

TURTLE FARMING AND RANCHING

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From of old, marine turtles have been exploited by man. Probably, wherever man reached coasts where turtles were abundant, and where these came to lay eggs, man will have used the meat and/or eggs as food. Diodorus of Sicily (Oldfather, 1935: 140-145) and Pliny (Plinius (died A.D. 79), 1561: 256) refer to the tribe of the Chelonophagi, the turtle eaters, who lived in Carmania, a region bordering on the Strait of Hormuz (forming part of the Iran of today); besides eating the meat of the turtles, they used the carapaces to cover their huts. According to Schenkl (1897: 3-4), the Greeks and Romans of antiquity did not eat turtle meat, although they may have used parts of turtles for medicinal purposes. However, they did use tortoise-shell. Pliny (Plinius, 1560: 13; Schenkl, 1897: 10) mentions Carvillius Pollio as having introduced the use of tortoise-shell to embellish beds, sofas and cabinets. In later centuries the Loggerhead served as a food animal in the central and western Mediterranean. Schoepff (1793: 79) states that in Italy the monks were very partial to Loggerhead meat. In more recent times, Vella (in Davidson, 1976: 387), and Kouki (n.d.: 187, 193) give recipes for preparing turtle meat and turtle stew.

The seafarers that crossed to the Caribbean, and those that went to the East Indies, learned to know and appreciate marine turtles as a source of good and wholesome food. In the first place this concerned the Green Turtle (*Chelonia mydas* (L.)). They found turtles to be hardy animals, which one could keep alive on board for extended periods, and which thus could serve as a supply of fresh meat during long voyages. As the fame of the Green Turtle reached Europe, live turtles began to be shipped from the Antilles and from the island of Ascension to England. In the middle of the 18th century the arrival in London of Green Turtles was still a fact worthy of notice (Gentlemen's Magazine, 1753: 441, 489). These shipments often sustained heavy losses. Alexander (1837: 300) refers to a shipment of 200 turtles, of which but four survived, and Hornell (1927: 46) considered a loss of fifty per cent not infrequent. Of course, steamships reduced the duration of the ocean crossings, and hence lowered the risks of having to jettison large numbers of turtles during the voyage. After World War II, ships with freezing plants made it possible to import, without any loss, dead and eviscerated turtles, not only from American Atlantic and Caribbean waters, but also from countries bordering on the Gulf of Aden, the Persian Gulf, and from the Indian Ocean. In the past, real turtle soup may have ranked as an article of luxury; gradually it became a product that came within the reach of people of more moderate means. The high standard of living of the last decennia resulted in a greater demand, and this gave a boost to trade. In the USA not only real turtle soup but also turtle steak and turtle burgers came into demand, and these products became available in many supermarkets.

It is not the exploitation for food alone that threatens the survival of marine turtles. There are several other factors that form as great a danger, if not an even stronger threat. In many areas, the sandy beaches suitable for nesting are now lost to recreation, building, construction of highways, etc. (e.g. E coast of Southern Florida; the Mediterranean). It is by now a well-established fact that beach erosion may account for a considerable loss in eggs (Fowler, 1979: 948, 954, tables 1, 3 : Tortuguero, Costa Rica; Fretley & Lescure, 1979: 30: French Guiana; Schulz, 1975: 127, tables XXV, XXVI: Surinam). The surf may wash out the eggs and the contact with salt water prevents their further development. Schulz (1975, table XXV) states that in Surinam within a four year period (1970-1973) some 1,387,000 Green Turtle eggs and (table XXVI) in the years 1971-1973 about 55,000 eggs of the Leatherly Turtle (*Dermochelys coriacea* (L.)) and 47,500 eggs of the Olive Ridley (*Lepidochelys olivacea* (Eschscholtz)) were "doomed" eggs (doomed not to

develop). Part of these could be used locally for human consumption, part could be transferred to a hatchery where they are protected from predators, and part could be used for supplying eggs to turtle ranches and turtle farms. A turtle ranch is an enterprise wholly dependent on obtaining eggs from natural beaches, which are hatched on the ranch to be raised until they are of a sufficient size for slaughtering. Such an enterprise is to be found in Surinam, where a number of raised turtles are released into the sea. Another ranch is to be found on the island of Réunion in the Indian Ocean; it obtains its eggs from Europa Island (in the Mozambique Channel) and from Tromelin Island (North of Mauritius). A turtle farm is an enterprise keeping turtles in captivity and where these turtles breed. At the start such a farm will have to import adult turtles and/or eggs to build up a breeding stock, but in due course the farm becomes independent from the populations living in the wild.

Attempts to keep Green Turtles and have them breed in captivity have been made already in the beginning of the present century, but without success, on Great Inagua Island in the Bahamas in 1903-1906 (Churchill, 1904: 12; 1905: 14; Bennet, 1906: 14; Boeke, 1907: 126-127) and in Curaçao, Netherlands Antilles in 1905-1907, 1908-1915 (Fock, 1906: 22; 1907: 25; Boeke, 1907: 125-133; Van Breemen, 1910-1914; Pleyte, 1915: 4-5). Creeks or parts of bays were fenced off in such a way that circulation of the water remained possible. It was assumed that in these fenced-off creeks there would be an ample supply of food (sea-grass, algae, etc.). After some years, it proved in Curaçao (1913) that in a fenced-off part of the "Spaanse Water", the not very numerous turtles had become emaciated, there was no tendency to reproduction at all, and the experiment ended in 1915 (Pleyte, 1915: 4-5).

At one time Professor A. F. Carr (Gainesville, Florida) pleaded for the farming of turtles (inter alia: Carr, 1967, 1968: 238; 1973: 255), and in this connection he also thought of fencing-off creeks. He ends the chapter dedicated to this subject with the following sentences: "Turtle ranchers of the future will have to get their hatchlings from nests on artificial beaches. The nests will be made by female turtles that have mated with males living behind fences", and "A technology of green turtle husbandry will have to be developed. Once that is worked out it will be a double blessing: people will be fed and species will be saved". In 1968 a turtle farm was founded on Grand Cayman Island (B.W.I.), and although Professor Carr was not its founder, it may be said that he stood at its cradle, and his writings on farming will certainly have stimulated the founders of Mariculture Ltd. One was faced with great problems, for there were many unknown factors, e.g. the age at which a turtle becomes mature, etc. After some years Mariculture Ltd. came into financial difficulties; the farm was taken over by a new company, Cayman Turtle Farm Ltd. (CTF). Mariculture was an enterprise that in the first place aimed at making profits as speedily as possible. Of course, CTF also aims at a situation in which the costs will be covered, a situation that has not yet been reached. In 1974 a task force of the Survival Service Commission met a Miami, and some of its members went to Cayman for discussions with Mariculture Ltd., and this resulted in the adopting by IUCN of the "Principles and Recommendations" with regard to turtle farms and ranches. CTF has proceeded strictly along the lines of these Principles and Recommendations.

The farm had to acquire adult turtles to serve as a breeding stock, and these came from various sources: Ascension Id., Surinam, Costa Rica, Nicaragua, and Mexico. They also purchased eggs (inter alia from Surinam). In 1973 the first eggs were laid on the farm, and in 1978 the stage was reached that so many eggs were laid on the farm's artificial beaches that there was no further necessity for importing eggs from natural beaches. Besides, in 1978, females that had hatched on the farm had started laying. Thus CTF became self-sufficient. It has been shown that a long migration to and from the nesting beaches with intervals of two or three years, such as occurs in nature, is not necessary. In captivity females may lay in consecutive years, and in various parts of the year. Thus, in fact the turtles on the farm have become domesticated.

In March 1979, the countries that signed and ratified the Washington Convention on the International Trade in Endangered animal and plant Species (CITES) accepted a

definition of "bred in captivity"; only those animals meet this definition that have originated from parents that themselves have been generated and born in captivity, i.e. they must belong to a second generation born in captivity. Only when agreeing with this new definition, permits for the import and transit of, and for the trade in such animals, may be obtained. Such a definition does not cause much trouble with regard to species of which the generations rapidly succeed one another, and which allow of production within one or two years. In the case of marine turtles matters are different. In these animals a period of more than 10 years may elapse between the hatching from the egg to the reaching of maturity. CTF (and its predecessor Mariculture Ltd.) came into existence at a time when completely different rules were in force, and the company, having always kept to the Principles and Recommendations of 1975, might expect that no drastic changes would be made, without at least establishing an ample period of transition. The demand of "bred in captivity", as now defined, may be made for the offspring of the first farm-bred generation, but one cannot make such a demand for animals that years ago were hatched from legally imported eggs and which have been raised at the farm. In so far as such animals are not used for breeding, there must be a possibility to slaughter them and to trade the products, to give the farm some income. The number of this group of animals will decrease rapidly, for eggs are no longer imported.

The new definition of "bred in captivity" will be disastrous to the project in Surinam, where eggs are collected from the natural nesting beaches, watched in a protected hatchery, and raised in captivity, a method by which meat is produced without having the heavy expense of a farm. The restricted level of exploitation which has been taking place in Surinam for years already, is financially favourable to conservation, as the proceeds are used in part for the protection of marine turtles. By making existence impossible for bonafide farms and ranches, one will not save the turtles.

Sometimes it is said that the marketing of turtle products by CTF will stimulate the demand, and that this will lead to an increase of poaching, but this is merely an allegation without any factual foundation. The demand for turtle products existed long before the farm was founded, and the capture of marine turtles, allowed in a number of countries, also existed already for a long time. In 1974 the question was put to Mariculture Ltd. whether it felt that it could satisfy the world demand for turtle products. This was an unreasonable question. A farm just started will need time to arrive at full production and one farm alone will not be able to supply the whole world with turtle products; it is just as unreasonable to expect that with his live-stock a single farmer could provide all the meat for a whole country. When the technology of turtle farming has been fully developed and mastered by CTF, and this is the case at present, it will be possible to establish turtle farms (and ranches) in other parts of the world, each to use breeding stock (or eggs) from the population naturally occurring in the region. Then, a product of a good and stable quality can be supplied in sufficient quantities; the demand for turtle products obtained from poachers, which products will be of a less stable quality, will decrease and eventually it will cease.

In the past many parts of turtles taken in the wild, for preparing turtle soup, were thrown away. At the farm everything is used: meat, liver, skin (leather), oil, scutes, etc. Thus, besides being a source of good quality meat (with little fat), the farmed turtles are a source of numerous other products. A process has been developed by CTF to use the scutes of the Green Turtle in arts and crafts, and this may well help to decrease the demand for tortoise-shell from the Hawksbill (*Eretmochelys imbricata* (L.)). The production of turtle products by turtle farms (and well-controlled turtle ranches) may lessen the pressure on the populations in the wild. It is worth mentioning that two renowned specialists on turtle conservation, Dr. G. R. Hughes (Natal) and Dr. J. P. Schulz (Surinam), realize fully the importance of CTF. When developing the technology of turtle breeding one must be aware that one is working with living materials, of which much is still unknown. One must give such projects time to develop the desired techniques and to put them to the test, but one must not try and make the development of turtle farming impossible on the basis of slight grounds and unfounded suppositions. The possibility should not be excluded

that in the long run farms will be the only place where one can watch turtles in abundance.

Besides lessening the pressure on natural populations CTF is also beneficial to conservation by the research done at the farm by Drs. Jim and Fern Wood, as well as by the opportunities it offers to other scientists. The farm disposes of an almost unlimited supply of materials for research. Being a taxonomist and anatomist, the present author in the first place thinks of the possibilities for research in these fields. The question as to how many subspecies can be recognized within the species *Chelonia mydas* (L.) has not yet been answered. A first attempt at studying the difference between the various populations could be made at CTF where adult turtles from various populations are available. There, one could make a detailed comparison, e.g., of turtles from Surinam as compared to those from Ascension Is., from Costa Rica, Nicaragua, and from Mexico. The results of such a study may show in what direction further studies in other parts of the world may be undertaken. Much is still to be learned about the processes taking place in the living turtle, and here again the farm could assist. Of course, some of the results may have to be checked by research on specimens in natural populations, but working with the turtles in the farm may be a welcome opportunity to develop methods and techniques.

It is to be hoped that the authorities in various countries (and in the first place in the USA) may soon come to the conclusion that CTF does a good job, that the ban on turtle products from this farm should be lifted, and that in fact at the farm one has to deal with domestic animals to which the CITES limitations should not be applied.

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