# THE TURTLE INDUSTRY IN SOUTHEAST ASIA

With 3 figures

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*Zusammenfassung.* Die Schildkröten-Industrie in Südost-Asien

Schildkröten, vor allem die Grünen See-Schildkröten *(Chelonia mydas)* sind in allen tropischen Gewässern verbreitet. Sie haben Anlaß zur Entwicklung von zwei grundverschiedenen Industrien gegeben: einmal die Jagd auf erwachsene Schildkröten im Atlantischen Raum und zum anderen das Sammeln von Schildkröteneiern an den Küsten von Südost-Asien.

Das Jagen führte schon früh zu einem starken Rückgang und sogar zum völligen Verschwinden der Kröten von Niststätten, die einst stark besucht waren. Die malaiischen Völker meiden den Genuß von Schildkrötenfleisch und beschränken sich auf den Konsum von Schildkröteneiern, die von Lizenzträgern gesammelt und auf den Markt gebracht werden. Die wichtigsten Sammelgebiete liegen an der Ostküste von Malaya, auf Inseln von Sarawak und Sabah und auf den Turtle-Inseln der Philippinen.

Die Befürchtung, daß nicht genügend Eier ausgebrütet werden, führte zur Entwicklung von Schutzmaßnahmen (Einrichtung von eingezäunten Brutstätten) zuerst in Sarawak, später in Malaya und Sabah. Aber trotz dieser Maßnahmen geht die Zahl der jährlich gesammelten Eier zurück.

Once abundant in tropical seas around the globe, the edible green sea turtle *(Chelonia mydas)* – famous for its flesh and the soup made from it – has become prey to slow extinction wherever killing for meat is practiced. This is notably true in Caribbean waters. Such large numbers of green sea turtles have been captured over the centuries, by net and harpoon in the sea or by upturning on land, that the historic Caribbean nesting beaches are today practically deserted and the Atlantic Ocean has lost its former importance in the geography of the turtle industry.

A far different picture emerges in the Pacific area. Because most peoples of Southeast Asia avoid eating turtle meat, the marine turtles of the South China Sea – green sea turtles as well as the hawksbill turtle *(Eretmochelys imbricata)*, the leathery turtle *(Dermochelys coriacea)*, etc. – are rarely killed for their flesh. It is, instead, the eggs of marine turtles, especially those of the green sea turtle, that Southeast Asians eat and consider a great delicacy. The demand for turtle eggs supports a thriving business in which the eggs are systematically collected and shipped to the major urban centers of Southeast Asia and to Hong Kong. Abstention from turtle flesh and reluctance to kill marine turtles have been reinforced by legal protection of marine turtles in both Western Malaysia (especially Kelantan, Trengganu, and Pahang) and Eastern Malaysia (i. e. Sarawak and Sabah). The Philippines, too, prohibit the killing of nesting female turtles, but turtle meat is apparently not tabu for Filipinos.

Some observers have attributed the avoidance of turtle meat to the teaching of Islam, but the Koran says nothing applicable to the subject and it is quite possible that the tabu on the consumption of turtle flesh in fact predates the spread of Islam into Southeast Asia (PARSONS, 1962: 9).

## *The Habitat of the Marine Turtles in Southeast Asia*

Our knowledge regarding the habitat of marine turtles is incomplete, being confined to their nesting grounds. We know nothing about the feeding grounds of the turtles, especially the green turtles, despite observations in other tropical regions of an apparent migratory cycle between nesting grounds and extensive feeding grounds abounding in aquatic vegetation, e. g. the migration believed to take place between the nesting beaches on Ascension Island and the feeding grounds off the coast of Brazil (CARR, 1967: 162–167).

Well known are the nesting beaches of the green sea turtles in Sarawak, Sabah, and the Sulu Archipelago between Kalimantan and Mindanao; less well known are those of the Perhentian Islands, Redang and Tenggol Island of Trengganu, and Tioman Island of Pahang. In recent years the beach of Rantau Abang near Dungun, Trengganu, which is visited by giant leathery turtles, has become a tourist attraction.

### S a r a w a k

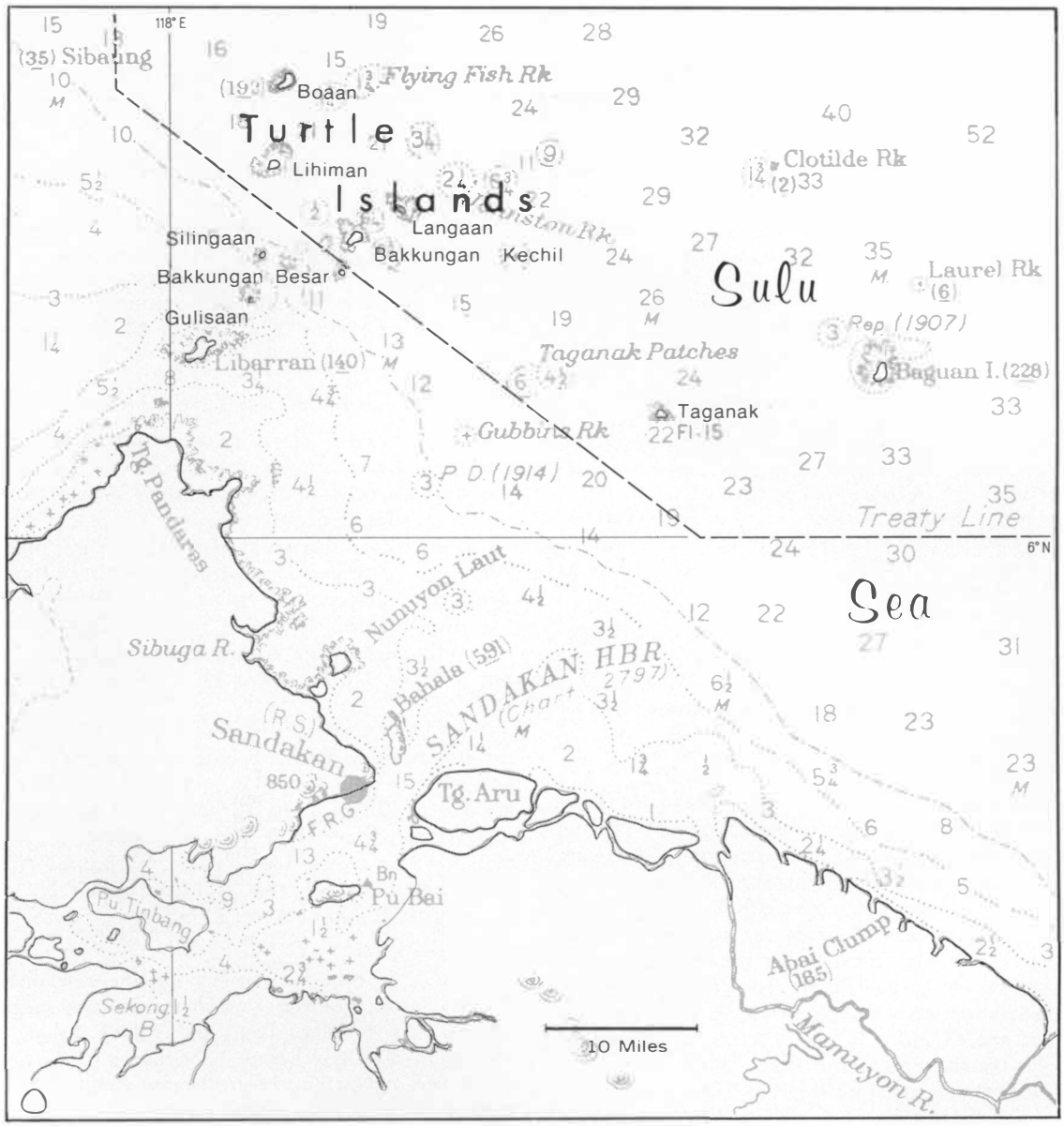
Location within the ten-fathom line characterizes Sarawak's nesting beaches which are clustered on three islands–Talang Talang Besar and Talang Talang Kechil, lying close together near the mouth of the Sematan River, and Satang Besar, located about four kilometers from the Santubong mouth of the Sarawak River and 1.5 kilometer off shore.

*Table 1: Size of the Sarawak Islands and of their Beaches*

| Name | Size of Island 1000 m² | Size of Beach 1000 m² |
|---|---|---|
| Satang Besar | 1011,7 | 11,6 |
| Talang Talang Besar | 372,3 | 8,3 |
| Talang Talang Kechil | 117,4 | 4,5 |

### S a b a h

Among Sabah's Turtle Islands, eggs are plentiful enough to be collected regularly on Pulau Silingaan, P. Gulisaan, and P. Bakkungan Kechil (Fig. 1) but are gathered only intermittently by visiting fishermen on Tegapil, Langkayan, Bilean, Koyan Koyan, and Nunu Nunukan.




*Correction:* The names Bakkungan Besar and Bakkungan Kechil must be interchanged

*Fig. 1:* Turtle Islands of Sabah and the Philippines

## Sulu Archipelago

In close proximity to Sabah's Turtle Islands, the Philippine Turtle Islands, comprising the seven islets of Taganak, Bakkungan Besar, Boann, Baguan, Lihiman, Langaan, and Sibaung (Fig. 1), were for years, administered by the North Borneo Company under a "gentlemen's agreement", before being returned in 1947 to the Philippine government. (The anomaly arises from their nearness, only 20 or so miles, to the Sabah port of Sandakan and their distance, over 100 miles, from their own provincial capital of Jolo.)

### *Breeding Season*

All evidence so far seems to point to a correlation between the temperature regime of a nesting area and the presence or absence of a definite breeding season. Thus, in the South China Sea, though female turtles lumber ashore for nesting at all times of the year, the majority appear during the months of July, August, and September. In tropical waters of somewhat higher latitude, such as Heron Island near the southern end of the Great Barrier Reef of Queensland, the turtles do not lay eggs from about March to October. Hen-

DRICKSON has charted these breeding seasons against the corresponding temperature regimes: Talang Talang Besar has an annual amplitude of about 2°F. compared to about 17°F. for Brisbane, Queensland (nearest station to Heron Island) (see Fig. 2).

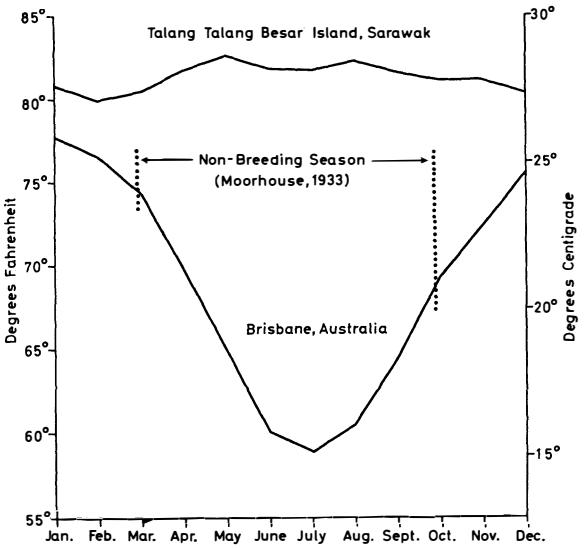



*Fig. 2:* Graphs showing mean monthly temperatures for Talang Talang Besar, Sarawak, and for Brisbane, Queensland, Australia (nearest station to Heron Island, Great Barrier Reef, Queensland). (After HENDRICKSON, 1958: 494)

Elsewhere, it has been observed that on the Tortuguero Beach between Rio Tortuguero and Rio Parismania in Costa Rica the green sea turtles gather in any significant number only during the summer months. And CARR (1952) reports year-round breeding for the Seychelles and the Gulf of Siam where the annual temperature amplitude is similar to that of Talang Talang Besar.

Another factor requiring further research is the effect of the monsoon cycle. The season of the northwest monsoon with its heavy rains, increased winds, rough seas, and heavy surf sees far fewer female turtles on the island beaches than the season of the southwest

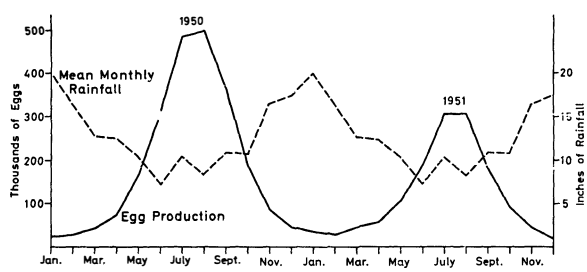



*Fig. 3:* Graphs showing monthly rainfall on Talang Talang Besar and monthly egg production on the three Sarawak islands in 1950 and 1951. (HENDRICKSON, 1958: 495)

monsoon. HENDRICKSON (1958) called attention to the negative relationship between the curves of egg production on the Sarawak islands and that of the mean monthly rainfall; the months of the northeast monsoon with their heavy rainfall have a low egg output (see Fig. 3).

### *Nesting of the Turtles*

Turtles, both male and female, gather in the waters adjacent to the breeding beaches, but only the female turtles come ashore under the protection of the night. The earliest times for beaching recorded on the Sarawak islands were 1820 hours and 1825 hours (HENDRICKSON 1958: 465) but the number of beaching turtles increases as the night progresses. On Heron Islands, for instance, I noticed in January 1970 that the turtle watchers did not bother to go to the beaches before 2200 hours.

After a brief period of inspection of the beach selected, the female turtle crosses the water line and begins her slow movement across a fringing reef in the direction of the beach proper, or in the absence of a reef formation crawls directly on to the beach, and gradually heaves her bulk up the slope to the high beach platform above the high-tide line. The sand of the lower beach is damp and firm and the turtle leaves a sharply marked track in the sand. Above the high-tide line, however, where the sand is dry and loose, the turtle interrupts her progress up the beach frequently for moments of rest and observation. Once the high beach platform is reached the turtle makes a nest. This involves two stages, the digging of a shallow body pit with both the front and hind flippers and the subsequent digging of an egg hole with the hind flippers only. The egg hole varies in depth between 30 and 45 cm. with an average of 38 cm. – its width and depth determined by the width and length of the turtle's hind flippers. Upon completion of the excavation of the egg chamber, she begins to lay eggs by letting them drop, one, two, or three at a time, into the nest. The eggs, usually about 100 per clutch, have the size of a ping-pong ball and are soft-shelled. The laying process finished, the turtle pushes sand into the nest hole with the hind flippers, occasionally compacting the sand with a kneading action, until a low mound has formed over the nest hole. This is followed by throwing sand into the body pit from its edge. While doing this the turtle gradually moves outward, disturbing the sand so thoroughly that the nest is well hidden.

After the original body hole is filled, the female turtle slips back into the sea, only to return as many as six or seven, more commonly four, times for a repeat of the laying performance. The fact that female turtles lay eggs several times during the breeding season has been established beyond any doubt by tagging experiments in Sarawak, Heron Island, and Tortuguero. Not only do the turtles come ashore several times but they usually return to the same island in instances

where two or more islands are not too distant from each other. In the case of the Sarawak islands, 5,748 records were made on female turtles returning to the beach after an average absence of ten days; of these only 215 (3.7 percent) changed islands (HENDRICKSON, 1958: 497).

After the nesting season, the female turtles apparently leave the waters for two years and do not reappear for nesting until the third year, e. g. the Sarawak turtles tagged in 1953 did not reappear on the beaches until 1956 (HENDRICKSON, 1958: 503). It would be useful to know whether a female turtle returns to the beach on which she was hatched but until now nobody has been able to devise a tagging method for baby turtles. To date tagging experiments have been limited to adult turtles arriving on the beaches under observation.

*The Collection of Sea Turtle Eggs in Southeast Asia*

The Southeast Asia practice of not killing sea turtles but only collecting their eggs in all likelihood goes back to ancient, precolonial times, although there is no record of just when the local chiefs and sultans began farming out the right of egg collection to the highest bidders. One of the earliest reference to the authorization of the collection of sea turtles by a local ruler is contained in a diary entry of JAMES BROOKE, later Rajah Brooke I of Sarawak, who visited Talang Talang Besar on 7 August 1839. He writes:

Morning calm. In the afternoon got under weigh, and anchored again near the island of Talang Talang ... the Bandar of the place came off in his canoe to make us welcome. He is a young man sent by Rajah Muda Hassim to collect turtles' eggs, which abound in this vicinity, especially on the large island. The turtles are never molested, for fear of their deserting the spot, and their eggs, to the amount of five or six thousand, are collected every morning and forwarded to Sarawak as articles of food (KEPPEL, 1846: 13).

More detailed are the journal entries for 4 May 1842 when JAMES BROOKE made another visit to Talang Talang Besar:

The island of Talang Talang are two in number, both small and hilly, covered with vegetation, each having a narow sandy beach. On this sand the turtles, in large numbers, deposit their eggs, which are a source of revenue and profit, and with the fish-stakes at Siru and Samatan, would bring from 1,000 to 1,500 reals a year revenue. The turtle is the common green species, and a few of the kind which produce the tortoise-shell. They commence laying about the middle of May, a stray one only making its appearance at this season. From the middle of June and July they come up ninety and a hundred of a night; and as each female, at a fair calculation, deposits 200 eggs, there may be reckoned 20,000 eggs nightly, for two or three months. These eggs are exported to Sambas and Pontiana, and all along the S.W. coast. The price at Sambas is eight finams a hundred, and at Pontiana one rupee for the same number ... It is the custom, whenever a friendly boat touches the island, to present two hundred eggs of large, and one hundred of small size. The head person at Talang Talang is appointed from Sarawak ...

I had here an opportunity of seeing a turtle deposit its eggs, which it did in the following manner: when on the sand it wandered from place to place, and tried several by digging a little, apparently rejecting them as unfit: at length, having made its choice, it buried its nose, and began scooping the sand with its hinder feet in a most deliberate and easy manner, throwing the sand to a considerable distance. It often stopped in its work, and recommenced, and so dug till the body was pretty well buried, and the hole a depth of three or more feet. It then took its station over the hole, and began to lay its eggs, which it did at intervals, for a length of time, to the number of two hundred and thirty; and all the while was perfectly indifferent to the proximity of numerous spectators. Having deposited its eggs, it filled the hole with its hinder fins and beat down the sand both on the spot and all around, and then retired, not directly (for the track would have been a guide to the nest), but in numerous tortuous courses, round and round, and finally took its departure for the sea at a point distant from its eggs. The Malays on watch have small sticks with flags on them, and as each turtle deposits its eggs, they mark the spot with one of these, and the following morning take the eggs and store them ready for sale. With all the vigilance, however, numbers escape their observation, and some nests they purposely spare. When the young come forth, the sand (which is small) is said to be literally covered with them, and as they make directly for the sea, the sharks and other fish devour great numbers (Mundy, 1848, Vol. I, 304–307).

The description provided by BROOKE could have been written a hundred years later, except that he can hardly have counted the number of eggs laid. None of the recent observers ever recorded over two hundred eggs; half the number seems the size of the average clutch. Present-day turtle watchers along the coast of Trengganu stick a pole, minus the flag, in the ground while the turtle is laying its eggs so as to make locating the nest the following morning easy.

BROOKE's observation that "some nests they purposely spare" is interesting in view of more recent developments and one wishes he had noted whether this was customary or in response to an order from the local ruler. The first governmental regulation came at the end of the nineteenth century when the right to collect eggs was farmed out in Pahang. In 1898 the district officer of Kuantan asked for permission to prohibit the collection of eggs between 6 May and 30 September because he feared that the turtles were becoming scarce and he wanted to make certain that more eggs were hatched. Resident Hugh Clifford refused to give permission in the absence of a legal base for such action (Kuantan, District Office Files 194/1898). Later the resident obtained such power by way of Enactment No. 3 of Pahang, dated 20 August 1915. Paragraph 3 of this enactment states:

The Resident may from time to time by notification published in the *Gazette* prohibit the taking of turtles' eggs within such areas as may be described in the notification (hereinafter called gazetted areas) except under a license or exclusive right granted under this Enactment (Chapter 219: Turtles' Eggs: An Enactment to provide for restricting and regulating the taking of Turtles' Eggs, in "The Laws of the Federated Malay States and of Each of Them", Revised edition, Vol. III, pp. 2956–57).

The Fisheries Ordinance (No. 20, of 1937) of the Federated Malay States, which to the best of my knowledge is still in force, outlaws killing or capturing of turtles and provides for the annual leasing to the highest bidders of the rights to collect turtle eggs.

During the second half of the nineteenth century and until World War II the collection of eggs in Sarawak was the monopoly of the leading families on the three turtle islands. But in 1941 Rajah Sir CHARLES VYNER BROOKE took over control of the turtle egg industry and vested the sole authority for running the industry in the Curator of the Sarawak Museum by means of the Turtle Trust Ordinance of 10 October 1941 (Capter 40 of "Laws of Sarawak", Revised edition, 1948) which provided that the profits be divided among the Malay Chartable Trust Boards. The 1941 Turtle Ordinance was repealed by Turtle Trust Ordinance No. 23 of 1957, dated 16 September 1957, which placed all authority in the hands of the Turtles Board, reducing the curator to the role of executive officer of the board without voting right (Section 13, 1–3, Turtle Trust Ordinance). Nevertheless, it was Thomas H. Harrison, Curator of the Sarawak Museum from 1947 to 1966, who initiated the turtle conservation program on the Sarawak islands which is still carried on. On all three islands, hatcheries were established to which some of the turtle nests were transferred for reburial in the sand. The nests were protected until the eggs had gone through the incubation period of about 50 days and the baby turtles had come to the surface.

HENDRICKSON has described the hatchery method (1958: 505–06):

> Workmen on each island transplant eggs into special hatchery enclosures built on the highest portions of the beaches. The enclosures are made of strong stakes driven deep into the sand, supporting horizontal bars of bamboo, split palm logs, or coconut palm leaf midribs. These fences project from about 20 cm. to 45 cm. above the beach surface and satisfactorily keep out wandering adult female turtles in search of nesting sites ... Commonly the last one or two nests to be excavated in the morning were chosen for transplanting to the hatchery ... The marking wand from the original nest was then used to mark the position of the eggs in the hatchery enclosure. At the men's convenience, usually within a day or two, the marking wand was replaced by a stake bearing a small plate on which was painted an identifying hatchery number for the nest, the date of laying and the number of eggs in the clutch ... Usually at about the same time the permanent hatchery stake was placed, a circle of wire mesh fencing material about 60 cm. in diameter and 45 cm. high was placed around the area over the nest. This was embedded a short distance in the sand and, when the young turtles hatched some weeks later, served to confine them until morning, when they collected and placed in a 'nursery tank'.

One of the first measures to conserve sea turtles in Sabah was the Gazette Order No. 228 of 1928 which prohibited the capture of turtles in alternate years, beginning with 1929. The 1929 closed season was prohibited the capture of turtles in alternate years, seasons were not enforced (DE SILVA, 1969: 7). Today the turtles are protected by the Fauna Conservation Ordinance of 1963 (Act No. 11) which came into force on 15 July 1964. Under this ordinance the islands of Silingaan, Gulisaan, Bakkungan Kechil, Tegapil, Langkayan, Bilean, Koyan Koyan, and Nunu Nunukan were declared turtle farms. The farms came under control and supervision of the Chief Game Warden in the Forestry Service, who had to formulate the policy regarding the conservation of turtles. He stopped the issue of turtle licenses authorizing killing of turtles and declared the month of March as closed season for collection of turtle eggs. As in the past, the rights to collect turtle eggs were given out by tender. DE SILVA provides data on the amount collected by way of license fee in Sabah (DE SILVA, 1969: 8). The annual collection increased rather sharply between 1950 and 1964 from $ 500 to over $ 20,000 (see Table 2). In 1965 the islanders of Silingaan, Gulisaan, and Bakkungan Besar were given the exclusive rights to collect

*Table 2: Revenue Collected in Sabah through the Grant of Licenses, 1950 to 1966*

| Year | Amount in Malay $ | Year | Amount in Malay $ |
|---|---|---|---|
| 1950 | 500 | 1958 | 7,600 |
| 1951 | 500 | 1959 | 10,600 |
| 1952 | 500 | 1960 | 13,400 |
| 1953 | 1,000 | 1961 | 15,863 |
| 1954 | 1,000 | 1962 | 15,864 |
| 1955 | 2,300 | 1963 | 15,200 |
| 1956 | 2,860 | 1964 | 20,050 |
| 1957 | 4,550 | 1965 | 13,750 |
| | | 1966 | 11,400 |

*Table 3: Egg Collection in Sabah in 1965*

| Island | Number of Eggs, 1965 | and 1966 |
|---|---|---|
| Silingaan | 284,940 | 236,190 |
| Bakkungan Kechil | 126,930 | 73,620 |
| Gulisaan | 63,580*) | 55,620 |
| | 475,450 | 365,430 |

*) DE SILVA reports 63,850, but T. HARRISON (1966, p. 67) gives the monthly collections for Gulisaan which add up to 63,580. DE SILVA obviously miscopied the total.

turtle eggs without going through the tender procedure with the understanding that they would pay 2½ cents per egg collected. For the year 1965 the islanders submitted the figures given in Table 3.

A check conducted from August to December 1966 showed that the collectors were deliberately furnishing low monthly figures in order to further lower the fees for the right of collection (De Silva, 1969: 9–11). Of the three islands on which eggs are being collected regularly only Silingaan is inhabited; Gulisaan and Bakkungan Kechil each has a lone egg collector residing there.

### *Conservation Programs*

Today the states of Kelantan and Trengganu in Western Malaysia, and the states of Sarawak and Sabah in Eastern Malaysia have conservation programs in form of hatcheries to which turtle eggs are transferred for reburial in the sand at a depth identical with the depth of the egg chambers dug by the female turtles.

Western Malaysia has two hatchery programs: one in Rantau Abang, near Dungun, Trengganu, for giant leathery turtles, and the other in Dalam Rhu, Semarak, Kelantan for green sea turtles. The former was established in 1961, while the latter was started in 1964. In both programs the license holders are paid for the eggs transferred to the hatchery. (In 1961, the price for 100 eggs was M$ 8.00.) Table 4 records the number of eggs transplanted in the hatchery at Rantau Abang and the number of hatchlings produced. In the absence of data on the total number of eggs collected we do not know what percentage of the eggs laid are moved to the hatchery. The transfer of the eggs to the fenced hatchery has the great advantage that the nests are protected against destruction by later nest diggings. Since clutches of eggs stay in the ground between 45 and 60 days before the hatchlings appear on the surface, they are vulnerable to accidental destruction. Hendrickson reports that during his period of observation approximately 120 nests were not spotted by the egg collectors and more than two-thirds of these "wild" nests

*Table 4: Leathery Turtle Hatchling Output at Rantau Abang, Trengganu*

| Year | Number of Eggs Transplanted | Number af Hatchlings | Percent Hatched [a] |
|---|---|---|---|
| 1961 | 8,366 | 3,699 | 49.4 |
| 1962 | 11,654 | 6,300 | 58.9 |
| 1963 | 9,956 | 5,580 | 57.5 |
| 1964 | 11,535 | 3,803 | 34.4 |
| 1965 | 10,071 | 7,199 | 74.4 |

Source: Balasingham, 1967: 140

[a] The percentage is calculated after deduction of the number of eggs in sterile clutches.

... were detected as a result of other turtles' digging through the nests, scattering partially developed eggs over the surrounding area as they excavated their own body pits prior to the nesting ... Less than one-third of the wild nests noted were discovered by virtue of hatchling turtles seen emerging from them and only this fraction of the nests could be considered as productive (Hendrickson, 1958: 505).

Hendrickson concluded that the number of turtles had declined much less in Malaysia than elsewhere and to him it seemed "logical to infer that exploitation for eggs has a much less adverse effect than has the slaughter of adult turtles" (Hendrickson, 1958: 525).

But how are we to interpret the striking decline in the number of eggs collected in the nineteen fifties and sixties? It cannot be contributed to underreporting. Statistical data on turtle egg collection leave a great deal to be desired. Where license fees depend upon the number of eggs, it is in the interest of the collectors to underreport their take. The data for the Sarawak islands are more complete than those for other areas of Southeast Asia. According to Table 5, the average number of eggs collected in the period 1927 to 1936 was slightly over two million per year. During the period 1948–54, the average was down to 1,580,000 per year, a decline of 25 percent. This is attributed to the killing of turtles during the period 1942 to 1945 by the Japanese occupation forces, who took the turtles for their meat. During the years 1955 go 1961, the average declined to 1,040,000 eggs. In the 1960's the number ranged from 420,000 in 1965, to 480,000 in 1967 and 516,000 in 1969, or an average of 472,000 for these three years. We can ignore the count for 1966 because there was obviously a breakdown in the reporting system which coincided with Harrison's resignation from his curatorship in February 1966. A comparison of the monthly collection for 1965 and 1966 (Table 6) shows no change for the month of January, but from February on, the difference in the collection becomes increasingly larger and can only be explained by deliberate underreporting. This explanation is confirmed by the data for 1967 and 1969.

*Table 5: Turtle Collection in Sarawak, 1927–1969*

| Year | Number of Eggs Collected |
|---|---|
| 1927–36 average | 2,147,000 (a) |
| 1947 | 708,000 (b) |
| 1948–54 average | 1,581,000 (b) |
| 1955–60 average | 1,038,000 (b) |
| 1961–65 average | 443,000 (b) |
| 1966 | 99,000 (c) |
| 1967 | 479,000 (d) |
| 1969 | 516,000 (e) |

Source:

(a) Banks, 1937: 526–27
(b) Harrison, 1966: 339
(c) Harrison, 1967: 432–33
(d) Harrison, 1967: 436
(e) Harrison, 1969: 403

*Table 6: Monthly Egg Collection in Sarawak, 1965 and 1966*

| Month | 1965 | 1966 |
|---|---|---|
| January | 5,814 | 5,498 |
| February | 6,314 | 3,891 |
| March | 7,663 | 3,475 |
| April | 13,085 | 4,331 |
| May | 22,706 | 6,296 |
| June | 45,674 | 8,877 |
| July | 86,067 | 14,706 |
| August | 98,644 | 15,274 |
| September | 69,462 | 13,826 |
| October | 34,679 | 10,432 |
| November | 18,678 | 6,701 |
| December | 10,280 | 6,000 (estimate) |
| | 419,066 | 99,307 |

Source: HARRISON, 1967: 431–32

HARRISON claims that Japanese fishing boats operating in the South China Sea are catching sea turtles in international waters, but he does not provide data on the size of the catch (HARRISON, 1967: 430–31). He notes furthermore that the waters around the turtle islands of Sarawak are no longer as quiet as they formerly were, which may keep some turtles away from these beaches. But where do they lay their eggs instead? We have no reports of new nesting beaches or of increased activity on other beaches.

In all probability we must attribute the shrinkage in egg production to excessive collection of eggs. An insufficient number of nests either go undetected or are transferred to hatcheries, so that the number of adult females is declining, because an inadequate number of hatchlings enter the sea and survive the attacks by predators waiting for them. HENDRICKSON has suggested as an additional conservation measure systematic fishing for sharks within the vicinity of breeding beaches in order to reduce the number of predators and to give the young hatchlings a better chance to survive (HENDRICKSON, 1958: 527).

Anything that can be done to reduce the losses during the early stages of the hatchlings' life cycle will contribute to the maintenance of the turtle population. The ultimate goal of the turtle conservation program must be to determine the percentage of eggs which can safely be taken for human consumption without seriously reducing the turtle population. It may also prove necessary to reach an agreement with the Japanese government which would ban the killing of sea turtles outside the waters of Eastern and Western Malaysia.

*References*

*Anonymous,* 1969: "Struggle to Save the Sea Turtle – Vanishing Wildlife – Island Sanctuary for an Ancient Ritual", *Life,* 47, 5 (September 1, 1969) 52–55.

BALASINGHAM, E., 1964: "The Giant Leathery Turtle Conservation Programme," The Malayan Nature Journal. 19 (1964) 146–48.

–, 1965: "The Giant Leathery Turtle Conservation Programme – 1964," The Malayan Nature Journal. 19, 2–3, 145–46.

–, 1965: "Conservation of Green Turtles *(Chelonia mydas)* in Malaya," The Malayan Nature Journal. 19, 4, 235–36.

–, 1967: "Turtle Conservation: Results of the 1965 Hatchery Programme," The Malayan Nature Journal. 20 (June 1967) 139–41.

CARR, ARCHIE, 1952: "Handbook of Turtles." The Turtles of the United States, Canada and Baja California. Cornell University Press, Ithaca.

–, 1967: "So Excellent a Fishe." A Natural History of Sea Turtles. The Natural History Press, Garden City, N.Y.

CHIN, LUCAS, 1969: "Notes on Turtles and Orang-utans (1969)," Sarawak Museum Journal. XVII, 34–35, 403–4.

HARRISON, TOM, 1950: "The Sarawak Turtle Island's 'Semal'," Journal of the Malay Branch of the Royal Asiatic Society. 23,3 (1950) 105–26.

–, 1951–1967: "Notes on Marine Turtles – The Edible Green Turtle in Borneo," Sarawak Museum Journal.
1. Breeding Seasons. V, 3, 593–96
2. Copulation. VI, 4, 126–28
3. Young Turtles. VI, 6, 633–40
4. Growing Turtles. VII, 7, 233–39
5. Tagging Turtles. VIII, 8, 504–14
6. Turtle Island Samah. VIII, 11, 481–86
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HARRISON, TOM, 1966: "Sabah's Turtle Islands: Vertebrate Notes," Sabah Society Journal. 3, 2 (1966) 61–68.

HENDRICKSON, JOHN, 1958: "The Green Sea Turtle, *Chelonia mydas* (Linn.), in Malaya and Sarawak," Proceedings of the Zoological Society of London. 130, 445–535.

–, 1961: "Conservation Investigations on Malayan Turtles," Nature Conservation in Western Malaysia, 1961. Malayan Nature Society, Kuala Lumpur.

–, 1962: "The Programme for Conservation of the Giant Leathery Turtle, 1961," Malayan Nature Journal. 16, 1–2 (1962) 64–69.

KAMM, HENRY, 1971: "Turtles Struggle Ashore to lay their Eggs, the Burden of Filipino Islands' Economies on their Backs," New York Times, September 19, 1971.

KEPPEL, HENRY, 1846: The Expedition to Borneo of H.M.S. Dido for the Suppression of Piracy: with Extracts from the Journal of James Brooke, Esq., of Sarawak. Harper, New York.

MOOREHOUSE, F. W., 1933: Notes on the Green Turtle *(Chelonia mydas)*. Report of the Great Barrier Reef Committee, 4, 1–22.

MUNDY, RODNEY, 1849: Narrative of Events in Borneo and Celebes, down to the Occupation of Labuan: from the Journal of James Brooke, Esq., Rajah of Sarawak, and Governor of Labuan. John Murray, London. 2 vols.

PARSONS, JAMES J., 1962: The Green Turtle and Man. University of Florida Press, Gainesville, Florida.

DE SILVA, G. S.: "Wild Life Conservation in Sabah," Sabah Society Journal. 3, 2 (1966) 77–84.

–, "Turtle Conservation in Sabah," Sabah Society Journal. 5, 1 (1969) 6–26.

VILLALUZ, DOMICIANO K., 1953: Fish Farming in the Philippines. Bookman, Inc., Manila.

*Legislation*

*The Laws of the Federated Malay States.* Revised edition. 1935. Vol. III, Chapter 219. Turtles' Eggs Enactment.

*The Laws of Sarawak.* Revised edition, 1958. Vol. IV, Chapter 109. Turtle Trust Ordinance, No. 23 of 1957, superceded Turtle Ordinance of 1941.

# WACHSTUMSABLÄUFE IN EINER ORIENTALISCHEN STADT AM BEISPIEL VON KABUL/AFGHANISTAN*)

Mit 14 Photos, 3 Tabellen und 1 Kartenbeilage (I)

HELMUT HAHN

*Summary:* The stages of growth in an oriental city – the example of Kabul, Afghanistan

The population of Kabul has, during the last 50 years, grown more than five-fold. The structural changes which have occurred as a result of this rapid growth have been studied with the help of mapping and questionnaire exercises carried out in 1968, to reveal not only the main features but also individual phenomena. The main determinant of individual differences is the topographically determined division of the city into two, which hampers a concentration of location factors, but the city's location in the transition area between oriental-islamic and Indian cultures has also been an influence. As is the case all over the Orient, the bazaar in the old town is losing prestige and a modern shopping and government quarter is developing in the neighbouring oldest part of the new town. It appears, however, that a second shopping centre is coming into being in the isolated western newer parts of the town. The combination of shopping and residential functions and its bazaar street character indicate eastern influence.

Proper slum formation cannot yet be observed in Kabul, even though the traditional social division of the old city by religion, language, etc. is caught up in complete breakup and a levelling down to a lower social grouping can be observed. The social differentiation of the new area of town follows only income differences. The stream of immigrants – above all of unskilled labourers etc. – pours into the old city, while the new town districts are inhabited primarily by middle and upper class people born in Kabul. In general, immigrants usually only resettle in the newer residential areas after a longer period of residence in the old city and after social and economic integration. Socially weaker strata, in financial grounds, can only afford the rents demanded, or become home owners in the areas of 'wild' building or in the villages of the urbanising area.

Die Einwohnerzahl der Stadt Kabul hat sich seit 1916 mehr als verfünffacht. In den neun Jahren seit der kartographischen Aufnahme des Verfassers[1]) nahm sie fast um die Hälfte zu. Gleichzeitig wurde die überbaute Fläche annähernd verdoppelt. Hatten die Wachstumsspitzen bereits 1960 die damalige Verwaltungsgrenze an mehreren Punkten überschritten, so gilt dies heute in noch stärkerem Maße (s. Beil. I). Das rasche Wachstum der Stadt beruht nur zum geringeren Teil auf natürlichem Bevölkerungsüberschuß; es ergibt sich überwiegend aus Wanderungsgewinnen. Eine russische Planungsgruppe schätzt für 1965 den Geburtenüberschuß auf 1,75% und den Wanderungsgewinn auf 2,75%, das jährliche Wachstum demnach auf 4,5%[2]). Zwischen 1955 und 1962 lag der Wanderungsgewinn eher bei 3% und die jährliche Zuwachsrate bei 4,8%. Von 1945 bis 1955 muß sowohl der Geburtenüberschuß – aufgrund der verbesserten hygienischen Verhältnisse – wie auch der Wanderungsgewinn – die steigende Anziehungskraft der Hauptstadt kam in diesen Jahren zum Tragen – laufend angestiegen sein. In den zwanziger und dreißiger Jahren haben der Geburtenüberschuß 0,5% und der Wanderungsgewinn 1,5% nur selten überschritten (vgl. Tab. 1).

Ein Bevölkerungswachstum dieser Größenordnung und Geschwindigkeit muß zu grundlegenden strukturellen Wandlungen in physiognomischer, funktionaler

*) Dieser Aufsatz ist FRITZ BARTZ gewidmet, der meinen ersten Aufenthalt in Afghanistan förderte und in seiner uneigennützigen und zurückhaltenden Art mir im persönlichen und wissenschaftlichen Bereich manchen wertvollen Rat erteilte.

[1]) Vgl. HAHN, HELMUT: Die Stadt Kabul (Afghanistan) und ihr Umland. Teil I: Gestaltwandel einer orientalischen Stadt. Bonner Geogr. Abh., Heft 34. Bonn 1964, S. 45ff.

[2]) Central Scientific and Research Institute for Town Construction (USSR): Master Plan of the City of Kabul, 1964, mit einer Vorausberechnung für 25 Jahre aufbauend auf Teilzählungen und Schätzungen 1962, insbes. S. 58–66.