Kerja Raya Quarry, Gurun, Kedah (fig. 7)

- Potential Geological Site

On the surface of a large inclined rock slab of metaquartzite, located along a hill path on the left-side of the Merdeka Waterfall, Sungei Ketapan are excellent Cambrian trilobite trace-fossil tracks - the only ones known in the country.

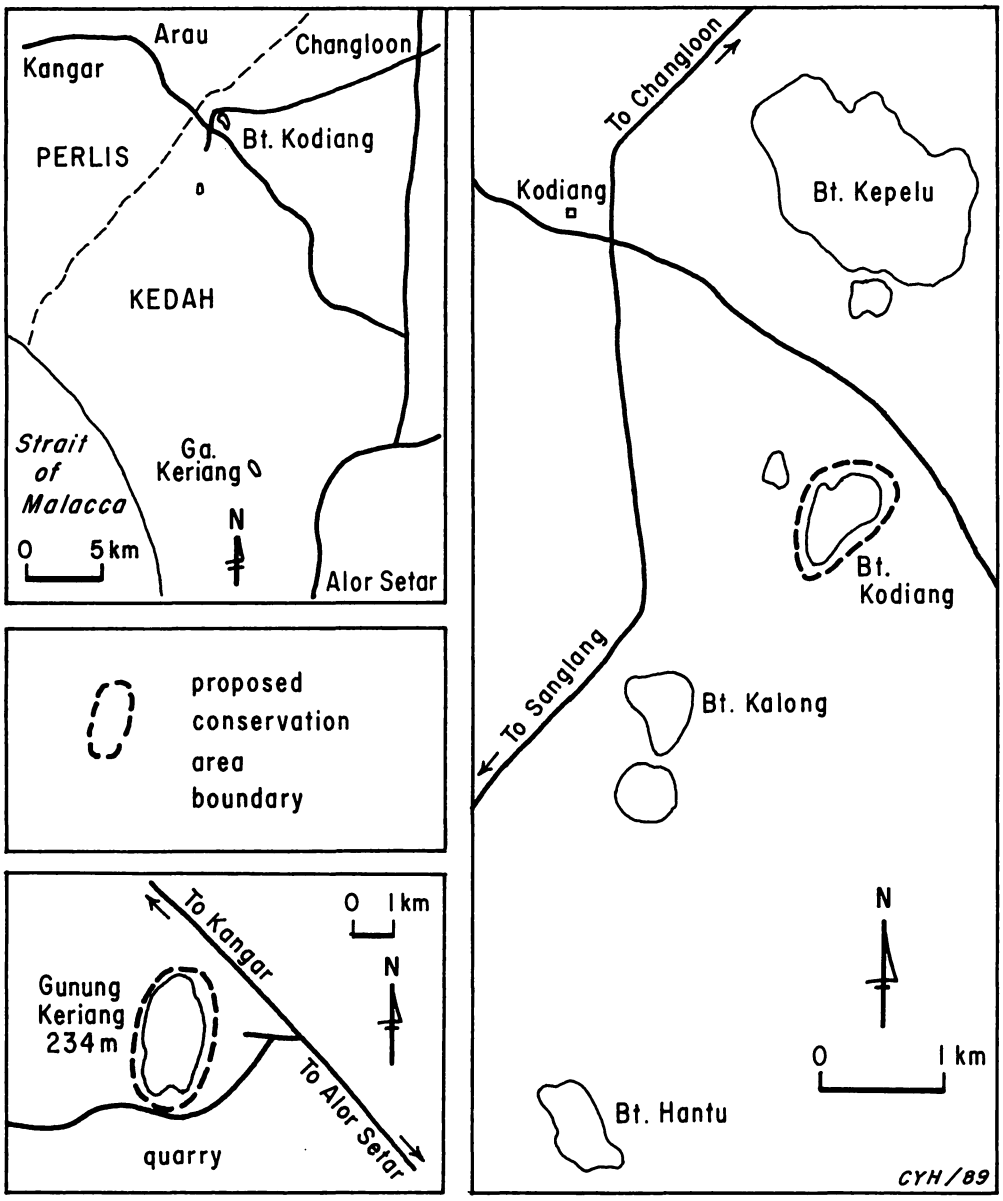

Figure 6 : Bukit Kodiang & Gunung Keriang, Kedah

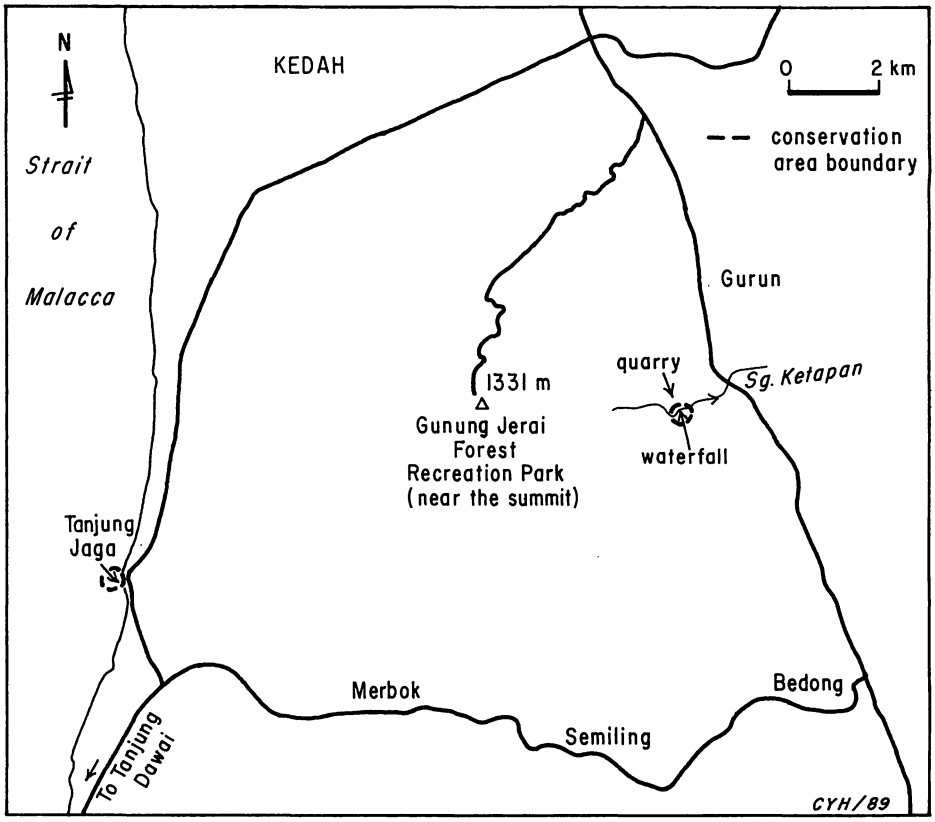

Figure 7 : Gurun Merdeka Waterfall & Tanjung Jaga, Kedah

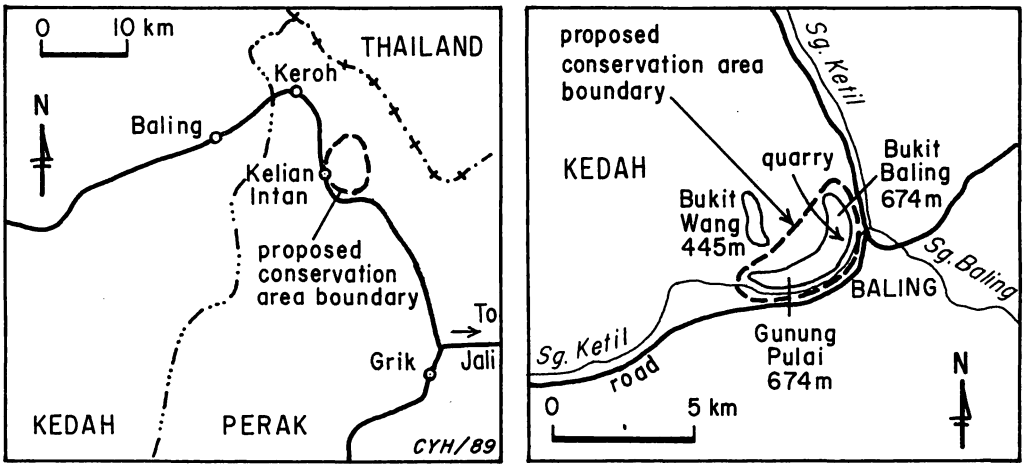

Figure 8 : Kelian Intan and Gunung Pulai - Bukit Baling, Baling, Kedah

The locality is visited yearly for geological field study by the staff and students of University of Malaya. The waterfall area is recommended for conversion.

The Gurun Jabatan Kerja Raya Quarter is on the right side (north) of the waterfall.

2.8 TANJUNG JAGA, north of Tanjung Damai, the coast of Kedah (fig. 7)
- Potential Geological Site

Graphic granite and interesting mineral formation of tourmaline and garnet in the granite pegmatite are exposed at the base of the western slope of Gunung Jerai at Tanjung Jaga beach facing the Straits of Malacca.

The graphic granite shows a texture resembling handwriting.

The locality is visited yearly for geological field study by the staff and students of University of Malaya.

2.9 BUKIT BALING - GUNUNG PULAI, Baling town, Kedah (fig. 8)
- Potential Nature Monument

This huge marble mountain mass 670 m in height and 17 km^2 in area is a prominent landmark of Baling town that is located at the eastern foot.

The mountain is U-shaped in plan, with a conspicuous top without tree-cover exposing the white marble rock. The marble is part of the Silurian Baling Group. The highest peak on the western side of this mountain is Gunung Pulai, 674 m in height. In the eastern peak are numerous caves that were excavated for archaeological studies. The caves Gua Pulai, Berhala, Jarak, Kelawar, China, Debu and others were once inhabited by prehistoric men and should thus be conserved as suggested to this study by a Muzium Negara archaeologist. The portion of the marble mountain fronting the road, Baling town and village should be conserved for environmental and aesthetic reasons (as suggested by the Geological Survey of Malaysia).

There is a quarry operating in Bukit Baling, the eastern peak, 595 m in height.

PERAK

3.1 BUKIT KEMUNING, Sungei Siput (North) town, north of Ipoh, Perak (fig. 9)
- Potential Nature Monument

This small limestone (marble) hill of the Kinta Formation, about 210 m in height, is in a rubber estate. The very prominent hill peak has a saddle shape. There are some caves, and access up the hill is aided by iron ladders present.

The hill is also suggested for conservation by the Geological Survey of Malaysia.

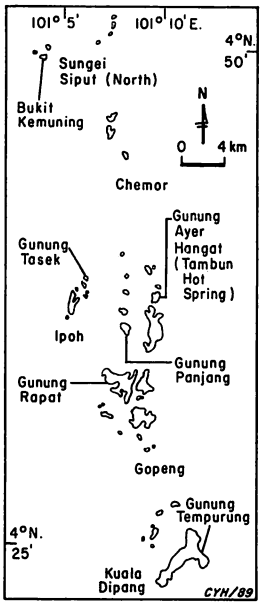

Figure 9 : Kinta Valley Limestone Hills, Perak

3.2 GUNUNG TASEK, Ipoh, Perak (fig. 9)
- Potential Nature Monument

This small limestone (marble) hill with a cave temple "Perak Tong" on the western side is a tourist spot. A 385-step stairway inside this hill of the Kinta Formation leads up to a window opening on the northern hill side. The hill is also suggested for conservation by the Geological Survey of Malaysia.

3.3 GUNUNG RAPAT-GUNUNG IDONG, Ipoh, Perak (fig. 9)
- Potential Nature Monument

This huge limestone (marble) hill mass of the Kinta Formation is a tourist spot with several cave temples on the southwestern side e.g. the historical "Sam Poh Tong" wherein a 36 m long and 2 m high horizontal cave passage leads to a wang (a large open space surrounded by limestone cliffs). The hill is also suggested for conservation by the Geological Survey of Malaysia.

There are many former mines and quarries around the limestone outcrop. At the foot of the northwestern hill sides near to the cave temples are long horizontal grooves. These grooves or notches are features caused by the erosive action of former swamps and rivers present in late Quaternary time.

3.4 GUNUNG PANJANG, Tambun, Perak (figs. 9, 10 & 11)
- Potential Nature Monument

This limestone (marble) hill mass of the Kinta Formation 384 m in height has prehistoric rock paintings 2,000 years old - the only such known in Peninsular Malaysia and among the few in the world.

The paintings are on a cliff face about 40 m above the western hill foot where a 141-step concrete staircase has been constructed for access to the paintings. The red-coloured hematite (iron-oxide) paintings depict men, animals (dugong, tapir, deer, and wild boar) and abstract designs. These poorly preserved weathered paintings originally extended over 30 m long and probably reflect early Senoi Orang Asli tribal beliefs.

Adjacent to this western hillside is an army camp and the Taman Chempaka low-cost housing area. An iron mine operates at the northwestern hillside. There are an abandoned iron mine and two old quarry faces (with one near the left side of the rock paintings).

This prehistoric site has tourist value and is also suggested for conservation by the Geological Survey of Malaysia.

3.5 TAMBUN HOT SPRINGS, GUNUNG AYER HANGAT, Tambun, Perak (figs. 9 & 11)
- Potential Nature Monument

The hot springs are located at the northern foothill of Gunung Ayer Hangat limestone hill, at Tambun near Ipoh, Perak. The hot spring area is enclosed in a popular public hot-water swimming pool.

Hot springs are recent geologic features from which water issues at a temperatures of 95-130°F from various types of rocks in the earth's crust. The Tambun hot spring is the only limestone-hill hot spring in Peninsular Malaysia.

3.6 GUNUNG TEMPURUNG, Sungei Siput (South), Perak (fig. 9 & 12)
- Proposed Nature Monument (3,000 acres,Third Malaysian Plan)

Gunung Tempurung 612 m in height is connected by a low col to Gunung Gajah, 372 m in height and together they form the largest limestone outcrop of the Kinta Formation in southern Kinta Valley.

Gunung Tempurung has a large underground cave passage called Gua Tempurung 900 m long, that passes right through the base of the mountains. Tin was mined in this cave passage before. Sungei Tempurung follows the course of this passage and the river was sampled in a karst-hydrology university study.

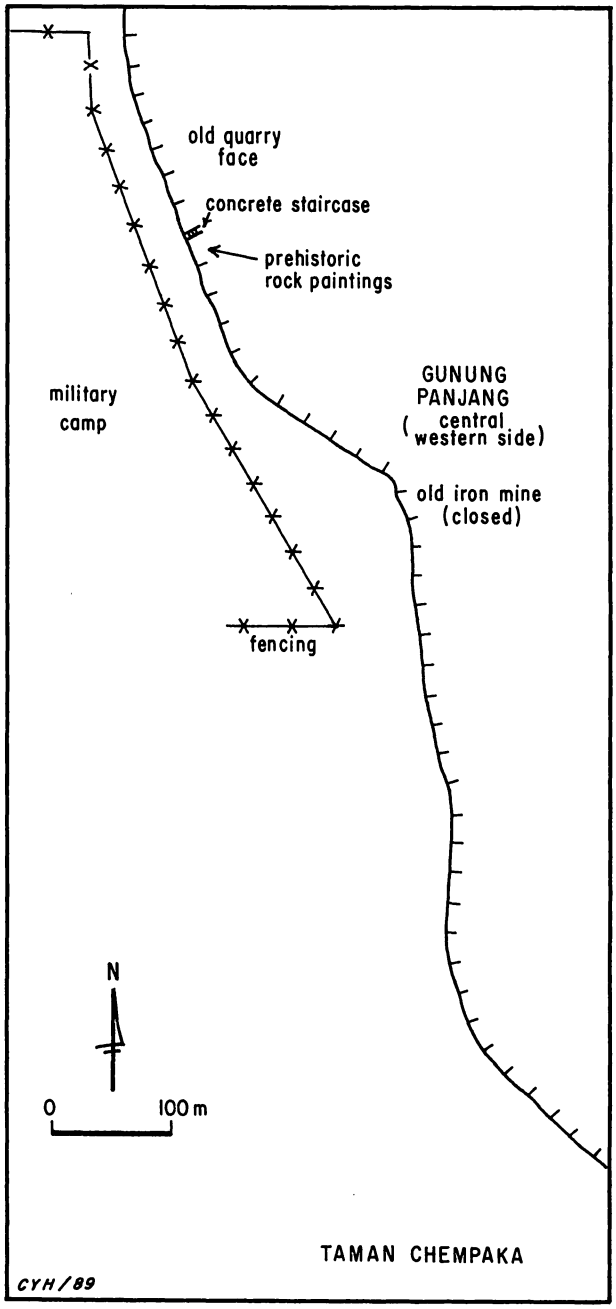

Figure 10 : Gunung Panjang, Tambun, Perak

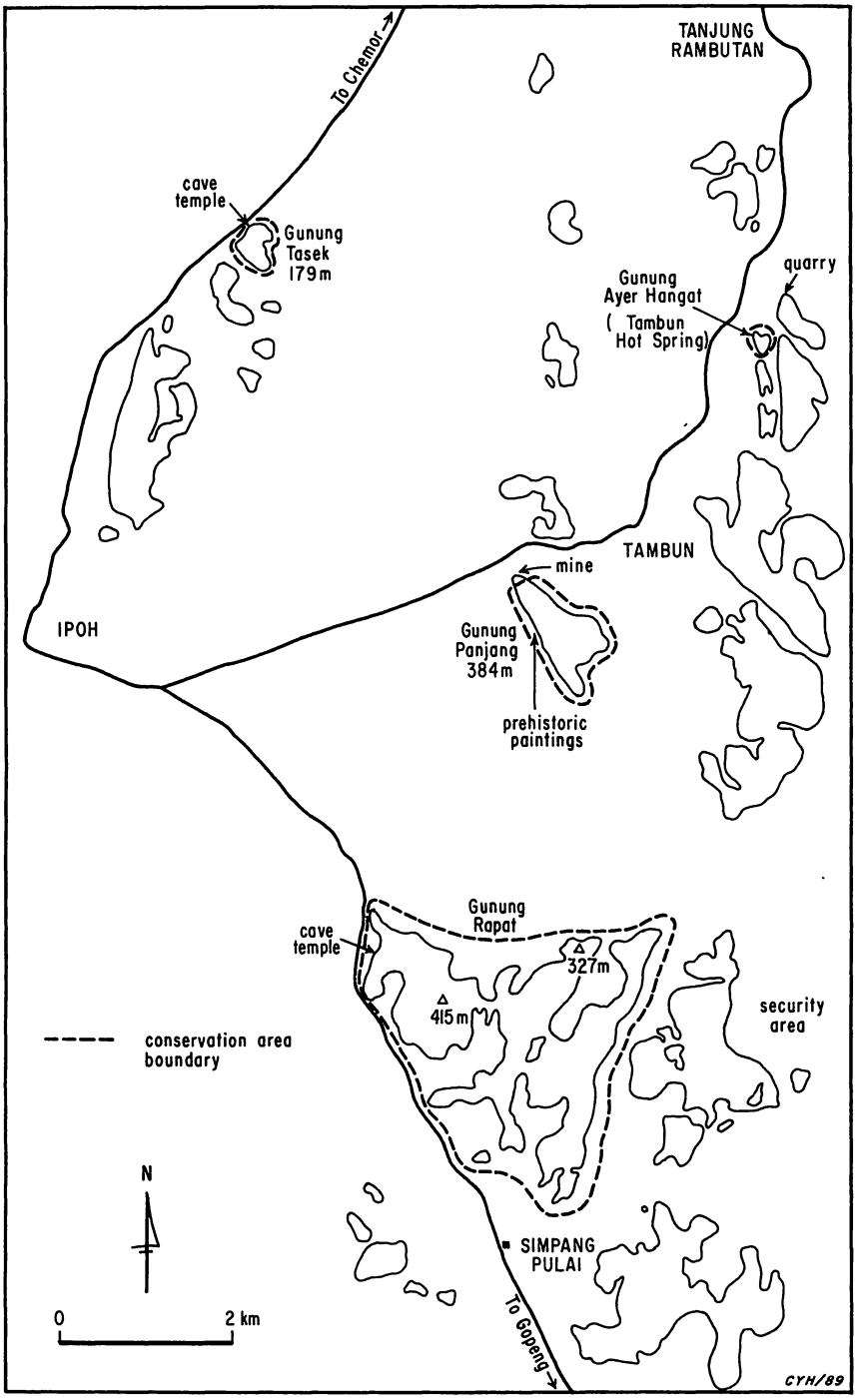

Figure 11 : Ipoh & Tambun Area Limestone Hills, Perak

The hill is also suggested for conservation by the Geological Survey of Malaysia.

Gunung Tempurung is the highest limestone hill in the Kinta Valley.

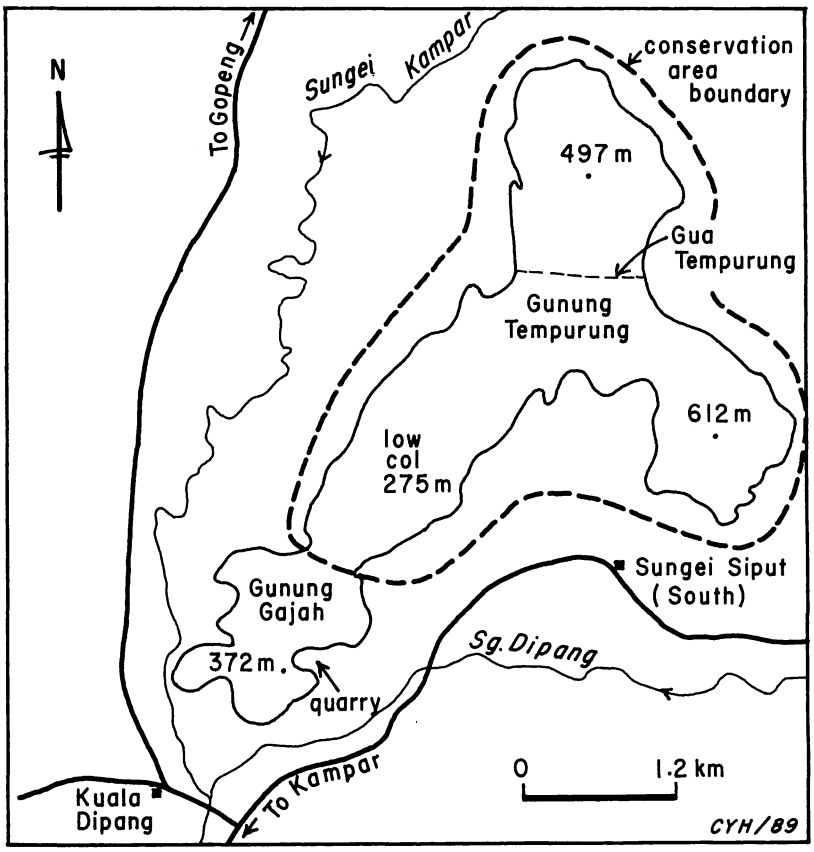

Figure 12 : Gunung Tempurung, Sungei Siput (South), Perak

3.7 KELIAN INTAN, Perak (fig. 8)

- Vestige Object of Ancient Mining History

Tin mining at Kelian Intan (between Grik and Keroh, Hulu Perak) for over 200 years is the oldest known record of mining in Malaysia. The present Rahman Hydraulic Tin Ltd. mining in the area began later in 1922.

Overhanging two-way traffic buckets carry tin-bearing ore excavated from Gunung Paku (670 m in height) to a distant tin mill across the Grik-Kelian Intan-Keroh trunk road (at an altitude of over 300 m above sea level) along cables supported by a series of pylon towers.

This historical mining structure - the only one of its kind in Malaysia - is a future vestige object of mining history with great potential conservation value.

SELANGOR

4.1 KLANG GATES RIDGE, Ulu Kelang, Selangor (figs. 13 & 14)

- Potential Nature Monument

The ridge is a prominent landmark and a popular recreation area for Kuala Lumpur. This massive quartz dyke over 530 m in height, about 16 km long, and a few metres to 180 m wide is the largest in Peninsular Malaysia and is very accessible. The ridge of coarse-grained milky and smoky quartz with well-formed crystals runs in a westerly to northwesterly direction.

Sungei Klang cuts through the Klang Gates Ridge at the Klang Gates Gorge, where a reservoir dam was constructed in 1958 to supply water to Kuala Lumpur.

Post-Upper Triassic quartz was emplaced in the granite along a near vertical zone of weakness in a fault system. The granite was subsequently eroded, leaving behind the more resistant quartz. A quarry for quartz glass sand operates at the western end of the ridge in Gombak, Selangor, along the Kuala Lumpur - Karak highway.

There is a Wildlife Reserve (1 km^2 in area) on the Klang Gates Ridge established in 1936 to preserve animals and quartz ridge plants.

The ridge is visited yearly for geological field study by the staff and students of University of Malaya. About 1 km^2 of land near the Klang Gates Dam is suggested by the Geological Survey of Malaysia for conservation. However, for easier demarcation, this study recommends that the 2-km long section of quartz dyke exposed on the west (left) side of the damsite and another 2-km long section of the dyke on the east (right) side of the damsite be conserved.

4.2 BATU CAVES, Selangor (figs. 13 & 15)

- Proposed Nature Monument (385 acres, Third Malaysia Plan)

This limestone (marble) massif of the Silurian Kuala Lumpur Formation is a prominent landmark of Kuala Lumpur and is the southernmost limestone hill on the Asian mainland.

There are numerous cave chambers and passages in the hill with interesting cave features. The Dark Cave has been a tourist spot and a scientific research station for university and research-institution scientists. The sun-lit Temple Cave is occupied by Hindu shrines, with access from the base by a 277-step concrete stairway and a funicular railway, which have stopped in 1980 because of the hill-quarrying.

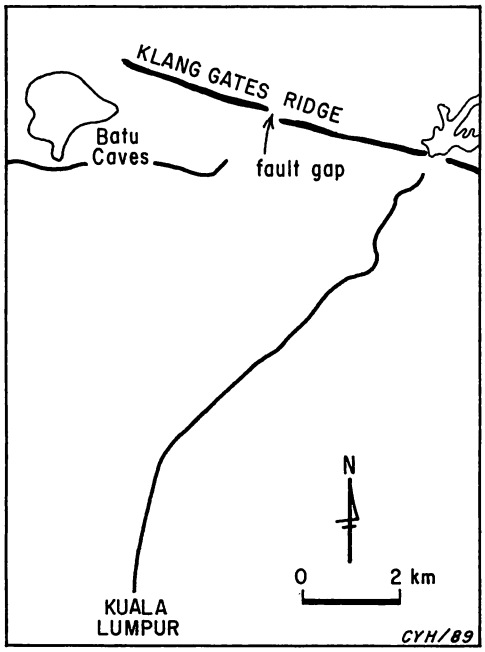

Figure 13 : Kuala Lumpur & Selangor Area

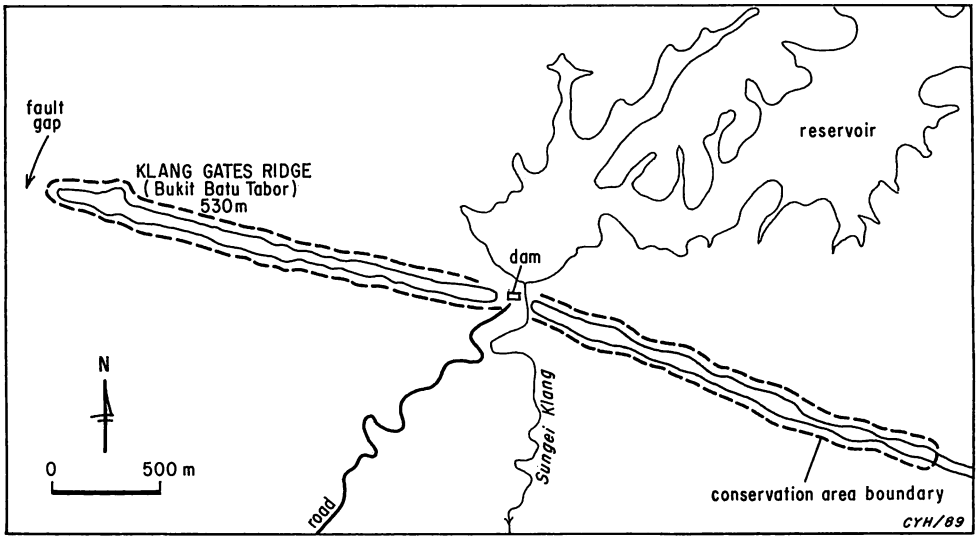

Figure 14 : Klang Gates Ridge, Ulu Kelang, Selangor

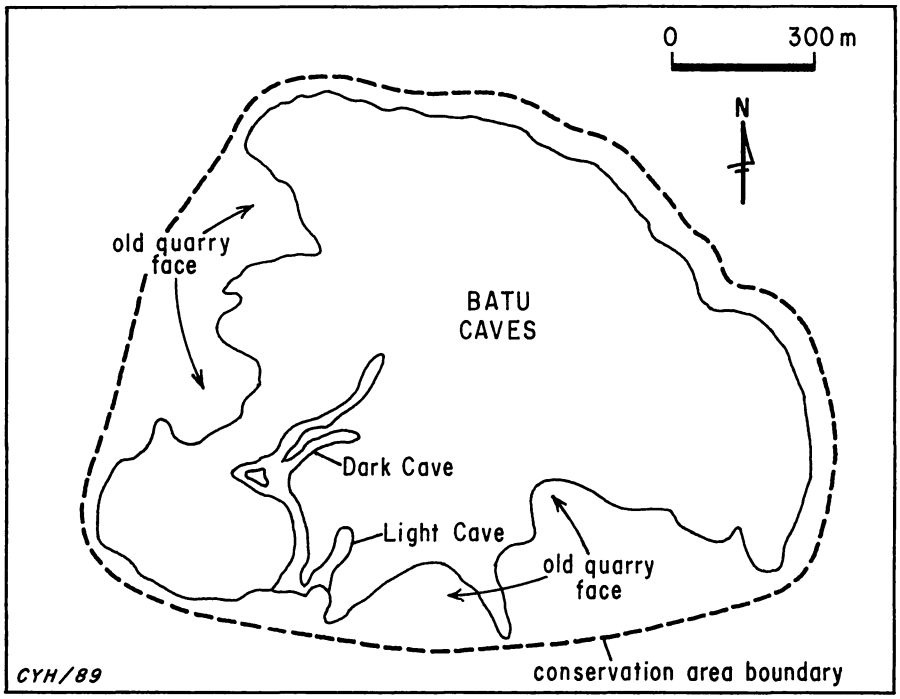

Figure 15 : Batu Caves, Selangor

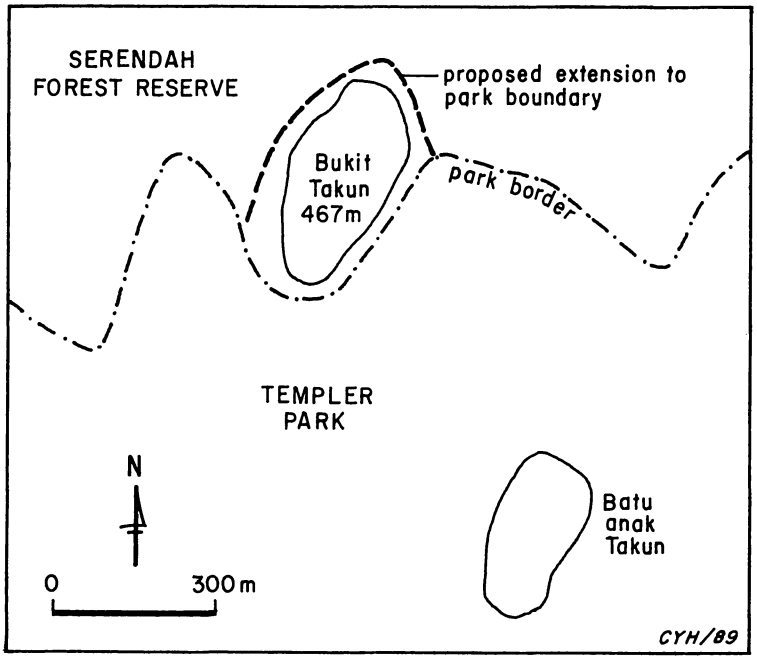

Figure 16 : Bukit Takun, Selangor

The hill has no economic minerals. Quarrying that had destroyed part of the hill lasted from 1896 to 1981.

The hill is visited yearly for geological field study by the staff and students of University of Malaya. It is also suggested for conservation by the Geological Survey of Malaysia.

4.3 BUKIT TAKUN, Selangor (fig. 16)

- Proposed inclusion into the existing Templer Park, Selangor under the Third Malaysia Plan (1976-80)

This small limestone (marble) hill in the Serendah Forest Reserve, Selangor, is a prominent landmark and a scenic backdrop just outside the boundary of Templer Park, Selangor (a wildlife and public recreation reserve) about 20 km northwest of Kuala Lumpur.

The Third Malaysia Plan proposed to double the size of Templer Park from the existing 3,000 acres to 7,500 acres by including Bukit Takun.

Bukit Takun, over 467 m in height has caves at the base and up the hill. Sharp limestone pinnacles and boulders balanced on top of each other form interesting hill scenery.

The hill is popular for recreation and mountain climbing and has no economic mineral. It is also suggested for conservation by the Geological Survey of Malaysia.

PULAU ANGSA, Selangor

- Geological feature of interest is not studied in this field, and recommendation of conservation status is thus not possible in this study.

KELANTAN

5.1 GUNUNG RENG, Batu Melintang, Hulu Kelantan, Kelantan (fig. 17)

- Potential Nature Monument

This small Permian limestone (marble) hill about 200 m in height is at the confluence of Sungei Tadoh and Sungei Pergau near the eastern end of the Grik-Jeli east-west Highway. There are numerous caves, e.g. Gua Paiong and Gua Badek, believed to have been inhabited by prehistoric stone-age men. It is a recreation spot for the village.

Gunung Reng is the only geological feature in Peninsular Malaysia featured in a Malaysian postage stamp issued in 1983 to commemorate the opening of the east-west Highway. In the stamp, the hill is a backdrop of the Pergau Bridge of the highway over Sungei Pergau.

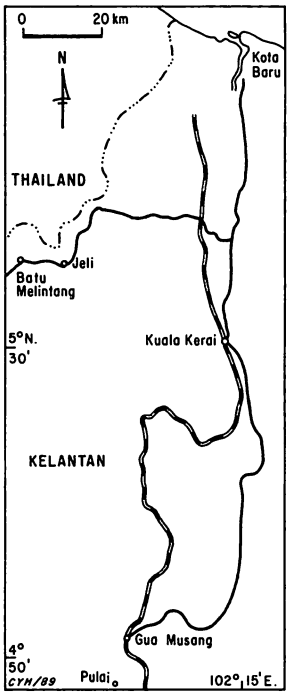

Figure 17 : Batu Melintang, Kelantan

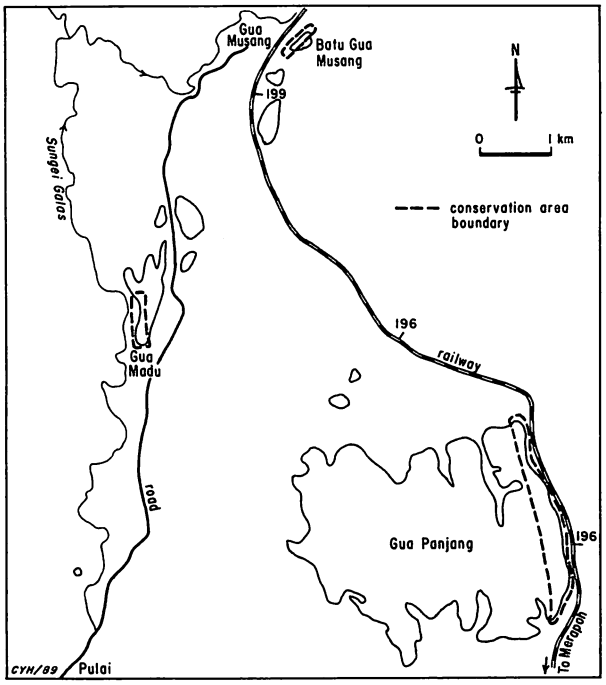

Figure 18 : Gua Musang, Hulu Kelantan

The hill is also suggested for conservation by the Geological Survey of Malaysia.

5.2 BATU GUA MUSANG, Gua Musang town, Kelantan (fig. 17 & 18)
- Potential Nature Monument

This small limestone(marble) hill of the Gua Musang Formation is in Gua Musang town next to the Gua Musang Railway Station. The hill has large cave chambers of archaeological value. The limestone is well bedded, with near-vertical bedding.

5.3 GUA MADU, about 6 km south of Gua Musang town on the road to Pulai village, Hulu Kelantan, Kelantan (fig. 18)
- Potential Nature Monument

This limestone(marble) hill has a cave, Gua Madu on the western hillside that is an archaeologic Mesolithic site excavated in 1939.

5.4 GUA PANJANG, south of Gua Musang town along the Gua Musang (Kelantan)-Merapoh(Pahang) Railway line, Hulu Kelantan, Kelantan (fig. 18)
- Potential Nature Monument

This huge limestone mountain is one of the largest limestone outcrop in Kelantan. It has rare Lower Triassic ammonoids and conodonts. Only the cliffs fronting the railway line for about 3 km (as suggested for conservation by the Geological Survey of Malaysia) are recommended here for scientific conservation.

TERENGGANU

6.1 PULAU REDANG, Terengganu (figs. 19 & 20)
- Potential Marine State Park

This offshore island in the South China Sea is northwest of Kuala Terengganu.

Interesting coastal features of sandstone sea caves and sea-arches formed by wave erosion occur along the west coast of the island. At Pasir Kecil on the southwestern tip of the island are Permian plant fern fossils of *Pecopteris* sp. and *Cordaites* sp. in the slate of the Redang Formation.

Near to and further off the eastern and southeastern coast of the island are numerous islets and islands of Pulau Kerengga Besar, Kerengga Kecil, Paku Besar, Paku Kecil, Lima, Ekor Tebu, and Ling where shallow coral reefs occur. Large coral areas in Pasir Telok beach at the southwestern coast of Pulau

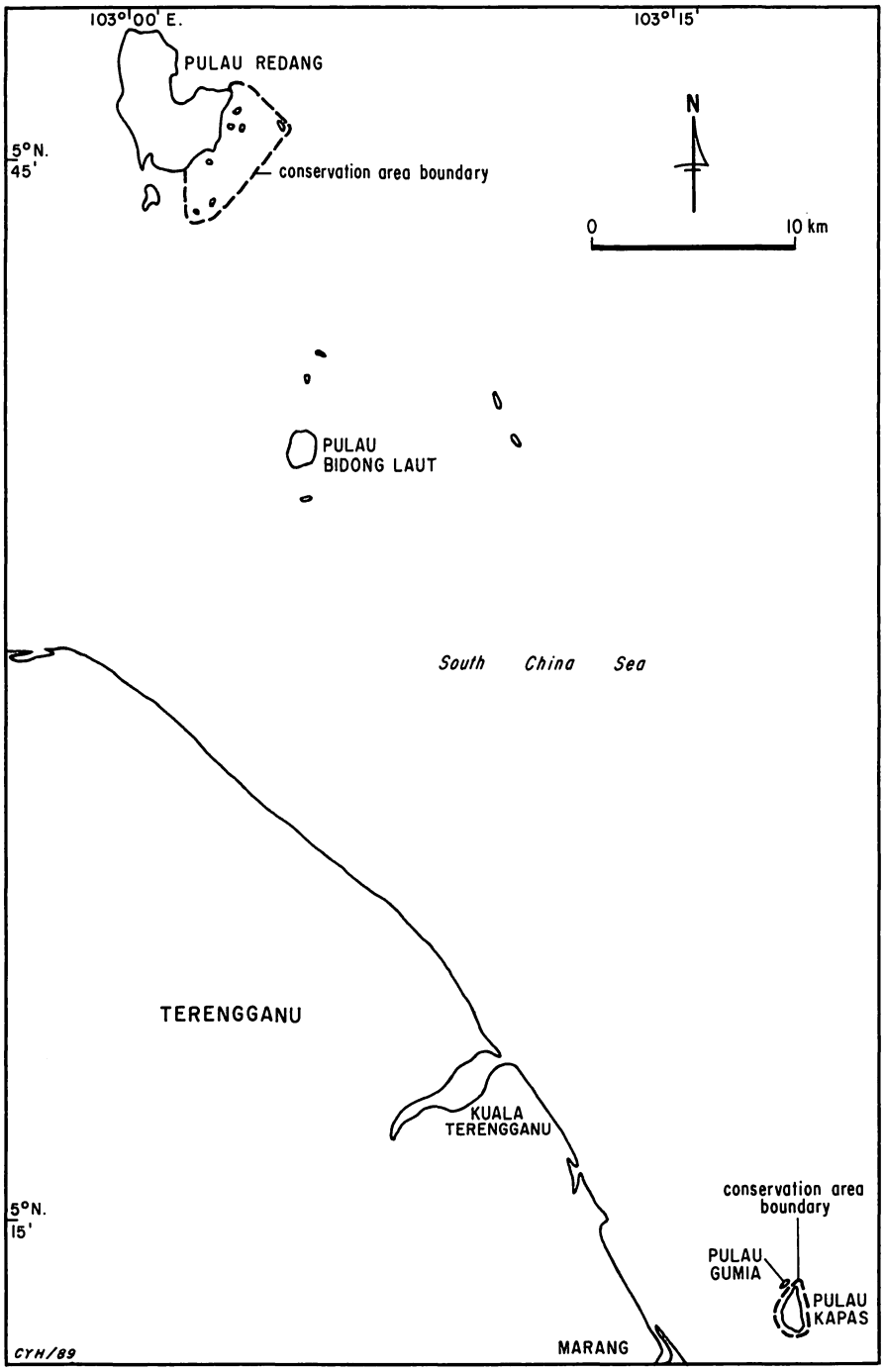

Figure 19 : Pulau Kapas & Pulau Redang, Terengganu

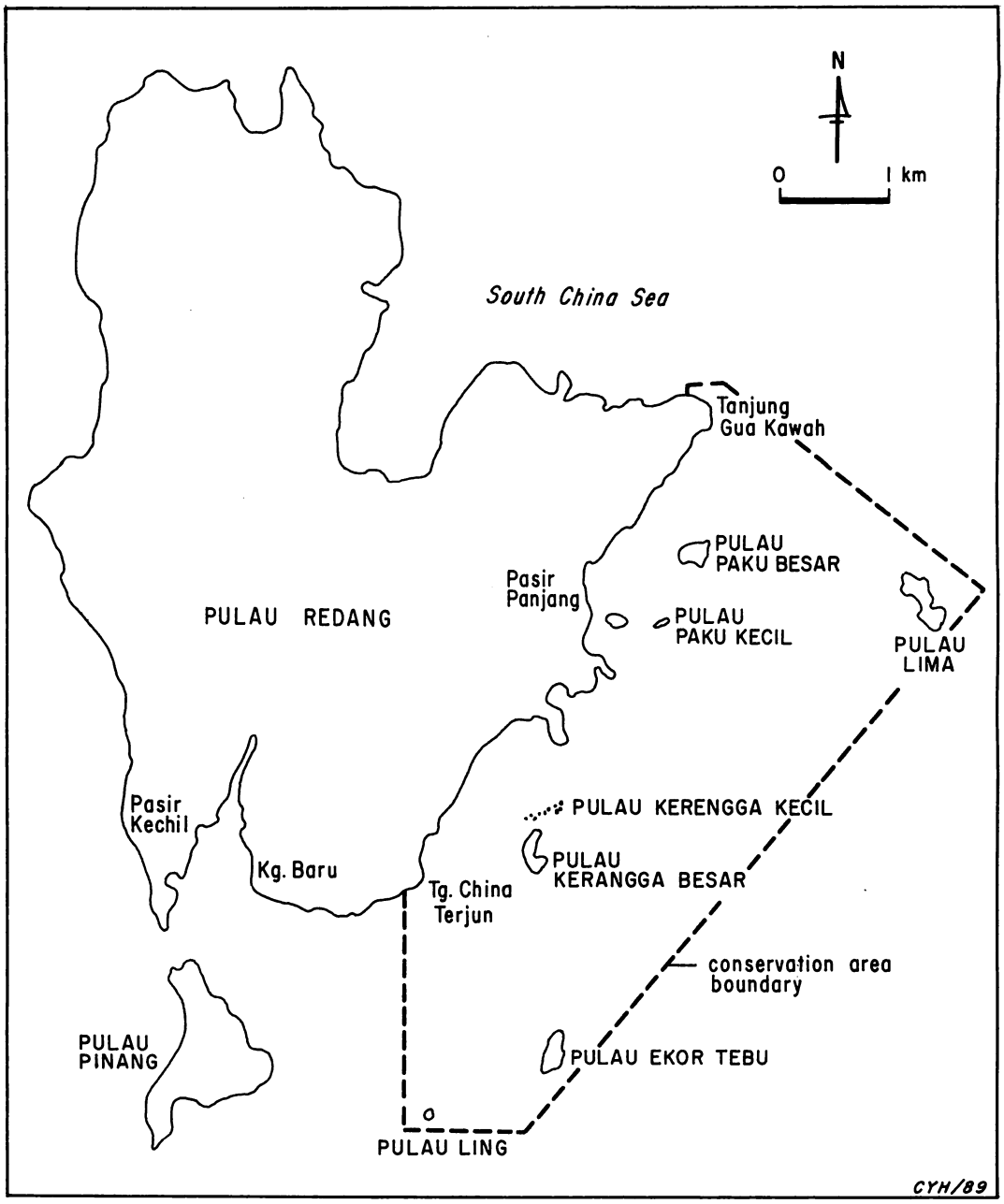

Figure 20 : Pulau Redang, Terengganu

Kerengga Kecil and the southwestern coast of both Pulau Lima and Pulau Ekor Tebu were damaged by the coral-eating crown-of-thorns starfish, *Acanthaster planci.*

Fish blasting, using explosives, and commercial coral harvesting that had damaged part of Pulau Redang corals were widespread before. Fish killing in the area is now forbidden under the Fisheries Act. The remaining corals can be conserved in a marine State Park for the regeneration of its value as spawning and nursery grounds for fish and marine life forms, for scientific studies, and tourist attraction.

Kampung Baru is a fishing village at the central southern coast of Pulau Redang.

In consideration of the coral reefs, the entire shoreline on the east coast of Pulau Redang from Tanjung Gua Kawah in the north to the Tanjung China Terjun in the south, and the islands of Pualu Paku Besar and Paku Kecil, Pulau Lima, Pulau Kerengga Besar and Kerengga Kecil, Pulau Ekor Tebu, and Pulau Lang are recommended for possible conservation in a State marine park.

The fossil locality at Pasir Kecil are coastal sea erosional features on the southern half of the west coast of Pulau Redang are not disturbed by any human development.

6.2 PULAU KAPAS, Trengganu (fig. 19)

- Potential Geological Site

This small and uninhabited island is 6 km offshore Marang, a fishing village south of Kuala Trengganu town. The elliptical island, 2.4 km long and 1 km wide is rocky and has some forest.

Good rock outcrops occur along the shoreline. The eastern coast is however cliffed and inaccessible. A Carboniferous to Permian sedimentary rock suite of sandstone, siltstone, mudstone, and shale is well-bedded and folded in various manners - isoclinal, overturned and chevron. The drowned topography of the few offshore islands off Pulau Kapas indicates worldwide eustatic sea level changes in recent geological time.

Coral reefs fringe the island and should be protected from further damage by man.

PAHANG

7.1 TANJUNG BATU HITAM, 11 km north of Kuantan, coast of Pahang (figs. 21 & 22)

- Potential Geological Site

Continental basalt flow of recent geologic (Late Cenozoic) time forms a wave-cut platform of the coast. The basalt cooled and solidified originally as hexagonal columns but these were later eroded under tropical weathering into circular (spheroidal) forms.

The locality is visited for geological field study by staff and students of the University of Malaya and is also suggested for conservation by the Geological Survey of Malaysia.

7.2 TANJUNG TEMBELING, rock outcrops on the southern (right) side of the Teluk Chempedak beach, Kuantan, Pahang (figs. 21 & 22)

- Potential Geological Site

Distinctive dark-coloured vertical dykes of Cretaceous dolerite cut through the older Late Permian granite beach outcrop.

The beach is a popular recreation area and the locality is visited yearly for geological field study by staff and students of the University of Malaysia.

7.3 BUKIT CHARAS, Panching, near Kuantan, Pahang (figs. 21 & 23)

- Potential Nature Monument

This small limestone (not marble) hill 254 km in height is in a rubber estate in Panching village about 25 km northwest of Kuantan on the road to Sungei Lembing town, Pahang.

The hill is the type locality of the Panching Formation outcropping in the area. Abundant marine shelly fossils visible on the notched rock surface indicate the rock was a Carboniferous tropical coral-reef system.

An extensive network of cave passages with large chambers known locally as the Panching Caves is present in the northern hillside. A Siamese Buddhist shrine occupies one of the cave passages. The hill is a popular recreation area for the village and a tourist attraction near to Kuantan.

No economic mineral is present. Limestone rock is quarried from another hill nearby, Bukit Panching. Bukit Charas is also suggested for conservation by the Geological Survey of Malaysia. The hill is visited yearly for geological field study by staff and students of the University of Malaya.

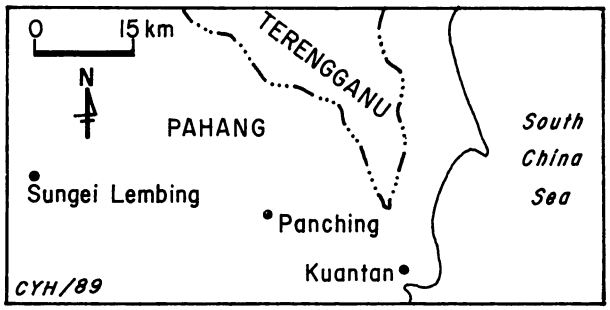

Figure 21 : Kuantan Area, Pahang

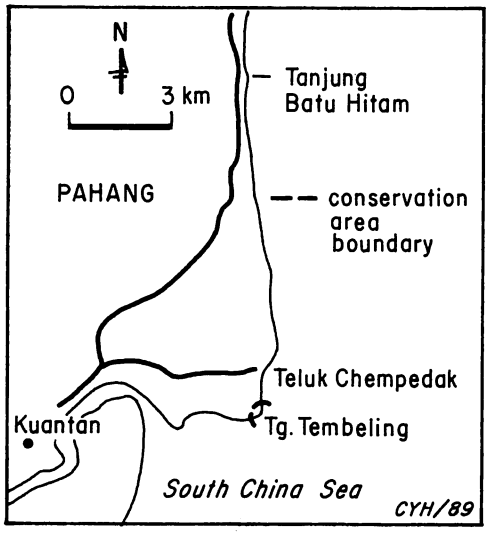

Figure 22 : Tanjung Batu Hitam & Teluk Chempedak, Kuantan, Pahang

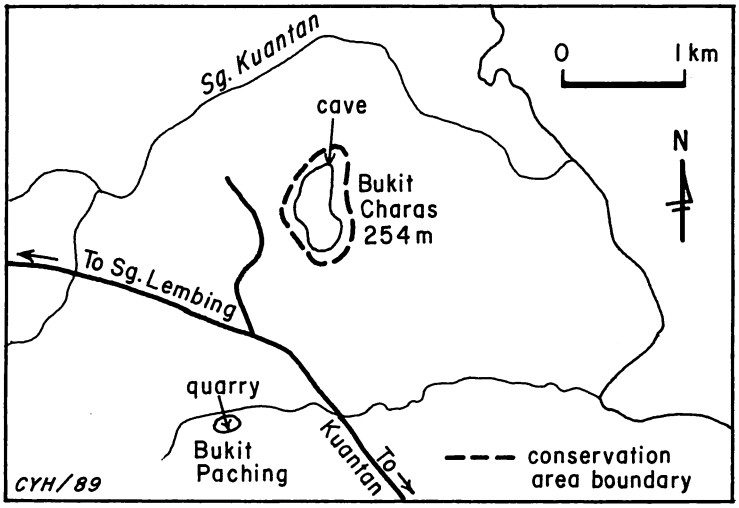

Figure 23 : Bukit Charas, Panching, Pahang

7.4 GUNUNG SENYUM, Jengka 25, Jengka Regional Development Authority, east of Kuala Kerau, Pahang (fig. 24)

- Potential Nature Monument

This large scenic limestone hill 483 m in height has a very conspicuous summit devoid of tree cover and exposing the white limestone rock. Several 'wang' (large open space surrounded by cliffs) with large limestone gour pools are on the south western mountainside. Gua To' Long is an archaeological site suggested to this study for conservation by a Muzium Negara archaeologist. The hill is also suggested for conservation by the Geological Survey of Malaysia.

Bat guano (phosphate) has already been extracted from the caves of this Permian limestone hill, and there are no other economic minerals present.

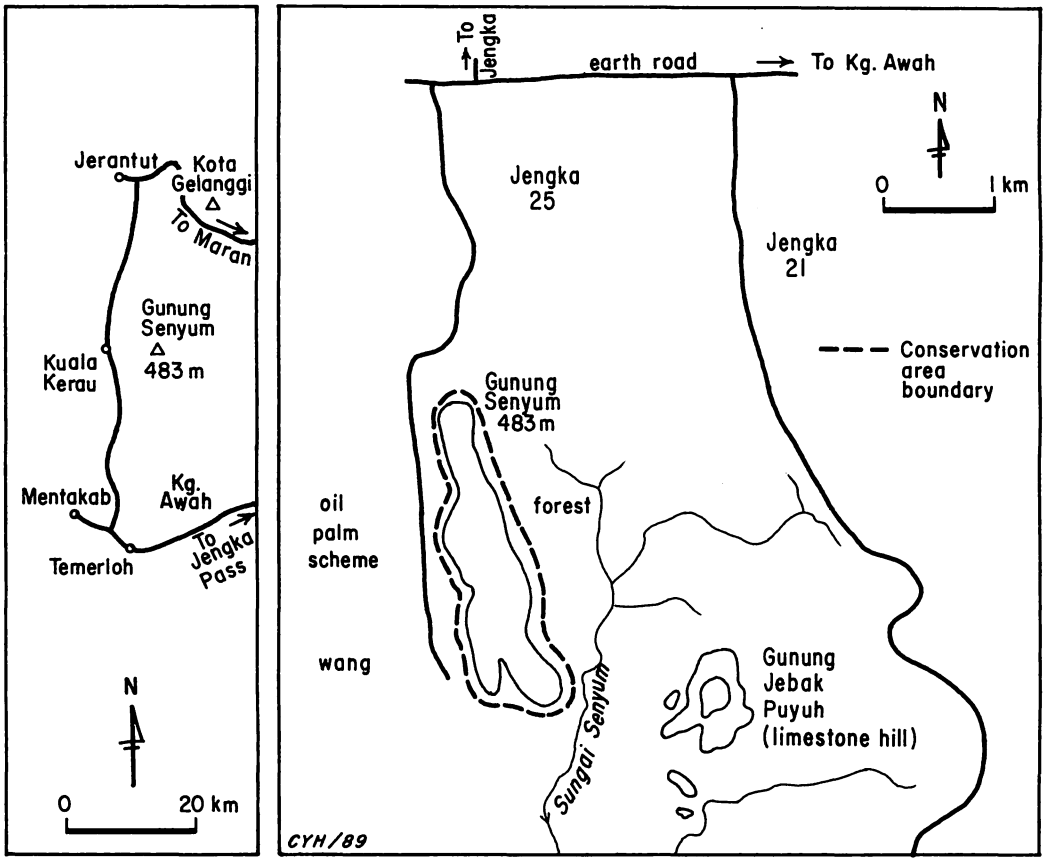

Figure 24 : Gunung Senyum, Jengka 25, Pahang

7.5 KOTA GELANGGI - over 20 km northeast of Gunung Senyum in Kota Gelanggi Satu Scheme, Jengka Regional Development Authority, Pahang and 32 km east from Jerantut town on the road to Maran (fig. 24)

- Geological Feature in the process of destruction

This huge limestone outcrop has three named peaks, Kota Jin, Kota Gelanggi and Kota Tongkat. The cave of Kota Tongkat is an archaeologic site with cord-marked pottery, oval glass beads of the Metal Age, shell, and a bronze bowl-rim fragment. This cave is suggested to this study for conservation by a Muzium Negara archaeologist. There are many other caves in the outcrop, e.g. Kota Burong, Kota Papan, Gua Angin and Gua Gelap. The hill is also suggested for conservation by the Geological Survey of Malaysia.

Kota Gelanggi (Jabatan Kerja Raya, JKR) Quarry is operating in the hill. The cave of Kota Tongkat is recommended for conservation in this study.

7.6 SUNGEI LEMBING UNDERGROUND LODE TIN MINE, PAHANG (fig. 21)

- Vestige Object of Ancient Mining History

Sungei Lembing tin-mining town is 42 km northwest of Kuantan, Pahang. Tin mining probably started in prehistoric time, while recorded mining began in 1883. The present mining company working this world's deepest underground lode tin mine, the Pahang Consolidated Co. Ltd. (recently renamed the Pahang Investment Ltd.) was formed in 1906.

Tin is extracted from collectively hundreds of kilometres of underground man-made tunnels (about 6 m by 2 m in cross-section area) with underground railways and is hoisted up to the ground surface above in cages raised by cables up through vertical mine shafts.

Many levels of underground tunnels at 30 m interval are supported by timber frames and are equipped with trucks, lights, ventilation and water pumps.

Among the several shaft mines, the present Gakak III mine shaft reaches to 1,400 feet below the surface.

Such unique and historical structure of underground shaft mining is a future vestige object of the country's mining history with great conservation potential.

7.7 KAMPUNG AWAH (JABATAN KERJA RAYA) QUARRY, Kampung Awah, 15 km east of Temerloh town on the road to Kuantan,Pahang (fig. 24)

- Geological Feature that is difficult to conserve in the field

Permian to Triassic submarine andesite and pyroclastic rocks are mixed with limestone (marble) containing foraminifera (fusulinid) fossils. The locality

is visited yearly for geological field study by the staff and students of the University of Malaya and is also suggested for conservation by the Geological Survey of Malaysia. However, a major quarry is in operation.

7.8 JENGKA PASS - a road section, 27 km east of Temerloh on the trunk road to Kuantan, Pahang (fig. 24)

- Geological Feature that is difficult to conserve in the field

A major unconformity between the basal flat-lying Jurassic Tembeling Formation red beds and a steeply dipping folded and faulted Permian sequence of limestone-shale-sandstone. The limestone is fossiliferous with fusulinid foraminifera, coral, and brachiopod while the sandstone and shale are intensively folded. The locality is visited yearly for geological field study by staff and students of the University of Malaya and is also suggested for conservation by the Geological Survey of Malaysia. Parts of this road section are covered by vegetation overgrowth.

PULAU TIOMAN

- Geological features of interest and complexity on the island of Pulau Tioman, Pahang have not been studied in the field and thus recommendation of conservation status is not possible in this study. Pulau Tioman has good tourist value.

JOHORE

8.1 TANJUNG KEMPIT- around the tip of the cape, east of Kuala Endau, east coast of Johore (fig. 25)

- Potential Geological Site

Good coastal outcrop of highly deformed and folded Permo-Carboniferous metasediment of mainly quartzite and slate/phyllite exhibiting many interesting structural geological features. The well preserved beds are overturned with mullions and boudins present.

The locality is visited yearly for Geological field study by the staff and students of University of Malaya.

8.2 TANJUNG PENYABUNG, southeast of and near to Kampung Penyabung, northwest of Mersing town, east coast of Johore (fig. 25)

- Potential Geological Site

This headland facing the South China Sea is composed of the Jasin Volcanics of rhyolite, tuff and agglomerate. Volcanic bombs embedded in the layered rocks indicate volcanic materials were erupted from a nearby source and transported by wind and deposited in the area.

A large and prominent lamprophyre sill intruded the rhyolite.

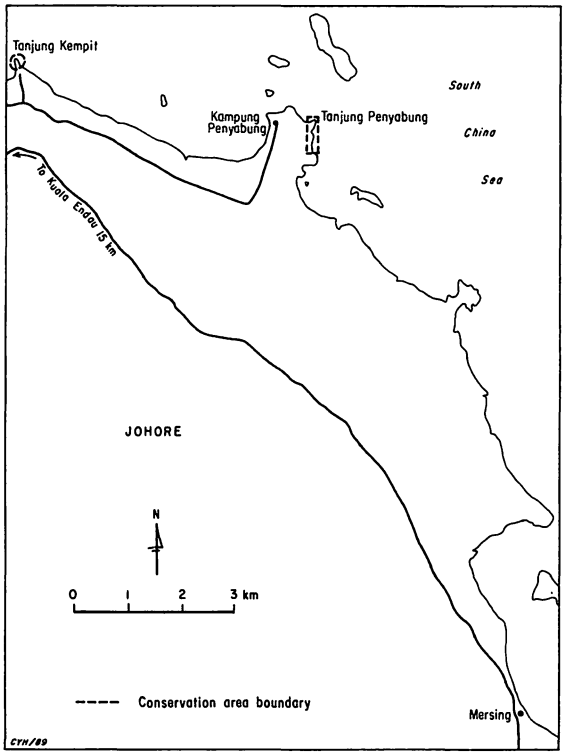

Figure 25 : Tanjung Kempit & Tanjung Penyabung, Johore

The locality is visited yearly for geological field study by the staff and students of University of Malaya.

Kampung Penyabung, a fishing village nearby is northwest of Tanjung Penyabung.

8.3 GUNUNG PANTI - north of Kota Tinggi, Johore (fig. 26)
- Potential Nature Monument

This mountian is a ridge with two summits, Gunung Panti 659 m in height at the eastern end and Gunung Panti Barat 561 m in height at the western end. The ridge is a geomorphological feature of a cuesta formed by the near horizontal sandstone beds capping the top of the mountain over the older granite intrusion below. This Panti Sandstone Formation with minor shale beds contains Lower Cretaceous gymnosperm plant fossils.

There is no occurrence of economic mineral and, by nature of the sandstone, rainfall is not retained and any human development (e.g. housing) on the

mountain is not viable. The locality is also suggested for conservation by the Geological Survey of Malaysia.

Since a military training camp is located on the southern granitic slopes of the mountain, the sandstone top of the entire horizontal ridge a few kilometres long from Gunung Panti Barat to Gunung Panti is recommended for conservation in this study.

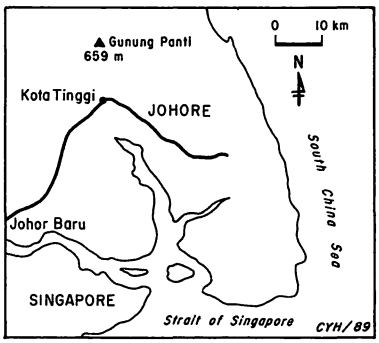

Figure 26 : Gunung Panti, Johore

APPENDIX 1

Peninsular Malaysian Laws Related to Geology and Conservation

The Geological Survey Act, 1974, controls geological surveys. Under it the Geological Survey of Malaysia may require any person authorised for prospecting land for metal or minerals to surrender in part specimens of rock material, mineral, ore, fossiliferous materials or other naturally occurring mineral substance in the earth for identification or analysis. Any person conducting a geological survey or prospecting who finds any fossiliferous material shall immediately or from time to time notify the Geological Survey Director General.

The Antiquities Act, 1976 provides for control, preservation and research into ancient (at least 100 years old) and religious or historic, archaeologic, monuments,archaeological sites and remains, antiquities and historic objects in Peninsular Malaysia. Antiquities include any human, plant or animal remains at least 100 years old. Historical object means any artefact or other objects to which religious or historic interest is attached. Monument includes any monument, cave or excavation of public interest because of religious, historic or archaeological interest and the site of any monument and the adjoining land. No person shall dig, excavate, quarry, burn lime in the immediate neighbourhood of an ancient monument or a historical site so declared or demolish an ancient monument or disturb, obstruct, modify, mark, pull down or remove any such monuments.

The National Parks Act, 1980 preserves and protects wildlife, plantlife and objects of geological, archaeological, historical and ethnological and other scientific and scenic interest in Peninsular Malaysia to promote the education, health, aesthetic values and recreation of the people.

APPENDIX 2

Geological Conservation in the United Kingdom, the United States of America and the United Nations

The United Kingdom government set up a national system of geological conservation with the formation of the Nature Conservancy Council in 1949 to conserve features of great geological interest. By Act of Parliament (1973) the Nature Conservancy Council is responsible for the conservation of flora, fauna and geological and physiographical features. It establishes, maintains and manages National Nature Reserves. The Geology and Physiography Section of the Nature Conservancy Council serves to conserve localities of geological and physiographic interest that are essential to the continued study of these sciences. A total of 151 National Geological Sites have been declared. The geological sites include small natural outcrops, mines and quarries, both active and disused, stream sections, road and rail cuttings, sea cliffs and foreshores, and large tracts of rocky upland. Caves and landslips are some of the physiographic sites conserved.

The United States of America National Parks Service was established in 1916 to unify and administer the national park system. The Wilderness Act 1964 establishes areas for permanent preservation. Over 20 major National Parks and National Monuments are established to conserve mountains,cliffs, waterfalls, geysers, hot springs, volcanic features, limestone hills, cave systems and features, sandstone mesas, buttes arches, domes and spires, fault-controlled topographic forms, plant and animal fossils including petrified trees and dinosaurs, and coral reefs.

The World Heritage Convention was adopted by the UNESCO General Conference in 1972 to protect World Cultural and Natural properties of outstanding universal value. Natural heritage are natural features or physical formations of outstanding universal aesthetic or scientific value; geological and physiographic formations that represent the major stages of the earth's significant ongoing geological processes and are of exceptional natural beauty. The World Heritage Sites related to geology are the Sagarmatha (Mount Everest) National Park of Nepal, the Yellowstone and Grand Canyon and Mammoth Cave National Parks of U.S.A., the Dinosaur Provincial Park and Burgess Shale site of Canada. Potential World Heritage Sites in Malaysia (related to geology) recognised by UNESCO in 1982 are the Gunung Mulu and Niah Cave National Parks in Sarawak and the Gunung Kinabalu National Park in Sabah.

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