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NATIONAL PARK ADVISORY PROJECT

TO THAILAND, 1959 - 1960

A SPECIAL REPORT

by

George C. Ruhle

FOREWORD

The International Commission on National Parks of the International Union for Conservation of Nature (IUCN) has been interested since its establishment in furnishing technical aid to countries in need of such assistance. For this reason we welcomed the generous offer of George C. Ruhle to take leave of absence from his assignment with the U. S. National Park Service to place his knowledge and experience at the service of the departments of the Governments of Indonesia and Thailand responsible for the administration of parks. All efforts to obtain support for this work from bilateral government aid programs were unavailing, so Dr. Ruhle undertook the assignment without salary and personally assumed a portion of the expenses involved.

In Indonesia he was dealing with a well established park system where his experience as a long time park naturalist enabled him to assist with educational activities, especially interpretation. His work in Thailand, which is the subject of this report, was concerned with a park system that was just being established. There he worked with the Royal Forest Department and the newly formed Association for the Conservation of Wildlife on many aspects of their national park development problems. This report sets forth a brief description of the areas with which he was concerned, and which it is hoped may be increasingly developed into viable national parks or reserves for the benefit of future generations of Thais, as well as of the rest of the world.

Thailand is a very beautiful country which I have visited many times. Nature conservation unfortunately has been gravely neglected. The Government is now making a strong effort to make up for lost time, and it deserves all the help we can give it.

The success of Dr. Ruhle's mission is manifested by the fact that since his return there have been many requests, both private and governmental, that he do further work in his chosen field in Thailand. He has a quality of warm personal friendship and deep understanding of Asian cultures, which makes him a splendid goodwill ambassador.

I welcome this opportunity to thank the U. S. National Park Service for making available the services of Dr. Ruhle for his mission to Indonesia and Thailand. I am also grateful to Fred and Jean Packard for their help with many matters relating to this successful mission, and the issuing of this report.

Harold J. Coolidge
Chairman, American Committee for International Wildlife Protection, and
International Commission on National Parks of the International Union for Conservation of Nature

16 July 1963

INTRODUCTION

In 1958 I was asked by Harold J. Coolidge, chairman of the Commission on National Parks of the International Union for the Conservation of Nature and Natural Resources, to go to Thailand. Purpose of the trip was to assist the Thai government, the Niyom Phrai Smakom (Association for the Conservation of Wildlife), and other organizations with forming a national park system, and to endeavor to assist any Thai agency, state or private, and any international cooperative agency in furthering worthwhile conservation programs in the country. In particular, I was to concern myself with problems relating to conservation of endemic flora and of rare and vanishing species of wildlife.

Through the efforts of Mr. Coolidge and his Committee of the IUCN, a donation of \$2,000 from private funds was obtained which paid for 60% of the transportation costs of my international travel. The remainder of the cost of transportation, plus associated expenditures for meals and lodgings, was at my own expense.

The Thailand Royal Forest Department paid all board, lodging and local transportation costs on Thai projects, and supplied office space, a car and driver, guides, interpreters and porters as needed. In addition to this, the Association for the Conservation of Wildlife and its Executive Director, Dr. Boonsong Lekagul, extended the use of their excellent library, extensive study collections, visual aid facilities and desk space. They were friendly, hospitable and interested far beyond expectation. Dr. Boonsong furnished transportation and meals on many weekend trips of special interest to him and his association.

Furthermore, the Cultural Section of USIS, the geological section of U. S. Operations Mission and the Royal Thai Irrigation Department were generous with help, particularly in the form of books, maps, photographs and advice as requested. The Royal Irrigation Department furnished transportation in its private plane, meals, lodging, a guide, and excellent informative material in connection with the Yan Hee project. The Construction Syndicate of Thailand did likewise for inspection of the Orb Laung Mae Sarieng highway construction. USOM furnished plane transportation to Saigon for a conference with Mr. Coolidge.

The Plan

Enroute to Bangkok, this plan was formulated:

1. Interview key personnel to solicit aid and lay a foundation for the project. These should represent the government, Chulalongkorn and Kasetsart Universities, and various cooperative (assistance) agencies, particularly American.
2. Seek opinions from informed individuals on outstanding areas with national park possibilities.
3. Investigate as many of these as possible within limits of time, facilities and budget.

4. Advise pertinent agencies on findings.
5. Disseminate information through consultations, lectures, press releases and articles prepared for magazines, radio and TV.

The Schedule

Solicitation of Aid: In May and June, 1959, I investigated every possible source of aid. David Davies, professor of English at Chulalongkorn University who speaks Thai fluently, gave me great help at this critical time. One entire night was spent with Mr. Coolidge in Saigon discussing my program. Dr. Boonsong Lekagul, who was a prime mover in getting me to come to Thailand, was touring Europe at the time, and therefore was unavailable.

After initial frustrations, I was granted an interview with the Minister of Agriculture, the late Sawasdi Mahaphol. He became very enthusiastic over the project and offered as minimum aid a house, servants, board, car, driver and guides. With this pleasant reassurance, I left immediately for Indonesia for a six-month assignment with the IUCN. Unfortunately, the Minister passed away a few months after our meeting, and on his return from Europe Dr. Boonsong approached the succeeding Minister, Gen. Surajit Charusareni, about an extension of the offer. After I returned to Bangkok in November, the Minister granted this aid through Nai Chalerm Siriwan, Director General of the Royal Forest Department.

Selection of Areas: Interviews for national park ideas and possible sites was concurrent with the search for aid. Opinions of Thai authorities and foreigners, mostly scientists in Thailand and abroad, were compiled and screened. Out of the many suggestions, the following were selected for initial investigation:

1. Thung Salaeng Luang, southeast of Phitsanuloke, in the changwat of Phitsanuloke, Phichit, and Phetchabun.
2. Khao Yai between the Friendship Highway and Nakorn Nayok, in the changwat of Saraburi, Nakorn Nayok, Phachinburi, and Nakorn Rachasima.
3. Khao Salob, northwest of Kanchanaburi, in the changwat of the same name.
4. Doi Suthep and Doi Phui in Chiangmai changwat.
5. The Doi Inthanon complex, Chiangmai changwat.
6. Orb Luang Gorge, Chiangmai changwat.
7. Phu Khadung, a sandstone mesa in Phetchabun changwat.
8. A parkway strip along the East-West Highway, 70-100 km. east of Phitsanuloke and contiguous to Thung Salaeng Luang.
9. The Meping Gorge above Yan Hee damsite in Tak Changwat.
10. The Krau Isthmus in southern Thailand between the Gulf of Thailand and the Andaman Sea.
11. The Chantaburi region in the Southeastern part of the country. Areas that I did not visit, but which may have promise, include:

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(a) Along Farnag highway, Chiangmai Changwat, reputed to be a volcanic area of jagged peaks and odd formations with interesting plant and animal life.

(b) Rugged topography between Farnag and Chiangrai; primitive area.

(c) Doi Vieng Pha, west of Mae Khi and Chiangdao; rugged cliffs and walls, interesting plants and animals.

(d) Doi Kham, south of Doi Inthanon; crags, waterfalls, undisturbed forests, wildlife.

(e) Mae Hongson Changwat, adjacent to Burma; primitive forest, much wildlife, very scenic.

(f) The region west of Mueng Loey; scenery, evergreen forest.

(g) Geyser region southwest of Chiangdao.

(h) Granite area north of Chantaburi.

(i) Select areas on the Peninsula such as Khao Lung Surat and Kraebong in Trang Changwat.

(j) Erawan waterfall on the River Khwae.

(k) An area in eastern Khorat adjacent to that part of Cambodia that is alleged to contain kouprey.

Other areas not covered in this report have been suggested for establishment as provincial parks, health and education centers, hill stations, wildlife preserves, reserve forests, national monuments and historical sites. Of special interest is the Sukothai historic site embracing the most significant ruins of the Sukhothai era of Thai history (circa 1238 - 1350) that to many Thai fixes their origin as a distinct people.

Although outside the scope of this report, but of great interest, is the Phra Vihar temple complex. This masterpiece of Khmer architecture is situated on the rim of the Dong Rek scarp that forms part of the boundary between Cambodia and Thailand. The two countries at present are having a bitter dispute over the temple, which has been carried to the United Nations for settlement*.

Interviews and Reports: I spoke with numerous individuals, especially those associated with conservation, such as: changwat governors, forests, scientists and planners, to introduce them to plans and objectives of national parks, reserves and conservation in general. Talks were given to student bodies, conservation groups and general audiences.

Written reports were submitted to the Royal Forest Department and to Mr. Coolidge for presentation to the IUCN meeting in Poland and the Fifth World Forestry Congress in the USA. A preliminary report on all areas visited was submitted to Mr. Coolidge and Dr. Boonsong, with attention directed to the following:

1. Cooperation with and coordination of conservation projects and practices in southeastern Asian countries.

This has met with enthusiastic support especially in Thailand, Indonesia and the Philippines. Other countries considered as part of the immediate area are Malaya, Singapore, Burma, Laos,

Cambodia, Vietnam, Sarawak, North Borneo, and possibly eventually Formosa and Hong Kong.

The Association for the Conservation of Wildlife plans to publish a quarterly digest of news and views on conservation in Southeast Asia with contributions from the countries concerned; the first issue to appear in January, 1961.

2. Conservation of wildlife, plant life, water, soil and forests.

3. Popular education on conservation and nature study: No material success was met in my attempts to organize guided trips afield in Thailand, an enterprise close to my heart. Weak both in acquaintance with Thai natural history and in ability to speak the language, I was unsuccessful in stirring up enthusiasm or in enlisting satisfactory mouthpieces for this effective in-expensive activity.

* The Hague Tribunal subsequently has awarded the temple to Cambodia.

SUGGESTED NATIONAL PARK AREAS

It is suggested that the designation "Royal Thai Parks" dedicated to Lord Buddha be used in place of "National Parks." Similarly, the terms "Royal Thai Game Preserves" and "Royal Thai Forests" appear to be preferable to "game reserves" and "forest reserves."

THUNG SALAENG LUANG

This region of attractive diversified forests and nature is being endangered because of its easy accessibility, now that the East-West Highway between Phaitanuloke and Lomsok is open. The extensive savannahs in the central southern part were excellent wildlife country, but this is changing rapidly because the area now is being heavily hunted and whole species are being exterminated.

The very rugged limestone crags near Ban Mung, southwest of the present suggested boundaries should be included as a scenic feature. Also, a sizeable tract between Kms. 75 and 100 along the highway should be added to preserve a section of virgin forest for visitors who cannot leave their cars. But unless immediate strong measures are taken, with adequate enforcement personnel, this amazing opportunity will vanish.

So famous is this area for its game that it is proposed as the first National Park. Nonetheless, during my brief visit there, I saw several dozens of hunters taking unlimited toll. The faint trail was blazed with middens of silvery feathers, each marking a spot where a resplendent peacock-pheasant had been plucked. The few remaining will quickly be wiped out, for despite the fact that this rare bird is seldom seen, I am told that it is easily snared.

Some of the hunters were after gaur whose herds already have been thinned, judging from the small number of tracks hardened in the mud. Most were taking everything they could find, mostly birds, snakes, gibbons and insects.

Campsites were marked by the rising smoke of fires over which the take was being cured. Every good camping site was occupied; meanwhile the dry cover was being burned everywhere "to open up the forest." I witnessed the setting of half a dozen new fires, and was regarded with undisguised disbelief when I objected and tried to explain why it was wrong. I was concerned by the burning that darkened skies and blackened landscapes everywhere.

Reasons given me for this burning included: to let in sunlight, to make hunting easier, to clear land, to facilitate travel, to make fertilizer (potash), to destroy pests, or merely because it's fun or pretty.

Burning simply must stop in Thailand as elsewhere for several reasons:

1. If any of the primeval is to be preserved.
2. If Thailand is not to grow progressively poorer in soil and in timber products.

3. If floods are not to increase annually, necessitating more and more expenditure for dams, levees and other means of alleviation.

4. If water shortage and drought are to be forestalled, perennial streams kept from drying up, the water table kept from dropping progressively, and the potability of the water remaining good.

Conclusions

I recommend that Thung Salaeng Luang should be set up immediately as a national park, that strict protective measures be adopted for its plants and animals, and that study be made for its intelligent development. A scenic limestone tract on the southwest should be included and the highly important watershed on the East-West Highway to the top of the divide should be preserved in its present state. This presents a ready opportunity to use virgin jungle as a magnet that will draw visitors from all parts of the globe.

I also suggest a recreational area for Piney Grove (outside Thung Salaeng Luang), and a parkway along the Mae Nam Wang Tong for 10 km. above the arboretum at Km. 33.5. This latter will have to be on reclaimed land. Recreation sites also should be developed beside the three attractive waterfalls along the highway and at Piney Grove.

KHAO YAI NATIONAL RESERVE

Either by statute or by declaration of the Royal Thai Forest Department, 200 square km. of highlands in the Saraburi Changwat, Nakorn Nayok, Nakorn Rachasima and Prachinburi have been designated as a National Reserve. Highly scenic, with primeval forests and a cross-section of indigenous wildlife, this wilderness area should be preserved in its unimpaired state as a bit of the old Thailand.

It is a part of the rim of the Khorat Basin that has the most precarious water reserves of the entire country, and every possible use that may effect that delicate water supply adversely should be scrutinized with caution.

The importance of the region as a future recreation center is enhanced by its closeness to Bangkok and its easy access from the heavily populated sections of the country. It has a cool salubrious climate that invites escape from the congestion of the cities during the dry season.

With due consideration first of all for the primary importance of the Khao Yai for watershed protection and soil conservation, the reserve area can be subdivided into sections for sound future usage and development.

1. The area of greatest elevation and ruggedness should be set aside as a National Park. This embraces some 500 square km. that can be dedicated as a total sanctuary. Traverse within the National Park should be by trail only. All campsites, buildings and roads should be banned within it as a violation to its basic character. It should be regarded as truly holy ground worthy of reverence by the Thai people.

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In its role as a total sanctuary, it automatically would serve as a protector of native animals, birds and rare plants. Within it, each can exist in normal, undisturbed fashion, can multiply and spread over the boundaries to replenish the less favored, contiguous areas in which protection, for various reasons, is not feasible or complete. By its very nature, the National Park would serve as an inviolate watershed in a highly critical location.

2. The greatest part of the remaining area should be established as a National Forest and Game Preserve. Limited access by road and establishment of recreation and other centers as next described should be regarded as proper use within the National Forest. Here again, however, watershed and soil conservation qualities must be adequately guaranteed by a wise use policy.

3. A few, carefully selected, delimited tracts of special use should be designated for development as recreation sites and as centers for specific groups or purposes, such as Boy Scouts and student groups, or as places possessing outstanding scientific and educational features. Special use areas should not be numerous, so that impairment of the forest is kept small. Each area so chosen should be considered independently and separate plans should be drawn for the appropriate development of each.

4. The highways within the Reserve should be designated as National Parkways. Each parkway should comprise a strip not less than one km. wide through which the highway passes. A comfortable margin to preserve primitive values should be provided on both sides of the right-of-way. These parkways should be administered as National Parks except that provisions should be made for traffic safety and for road maintenance. Location of special use areas and access roads within parkways should not be regarded as serious intrusion upon their essential wilderness character. These National Parkways bordered by primeval forest will serve as a welcome relief to tourists and motorists grown weary of monotonous, endless expanses of rice paddies and farmlands that are rapidly taking over the heart of the country.

It must be recognized at this point that, once the road between Khorat and Kabinburi is improved, it will be a primary artery for the movement of goods from one side of the mountain range to the other. Master planning should be made always with this in mind.

5. It is said that the military is contemplating use of a part of the Reserve area for undisclosed purposes. If this is so, the site should be selected and earmarked now by an appropriate committee.

In all of the above, I firmly advise that:

(a) Usage of the Reserve for scientific, educational and inspirational purposes should be predominant and should be encouraged in every possible way.

(b) All exotic life should be banned from the Reserve as completely as possible; local trees, shrubs and low plants should be used for blending into the landscape and for screening. In other words, the roses, poincianas and plumeria so attractive and appropriate in city parks and private grounds have no place here, for the Reserve should be kept thoroughly Thai.

(c) The entire area should be a wildlife preserve. Nothing has heretofore been done in Thailand to insure breeding stocks of their fast dwindling wildlife resources which is vital for perpetuation, whether for meat, revenue, education, sport or sentiment. Once native animals are given complete protection, they will saturate the area and be squeezed outward into the surroundings where they may become legitimate prey of the hunters.

(d) Fishing should be permitted with the Forest Preserve, but with rod and reel for sport and recreation only.

(e) Trails should gridiron the Reserve for reasonable access to all points of significance.

(f) Use should be encouraged for outdoor recreation of types most appropriate for woodland environment such as hiking, photography and nature study.

(g) As nearly as possible, all development within the Reserve should be made in harmony with the primitive landscape. Buildings should be low, rustic, and unobtrusive; utilities should be located and installed with careful provision for masking whenever possible. All scars on the landscape such as roadcuts, reservoirs, quarries, and special use areas, should be kept at a minimum, screened and located with least damage and intrusion to the primitive scene.

(h) With regard to construction necessary for official usage, all thoughts of conventional, stylized, city architecture should be brushed aside. With due consideration of function, efforts should be devoted with consideration for access, water supply, subclimate, view and basic purpose. For official dwellings, I suggest bungalows of stone with concrete floors and low spreading roofs.

It is my hope that an interpretive program patterned after the model used in the United States national parks eventually can be established within the Reserve. This will impart understanding and appreciation of the high values of the area. This loftiest usage will yield great benefits and will serve as a prime instrument in keeping the Reserve unsullied for the future.

Khao Yai Reserve presents a challenge that is worthy of the best statemen. In this, as in other national park and conservation projects, let self-interests be swept aside in the interests of the Thai nation and its future. Leaders of Thailand have a rare opportunity to leave these durable community benefits as monuments to their perspicacity and greatness.

III. KHAO SALOB

This tract is near Kanchanaburi and the River Khwae, west of Bangkok and 25 miles from the Burmese border. Located in a limestone karst region, its rugged grandeur is internationally

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famous. The much metamorphosed limestone is of ancient age (Silurian, Permian, Carboniferous) with granitic outliers of Triassic Age.

Wildlife of the area includes elephant, seladang, serow, tiger, leopard and bear. This once was the home of eld deer (Cervus eldi) which should be reintroduced.

There is some iron mining on a small scale at Khao Umkhrum; the Nong Phai lead-zinc mine is in Amphur Si Sawat.

Dr. Boonsong and I traversed the entire eastern edge of the proposed National Park area on January 10. We called on the governor of the changwat at Kanchanaburi who is very enthusiastic about the project and pledged full support to it.

The rugged beauty of the Mae Khwae Noi is famous far beyond the borders of Thailand, and Khao Salob is reputed to have excellent natural features that demand study and consideration for national park status. Time and circumstance did not permit my returning for the investigation and consideration which it should receive.

The River Khwae Noi became famous during the construction of the "death highway" to Burma during the Japanese occupation during the 1940's. The Erawan is in this region.

DOI SUTHEP and DOI PHUI

These mountains are part of the pre-Permian ridge of gneiss and shist that forms the western wall of the Mae Ping valley at Chiang Mai, and are extremely important to the water supply of the rich, populous lowlands. Although declared a protected area, it has been much damaged by encroachment.

A celebrated chedi (temple) high on the flanks of the ridge dominates the eastern slope; a new royal hill-palace and a forestry experiment station are located above the temple.

The forest at higher elevations is oak-chestnut, open and beautiful even though abused. Pinus khasya grows on the summit of Doi Phui. The entire area is well situated to provide outdoor recreation for the valley people, only 20 km. from the heart of Chiang Mai.

A hill tribe has a village on the far side of the mountain which is visited frequently by Thai and foreigners. When I visited the area in December there were many beautiful flowering plants. A fine arboretum, Huey Keo, is located at the foot of the grade below Doi Suthep. Nearby is a small but well maintained zoo established by the Young family which did missionary work in the upper Shan States for three generations.

The importance of these highlands both for recreation and watershed protection demands that stern measures be adopted to insure their great values for all times. I urge that it be established as a forest recreation park.

DOI INTHANON

This area includes Doi Inthanon or Doi Angka (8,452 feet), the highest peak in Thailand. It is representative of a series of north-south ranges that characterize northern Thailand, and is the culmination of a block of gneiss and schist of pre-Permian age that extends for 100 miles. The summit is rugged and still relatively unspoiled. The mountain possesses fine scenery, waterfalls, streams and representative tracts of several types of dipterocarp forests; it extends upward into the temperate rain forest zone with plant-life found nowhere else in the country, such as gentians. I saw more orchids on the mountains than elsewhere in Thailand. This is important, as they are not protected and are quickly exterminated by collectors for the market.

While most of the wildlife on the mountains has been depleted, the Doi Khaem area to the southwest is reputed to retain a good stock of native species. These should be given protection and an adequate tract of habitat set aside for them.

Of all areas described as possessing national park possibilities, this one appealed most to me, and I looked forward to it eagerly and hopefully. It fell short of expectations only in respect to human abuse, I learned, as Forester Bhandhaburana and I made the 35-km. trip by foot to the summit between December 11 and 15.

Villages of shifting hill tribes live on the peak; they are increasing rapidly and threatening the integrity of the mountain. If only for watershed protection, it is essential that these people be stabilized as soon as possible, while encouraging retention of their identities and customs.

A fine waterfall, reputed to be the highest in Thailand, is below the band peak of Tigerhead (5,707 feet), the southernmost extension of the Nagka mass. In its forest setting this is a conspicuous feature visible for a long way on the highway between Chiang Mai and Chom Thong. A secondary road, 10 km. long, goes from Chom Thong to another beautiful falls, Mae Khaeng, which unfortunately already has drawn the usual sprawl of shacks and refreshment stands around it.

The route up Doi Inthanon begins at the foot of Mae Khaing in a dryland deciduous (pa daeng) forest composed largely of Pentacne and Dipterocarpus. It is clean with short grass undercover, graduating into a beautiful broadleaf-evergreen association. As one ascends, the dominants become oak, chestnut and pine. There are a number of hill tribe settlements along the way, with shy, friendly villagers who were most curious about our party.

Above this lower forest occurs a wide expanse of rice terraces which extend to the base of the steep face of the main ridge. This face has suffered most from "Kaingin" agriculture, so that it now is covered with alang-alang (*Imperata arundinacea*) which defeats the attempts of the inhabitants to use the land.

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A great open evergreen forest, inviting and unspoiled, thrives at higher elevations. The summit itself, usually hidden in mists, possesses a rain forest draped with lichens, epiphytes and lianas. In characteristic manner, similar to the summit climber's cairn of rocks in Europe and America, a small Buddhist shrine marks the highest point. Studded with joss sticks like a pin cushion, it is attached to the side of a tree and is bedecked with shreds of faded cloth, withered flowers and a Thai flag. A huge pile of rocks has been heaped at the base.

A sphagnum bog lies in a depression a few hundred meters from the top; it surrounds a pond and is in turn surrounded by a border of beautifully flowering rhododendrons and other shrubs. Rare plants, with temperate zone relatives, make their home in this place.

The biggest disappointment of the trip was the absence of conspicuous animal life. Gibbons were heard; a few squirrels were seen. Nor was this a result of poor observation, for my guide, a hill tribesman, could discover none either. This man was remarkable - although he and I could not speak the same language, he sensed my interest and enthusiasm for natural features early on the trip and responded in a measure that made his services pleasant and helpful. He found and pointed out showy flowers, including orchids, edible nuts and fruits, scented wood (sandalwood, champac, etc.), useful plant parts such as banana flowers and sticks of rattan, brilliant butterflies, and interesting birds including hornbills.

I feel strongly that Doi Inthanon must be preserved as a National Park. Certainly national pride demands this for the highest mountain in Thailand. In addition, the area contains superlative values that merit full and rigid protection now. The ridge extending south from the summit, Doi Khem, should be included with the main peak since it contains picturesque crags, waterfalls, and (so it is said), some of the fine mammalian life once widespread over northern Thailand - gaur, bear, tiger, deer, and clouded leopard (Neofelis nebulosa).

ORB LUANG - MAE SARIENG HIGHWAYS

On December 17 and 18 Forester Winai, photographer Aeg and I visited the highway being constructed from Ban Mae Chaem to Mae Sarieng. The first 20 km. have been completed, and construction is underway to km. 48. We were guests of Construction Syndicate Ltd., a Thai company, which furnished meals, lodging and transportation, and were conducted by Assistant Project Supervisor Ravee during our visit.

None of the area is regarded as of national park significance, but immediate protective measures should be started nevertheless for the best interests of the country. As long as the Syndicate controls the area it is in no immediate danger; but once the guards are relaxed the picture may well change. No guns are permitted within the area.

The company understands the fragile character of the wilderness along the right-of-way and has pledged its help to keep it unimpaired.

Several thoughts are offered concerning this area:

1. Protection and preservation of the watershed is of prime importance. Forest burning by squatters must be prohibited and stringent punishment meted out to culprits.

2. Establishment of wildlife refuges in the area should be taken under consideration to provide a stock of game, such as gaur, deer and others.

3. Choice strips of rights-of-way of great scenic charm should be designated as "no other use" areas.

4. Camping sites, picnic table, observation points and lookouts should be provided at appropriate places.

5. Orb Muang Gorge, some 15 km. above Ban Mae Chaem on a tributary of the Mae Ping, should be protected as a national monument. The possibility of establishing nearby facilities and accommodations (first class but simple) should be studied and plans drawn.

6. The immediate threat by private logging operators of dynamiting the gorge to facilitate the transporting of logs should be halted. I am told that the gorge is without parallel in this country, and its destruction would deprive the Thai people of an internationally famous scenic heritage. If the present stream transport of logs is inadequate, there are other methods which can be used. If the gorge is preserved, any increased costs should be more than erased by future tourist revenue. The benefit and convenience of the few should not come at the expense of the rest of the nation and of future generations.

7. As long as game animals are maintained in numbers along the wilder section of the highway, the danger to people from tigers is reduced to the vanishing point. The possibility, however slight, of seeing a tiger in the wild might well become as great a tourist lure as the lions of Kruger Park and the wildlife waterhole at Myeri, Kenya. What a lucrative yield this would return to Thailand for the little measure of protection that is necessary!

8. Encouraging hill tribes to raise tea and coffee in well-chosen designated sites offers great promise of eliminating the havoc brought on by shifting cultivation. It would give them a steady income with which to buy the goods and luxuries for which they show an increasing desire. I heard a transistor radio in a Lawa village on Doi Inthanon, and every tribesman seemed to have a cigarette lighter; most had flashlights and similar gadgets.

PHU KHADUNG

On January 22 - 24, Forest Officer Chuay and I visited this flat-topped sandstone plateau with its precipitous walls and an area of less than 500 hectares, a peneplain or old land surface that is a remnant of an earlier southeastern Asian landscape. It has excellent qualifications for a national park, all the more important because of its thin soil cover, rocky nature and difficult access. These characteristics promise, at best, but a meager return from economic exploitation which would quickly reduce its present outstanding values to the commonplace and ruin its recreational possibilities.

The area includes clean open pine woods, extensive meadows, a precipitous surrounding rim, waterfalls, rhododendrons and other showy plants. The climate is delightfully cool. The region also has great value as a watershed for the parched Khorat.

In my estimation, the greatest attraction of the area is its solitude and isolation, which should be used as a guide in its development. Easy access and extensive exploitation would destroy these values. It would be a mistake to build an airfield on the summit, as has been suggested; the area is far too small to tolerate such intrusion. A road to the summit would be regrettable for similar reasons, in addition to creating an unsightly scar and being very costly.

Three tigers were reported in the area when we visited, and there were a few signs of deer. Reintroduction of game species that once abounded, and which are vanishing elsewhere in Thailand, should be given high priority. It is most important that immediate rigid protection of the area be provided.

Since the attractions of pine forests, meadows, flowers and waterfalls also are available elsewhere in Thailand, this special area should be left as it is, available to the hardy hikers who are willing to pay in brawn for the privilege of reaching the summit. Fortunately, there is adequate compensation nearby for this restriction; far more scenically exciting than the summit plateau are the bold limestone crags of Pha Nok Khao, contiguous to the plateau on the southeast. These offer outstanding recreational, educational and inspirational returns. The important Khonkhen-Loey road passes along their base, making them easily accessible, and there is ample flat space for setting up visitor accommodations.

Among the economic schemes, the possibility of using the plateau for a cattle range has been suggested. Such a venture would be doomed from the start. The thin soil, exposed as an unavoidable consequence of grazing, would soon be washed and blown away. With it would go forever the qualities that make the area important to the water supply of Khorat and eligible for national park status.

After much study, I recommend that Phu Khadung be set up as a national Park; that Pha Nok Khau be included in the area; that public access to the summit be by forest trail only; and that visitor accommodations be established at the foot of the mesa on the highway.

EAST-WEST HIGHWAY

Remarks and suggestions on this area have been included with the report on Thung Salaeng Luang.

MEPING GORGE and YAN HEE RESERVOIR

This area was visited from January 31 to February 9 upon invitation of the Deputy Minister for Irrigation. I travelled by raft from Ban An to the damsite, and climbed several prominences above the stream for better perspective of the surrounding area. Visibility was greatly impaired by a wall of smoke that hung everywhere.

I am very enthusiastic over the economic, recreational and scientific values of the area. The damsite location reflects the thorough studies and broad considerations that were made in its selection. An oral report of my observations and opinions were given to the Deputy Minister for Irrigation, M. L. X. Kambhu, on February 10, including the following:

1. Maintenance of the integrity of the reservoir and the watershed are of greatest importance. Whatever uses are made of the drainage basin must be determined by the primary purpose for the lake and the dam, and the effects upon them.
2. Protection of the watershed is corollary to 1. All use must be guided by the necessity to maintain even runoff, to forestall low-land floods and erosion, and to protect against silting of the reservoir.
3. Further consideration of basin studies should go on continuously until the lake area is inundated.
4. With respect to optimum usage, it is helpful to divide the drainage basin into three areas according to contemplated usage:

(a) Royal Thai Forest: By far the greatest part of the watershed should be set aside for timber crops, together with additional designated optional uses such as tea and coffee plantations in certain localities. All lumbering should be carried out on a sustained yield basis, always considering the effects on the reservoir. Burning must be banned, with severe penalties for infractions; this is absolutely necessary to preserve ground cover on which the

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vital qualities of the area hinge. Gathering of down timber, brush, herbs, and material for charcoal must be prohibited as detrimental to the watershed.

(b) National Park: The rugged limestone and granite region along the middle course of the river has outstanding scenic and scientific values that merit national park consideration, and still are wholly in keeping with the reservoir project. There are bold cliffs, pinnacles, crags, spires of spectacular beauty. Caves in the sheer walls are festooned with delicate travertine draperies and stalactites. Springs associated with these are vivid green with water-loving plants. Euphorbia antiquorum growing on bare rocks adds a grotesque touch.

(c) Cultivated areas: Areas for certain types of cultivation are entirely in order, but must be carried out under the limitations mentioned above. Contour cultivation is imperative on all sloping surfaces under intensive use. Tea and coffee plantations can be planted on the uplands. Tobacco, onion, lac and similar crops can be regarded as suitable for alluvial flats in the upper part of the reservoir basin. To prevent silting, however, the burning of stubble and other vegetable matter should be prohibited in connection with any cultivation.

5. The entire basin should be regarded as a place in which game animals may thrive. Always with due consideration for watershed protection, these may be harvested in designated areas in accordance with regulations to insure a sustained yield. It may be wise, nonetheless, to set aside certain game refuges in which hunting is not permitted; it may also be necessary to protect rare or vanishing species throughout the basin (i.e. elephant, clouded leopard and peacock-pheasant).

Hunting regulations should be very specific, stating clearly all limitations such as (a) number and sex of quarry, (b) relative age and size, (c) dates on which hunting is permitted, (d) hours of day during which hunting is permitted, (e) means by which take is permitted ("fishing with hook and line only"), (f) cost and dates of validity of hunting license, (g) number of game or fish one is permitted to have in his possession at any given time, (h) penalties for violations.

To be consistent with the accepted concept of national parks, all wildlife within the park area must be given full protection. Given natural habitat which provides shelter, food, breeding and home sites, the stock of wildlife should prosper to the extent that it would eventually migrate into adjacent areas where it would be subject to regulated harvest.

6. Grazing of domesticated livestock within the basin area should not be permitted, as this would badly damage ground cover, hasten erosion, and shorten the life of the reservoir.

7. The marsh between Mae Wang and the head of the airstrip at Ban Ngao should make an excellent bird sanctuary, close to the damsite where it may be readily enjoyed by visitors. The marsh has an area of two or three ^{square} kilometers. Consideration for its establishment must be made soon, however, if it is to be used for this purpose, before it is taken over by squatters. The sanctuary should be set up for educational and scientific purposes, and appropriate interpretive services should be planned for public understanding and appreciation. Its administration should be coordinated with that of the proposed recreational area at the damsite.

8. A resort hotel should be planned on a prominence above the lake and not far from the dam. The location should be chosen for practical considerations and for the splendor of its view.

9. Motion pictures, photographs, and similar records should be prepared before the reservoir area is flooded. These would serve as documentary evidence for interpretation and the historical record.

10. The general public should be informed about the purposes, objectives and significance of the project. A publicity program should be inaugurated immediately in the press, on radio and TV, and through other media. By disseminating early information on plans, facilities, objectives, regulations, etc., interest will be stimulated and much trouble will be avoided that comes from lack of understanding and information.

CHIANG DAO

The eastern pedestal area and the limestone cavern, 11 km. northwest of Chiang Dao, were hurriedly visited with Forester Winai on December 11. Only the first hundred meters or so of the cave could be explored, as a limited supply of small candles was our only available illumination. At our furthestmost penetration we saw a two-meter watersnake; blue trout live in the pool outside the cave.

Primitive values have been sacrificed at the entrance, which has been converted into a shrine. The cave does not appear to possess outstanding significance that would justify it for consideration as a national park.

The mountain, second highest in Thailand (7,160), is of higher caliber. It is very difficult to climb, being an abrupt, isolated prominence rising to great height over its surroundings. It is associated with a karst topography, a type which usually exhibits spectacular features.

The mountain is venerated and shunned by the people who live near it, as it is believed to be inhabited by evil spirits certain to bring dire misfortune to all who trespass upon it. This superstition has been beneficial, as it has preserved the spectacular natural features.

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It is reported that there is still some interesting indigenous wildlife on the mountains, and the summit area has many forms of plants peculiar to the high mountains of northwest Thailand.

I strongly urge further study of this area.

THE KRA ISTHMUS

This area was visited with Sir Henry Champion, the famous English entomologist, during the latter part of December, 1960. I was amazed at the physical beauty of the country, which rivals the best coastal scenery in Asia.

Long north-south ridges of limestone, some extending back to the Cambrian Age, are intercolated with Triassic and Cretaceous granites. These steep-walled, rugged, forested ranges are of great beauty and value, and the off-shore islands below Phuket rival the spectacular Inland Sea between Honshu and Shikoku in Japan.

A scenic highway along the Andaman Sea could capitalize on the rugged shoreline, sand beaches, dark forests and bold mountains. The broad white beaches suggest consideration as national seashore and recreation sites.

Numerous shrines in ruins, shrines built on the commanding summits of islands and peaks, shrines and historic Burmese association merit study for their preservation and development as centers of national importance.

The jungle highlands, comprising the backbone of the Isthmus and the international boundary, are reputed to be rich in wildlife, including a few remaining Sumatran rhinoceros. The possibilities of international parks and preserves with Burma suggest themselves.

Mangrove swamps along the shoreline should be given rigid protection, not only to preserve their integrity as habitat for important forms of wildlife and as protectors of the land against the sea, but also for their tremendous value as a source of superior charcoal. I can foresee their future use for scenic, interpretive, motor-launch trips. An early study should be undertaken to select the superior areas for parks and reserves, so that the best qualities of the region will not be lost.

CHANTABURI REGION

I visited southeast Thailand on January 4-7 with Dr. Harold Bradley, former president of the Sierra Club, and Forest Officer Winai. The Laem Ya area and the waterfall 10 km. beyond Chantaburi were our particular goals.

Both Kaem Ya and the waterfall area would make good provincial parks, and they would serve the local populace well as recreational and educational centers.

It was not possible to visit the celebrated Khao Soi Dao on this trip.

MUAKLEK AND THE FRIENDSHIP HIGHWAY

These were visited with Dr. Boonsong and Dr. Bradley on January 2 and 3. Muaklek has interesting possibilities for development as a recreation center, while hill stations and resorts may be located on the highway. However, the roadway has no characteristics that would merit consideration as a national park. In the course of a few years it has been violated to a degree that leaves no promise as a natural scenic or National parkway. The loss of forestry products, watershed values, soil and scenery is staggering, surpassing many times the value of the highway itself.

The Friendship Highway shows how rapidly the primitive forest disappears after penetration; erosion and alang-alang grass take over, and the landscape assumes an aspect of monotony. The wilderness, whose conquest was made possible by construction, used to teem with wildlife, now gone. The region was called "Dong Phya Yen" or "The Forest of the King of the Cold" because, Thai assert, it was eternally chilly and damp under the dense forest canopy. No longer is the region forested or damp or cold. A change, perhaps, was necessary and desirable; it does not follow that waste and abuse are unavoidable attributes of that change.

The foresters explained to me that for the past 10 or 11 years the forest officers in the provinces have been directly under the changwat governors and only under the technical direction of the Royal Forest Department. Justice and discipline are meted out on the local level, which gives an opening to exploitation by the unscrupulous. However conscientious they may be as public servants, governors usually are not trained foresters and have little understanding of proper forest management. In the past, fines for timber theft and other violations have been so low that disrespect for the law and profits from its violations have been widespread.

A potent factor contributing to the destruction of the forests stems from the need for charcoal and wood for fuel. Few substitutes are available now, although some efforts are being made along these lines. Cultivation of fast-growing trees suitable for supplying present needs should be investigated thoroughly, especially those kinds that can thrive in alang-alang grassland and on waste land. Prosopis sp., Pithecolobium dulce, Samanea saman, Leucaena glauca and certain members of Myrtaceae and Proteaceae serve in this way in some other countries. Cultivation and intelligent harvest of mangrove swamps helps to diminish the drain on other forest potential for this purpose.

CONCLUSIONS

A national park, as I use the term, embraces an area in virtually a primeval state that contains superlative values of scenic, scientific, educational, inspirational and aesthetic grandeur of national significance. Each national park is a prime example of its particular type, worthy of commitment to national care. The scientific, educational and social benefits derived from a national park, intangible though they often may be, far surpass economic returns that may be gained from other uses of the area.

The administration and use of a national park should be such that it can be preserved in essentially unimpaired state for future generations to see and enjoy.

In my usage, national monuments, historic sites, reserves, and recreational projects do not necessarily comply with the lofty standards set for a national park, but nevertheless do have special national significance. The administration and use of each of these must be fashioned individually in accord with its particular qualities and purpose.

Thailand has some exceptional areas worthy of being preserved as national parks. This may sound strange to one who associates the term only with such features as dazzling snowcaps, shimmering lakes, lofty waterfalls, or volcanic splendor. Thailand's pride should come from preserving in unsullied, primitive state her rare plants and animals as well as representative samples of her luxuriant tropical forest, her granite highlands, her karst topography and her magnificent expanse of seashore.

The population of Thailand, as elsewhere, is growing at a staggering rate - one estimate is 2.3% per annum. This creates great pressure for more arable land, and is linked with other critical features such as land abuse, increased mobility, withdrawal of land for reservoirs, housing, highways, and industrial or military purposes. These make immediate selection and establishment of national parks all the more urgent. They also make imperative provision for recreation and escape of the type that can be given only by parks and reserves.

It is important that more and more people learn about soils, water, forests, wildlife, all the natural resources, their interrelationships and what they mean to man. It is impossible to feed more and more people at higher and higher standards of living on less and less land and poorer and poorer soils. Conservation should not only be taught in the schools, but also should be preached from the pulpit, on radio and TV, in newspapers and other publications, in service and women's clubs, and most effective of all, in the home.

Getting people to break old habits and acquire new ones is a slow process; you cannot remake a people gently overnight. You cannot free

masses from ingrown destructive habits if they know no natural laws nor see the consequences of their violation. They must be shown how and why certain conduct is harmful, as well as the reasons and rewards for doing things properly. Yet the fact that the need is so urgent, the continuing loss is so great, and the progress so desperately slow are not reasons for giving up and doing nothing at all.

Good laws and strict impartial enforcement, however helpful, are only a means, never an end. Punishment and fear of punishment have but limited effect and can never replace patient, friendly counsel with repeated emphasis on reasons and rewards.

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PRIVATE COMMENTS ON CONSERVATION PROBLEMS

IN THAILAND

The following heterogeneous notes are submitted with the hope that they can be of value; they emphasize the difficult or peculiar, but leave unsaid the many pleasant and favorable aspects which have been touched upon previously.

The Thai are an intelligent people eager to receive sound advice and grateful for it. Nothing in the following is meant to reflect upon the esteem and affection that I hold for the Thai.

Random Observations

Few Thai recognize that native plant and animal life, geologic features, and scenery are precious natural resources. Few realize that abuse and inappropriate usage destroy the many economic, social, political and spiritual values that are inherent attributes of unspoiled nature. Few comprehend that the scientific, educational and aesthetic benefits from an area can far exceed material returns. Few know that wilderness is a fragile quality that is easily dissipated but can be restored, if at all, only with utmost difficulty and extreme slowness.

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There is a dearth of knowledge and many misconceptions among Thai regarding the national park movement. Even on highest levels I found much confusion over what constitutes a national park, how to establish a park system, how to select suitable areas, what guidelines to follow in administration and development. Many think of national parks as hill stations and spas, city parks stuck somewhere in the forests and mountains, amusement centers or resorts for drawing huge, money-making crowds. Therefore, it is not surprising that the thinking leans toward extensive planting of exotics, city architecture and landscaping, gaudy paint colors and facades, super highways, and huge expenditures of money. The most disturbing of all prevalent beliefs, fortunately not too widespread, is that the first steps are to cut down all the native forest, bulldoze the site, and smooth everything off.

Terms such as "invasion of the wilderness" and "impairment of natural values" are without meaning to the Thai at present. The idea that any area can best serve undisturbed for education, science, and posterity looms naive, indeed. Re-creation of mind and spirit is an odd, warped notion. Recreation means sports and games and drinking. It is eccentric to think of sanitation, cleanliness and orderliness. It is much easier to throw garbage and litter on the ground and, besides, the dogs will clean up all they can eat. It is strange that anyone believes that outdoor shops and stands should be controlled through franchise and concession.

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The Thai, like other peoples of southwest Asia, are squandering their natural resources. They desperately need sound conservation practices, although public and legislative opinion are indifferent to or unaware of the need. Annually the caingin farmer destroys more valuable timber than the lumberman turns into lumber. There is an appalling misuse of land with total disregard for consequences. Much of the land shows serious erosion and loss of fertility; many acres are so impaired that they are useless for either cultivation or timber.

Little heed is given to the warning signs: denuded forests, ever-growing floods, eroded hillsides, streams once permanent but now dry throughout the hot season, dry lakebeds and marshes, dead springs, abandoned ricefields and fruit orchards, a lowering water table, skies choked with smoke of burning land cover. There is little understanding that lush undisturbed forest affects subclimate, protects watersheds and soils, improves the water supply.

Clearance and destruction of the forest is labelled "conquest of the wilderness", and nowhere is this idea more prevalent than in the humid tropics in which competition for land between man and the forest has been keenest. The jungle, more specifically the second-growth successor of the primitive forest, quickly reclaims its territory. Man is engaged in a continual struggle to rid himself from its thrall, real or imaginary, and to make easy his trespass upon it. One Thai remarked to me that the average Thai, who is an agriculturalist, hates trees. Too often his practices, such as wanton burning, needless cutting and disfiguration of trees, appear to substantiate this.

Measures to provide or extend protection of the forests are pitifully slow and often inadequate. Forests are subjected to widespread destruction by burning, timber-stealing, charcoal-making, and clearing for cultivation.

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In western minds, Buddhism is believed to instill respect for the living organism and reverence for life. While I found no evidence of wanton cruelty in Thai character, I saw but little interest in animals except that they can be eaten, pull a plow, or carry a burden. I was told grisly stories of mass murder of game, of neglected animals in traps, of wildlife shot for fun and not utilized, or wounded and not pursued. The stories were told with little show of sentiment or feeling.

At present, no species are protected in Thailand except a few that can yield good revenue: sea turtles, elephants important to the teak industry, and swifts whose nests are eagerly purchased by Chinese for birds-nests soup. The flesh of wildlife is on sale in markets and meatshops everywhere. In the enormous Bangkok Sunday market, as elsewhere on a smaller scale, endless rows of caged and tethered victims are seen. Among them, many have died, are sick, or pictures of misery from heat, confinement, lack of care and careless handling.

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It is common practice to dynamite and poison fish. Birds are indiscriminately netted for their tiny morsels of meat. Hunting, more properly killing, is done with jeeps, spotlights and high-powered guns in all seasons and all hours of the day. In one instance at Orb Luang I was told that soldiers even hunted with machine guns, although they appeared wholly uninterested in collecting their kills. I counted ten guns bristling in a single weapons-carrier that sped past us on the East-West Highway.

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Wild rhinos are nearly extinct in a country that once could boast of having both R. sondaicus and R. sumatrensis. A slight possibility remains that a few may wander over the border from Burma in the dense jungles of the Peninsula and along the western boundary. Reports are vague and conflicting. Schomburgh's deer is gone forever, along with its type habitat in the great Central Basin. Eld deer are very rare. Now the rhesus monkey (Macaca malacca) is threatened because of the lucrative return from the sales for the manufacture of Salk polio vaccine.

Wildlife is only one valuable natural resource whose outlook appears so dim in Thailand. Wild orchids are becoming scarce, yet are eagerly hunted for the pittance their sales can yield. If not for this, then they are pulled up wherever they are found, to be cast aside when the whim of the moment is satisfied. "Flower lovers" threaten rhododendron and other showy species.

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A ray of hope pierces this dismal picture. A committee has worked hard during the past year to give Thailand a game law with provisions adequate to save what is left. But a strong-voiced opposition clamors for mild regulations that in the end would give nothing.

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What to do about the unassimilated non-Thai tribes of the forested highlands is a pressing problem. It is folly to overlook their existence, for their mode of living and shifting cultivation destroy critical watershed and comprise a serious threat to water and soil resources of the lowlands upon which the nation's future welfare depends.

Ethnologists have but incomplete information on these peoples. They comprise a score or more of tribes mostly of Mon-Khmer stock, although the origin of a few of them, including the numerous, better known, Karen, Miao and Iawa, is still in dispute. They maintain themselves distinct and aloof, each tribe with its own language or dialect and particular culture.

The problem of sympathetic diversion of the hill tribes from roving cultivation and from opium growing is a difficult one. A clue to the solution may be their growing desire for money and

what it will buy. In remote villages I saw cigarette lighters, flashlights, transistor radios and other luxuries. Opium traffic makes most of these possible. Flying over their country in poppy season reveals its extensive cultivation. In justice to these peoples, I believe that most of them detest the use of the drug, but not the growing.

Conscientious effort is being made to interest these tribes in raising coffee, tea and corn. Relocation of their villages to less critical areas also is being tried with some success. Well adjusted and loving their mountain habitat, they cannot readily be moved to flat river bottoms. Transportation looms large in changing their agricultural habits; they live far from their markets, and travel to their settlements, often possible only on foot, is by trail over rough terrain. A small quantity of opium that brings a handsome return can be carried without effort by one man. Coffee, tea and other produce requires much more exacting means of transport.

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The Thai in general do not appear to have the fervent feeling for history nor a reverence for historical sites that is possessed by others, the English and French for example. Early Thai history is fragmentary and limited to stories of her kings. King Mongkut described Thai history as full of fable. This paucity of information is largely due to the destruction of all records by the Burmese in the sack of Ayutthaya in 1767.

Scattered throughout the country are magnificent ruins that proclaim the glory of the past, but these are poorly protected, often desecrated and slowly disintegrating. Given proper care, these someday can become great tourist attractions and a powerful stimulus of national pride.

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I note two weaknesses in the present distribution of scholarships, grants in aid, funds for attending conferences, and the like. (1) The selectee may be chosen on the basis of prominence or position instead of merit, and may therefore prove to be incompetent and useless. (2) Upon returning home, individuals sent abroad may not be given the opportunity to apply the training and experience gained from the grant. For better results, stricter screening and selection of candidates is necessary, and a reasonable assurance should be required that the selectee will be assigned to an appropriate billet upon his return.

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The above notes originated before April, 1960. Since then, two significant laws have been passed that can be truly revolutionary if freely accepted by the people and if properly enforced. Acceptance requires good understanding by the public that will come

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through interpretation and education. Enforcement requires adequate funds and devoted personnel.

These two laws are an effective forestry regulation passed in July, 1960, and an excellent game law passed the following December. In addition to this good news, a national park law is expected to be passed in January, 1961. The Thai legislators merit sincere praise for these laws; the acts proclaim their wisdom better than my words.

December 1960