A tag in ten thousand

George Hughes

"I wonder where it comes from?".

This question is asked on every occasion that a dead or dying animal bearing a metal or plastic tag is found. Often the curiosity created by the tag is pursued by those who find it and they return the tag and the appropriate information to the address inscribed thereon. By so doing they are answering the seldom heard prayers of many hard working and enthusiastic amateur and professional biologists and their (normally) exhausted student helpers.

For some the curiosity extends no further than the initial question stated above and the tag is either thrown away or taken home with the intention of writing but that is as far as the tag gets and it finds a final resting place on the rubbish heap. Whilst the tag, being inanimate, can cope with this unchivalrous treatment, the person who put the tag on the animal can't and is often to be found weeping quietly as news of a discarded tag comes to hand without the slightest scrap of valid information to help him.

An example of this situation was a verbal report received from two South Africans recently returned from Hong Kong. This famous city was apparently astir as a result of the finding of a sea turtle bearing a tag which indicated that it had been tagged in South Africa: 9 000 miles (14 400km) away. So far no official confirmation of this startling find has made its way to Durban from the Far East but mental appeals have been sent to Buddha.

As is obvious from the above paragraph one of the many animal groups that has received attention during recent years is the sea turtle family, two species of which nest on the Tongaland coast of Natal (see photo). These two species are the loggerhead turtle *Caretta caretta* and the leatherback turtle *Dermochelys coriacea*, the latter being the second largest reptile still extant in the world. Since 1963 nearly 2 000 adult turtles and some 10 000 hatchlings have been tagged in Tongaland.

The Tongaland turtle nesting beaches.

Few people realise the enormous effort that goes into an animal study programme of this nature if detailed and valid results are to be obtained. The Natal Parks Board has made what can only be described as a major contribution to the study of sea turtles and each year the Board employs three or four university students to walk the beaches every night. Further, along the breeding beaches there is a european ranger and his staff of twelve game guards who together spend a total of five months on the beach. The Board purchased a beach buggy with which to improve the patrol methods and it can truthfully be said that Tongaland now hosts one of the best protected beaches in the world not actually in a game reserve.

Each student is equipped with a tagging tool, tags, measuring tapes, calipers, notebooks and a pencil. When a turtle is encountered it is inspected for a tag or signs that it had been tagged previously and has lost the tag. If the turtle has not been encountered before during the current season it is measured across the carapace and the head, its site of emergence recorded to the nearest quarter mile (400m) and whether it has laid its eggs or not. Finally it is tagged with a monel metal tag which, in the case of the loggerhead is placed on the foreflipper only, and in the case of the leatherback on the foreflipper and rear flipper because of the possibility that the foreflipper tag gets displaced, an insurance that has paid off on occasions.

All this activity must be carried out in such a way as to create minimal disturbance to the turtle and at the same time the worker must endeavour to avoid flailing flippers and the occasional nip directed at the ankles by a peeved turtle. Whilst a 'belt' from the relatively small loggerhead turtle (weight 140kg) is painful, a swat from the foreflipper of a leatherback (700kg) can be disastrous, and many 'turtle trotters' (student walkers) have notched shins bearing throbbing testimony to this hazard. The author was once laid out cold by an uppercut from an adult green turtle (200kg) which had been turned over, so a leatherback is quite capable of dealing a fatal blow.

We are often asked why we tag turtles and the most obvious reason is that we wish to map the distribution of the population and to try and ascertain its migration routes. Results from the Tongaland work have provided a reasonably clear picture of loggerhead movements. So far, from our very modest population of leatherback turtles, we have had only one tag recovery away from the nesting area. This was a sleeping female gaffed on the surface of the sea just outside Beira harbour during December 1972.

Tag recoveries have shown that the 56km of protected beach in Tongaland is a nesting landmark for loggerheads distributed over 3 200km of the East African coast. Tagged loggerheads have been found 2 800km north of the spot they were tagged and 400km south. Within the two extreme points of recovery loggerheads have been recorded at virtually every major fishing town or village and this suggests that the vast majority of the population spends much of its non-nesting life in the warm tropical waters of Mozambique and Tanzania.

From these recoveries information is also gained on the speed and determination of a migrating turtle. For example, do they drift aimlessly or casually with the ocean currents or do they have a goal towards which they swim at speed? One loggerhead, having completed her nesting season during which time she could have lost 20% of her body weight in producing and laying her 500 odd eggs, left Tongaland some time after the 5th December 1970 and sixty-six days later was killed in Kilwa Masoka, Tanzania, having travelled 2 640km in that time. Thus her minimum travelling distance per day was 40km. Such a lengthy and swift migration would suggest that there is an element of deliberate movement rather than an aimless drift in the current systems. It is also worth pointing out that the prevailing current along the East African coast is southward moving, but the animal could have taken advantage of the eddy and counter current systems.

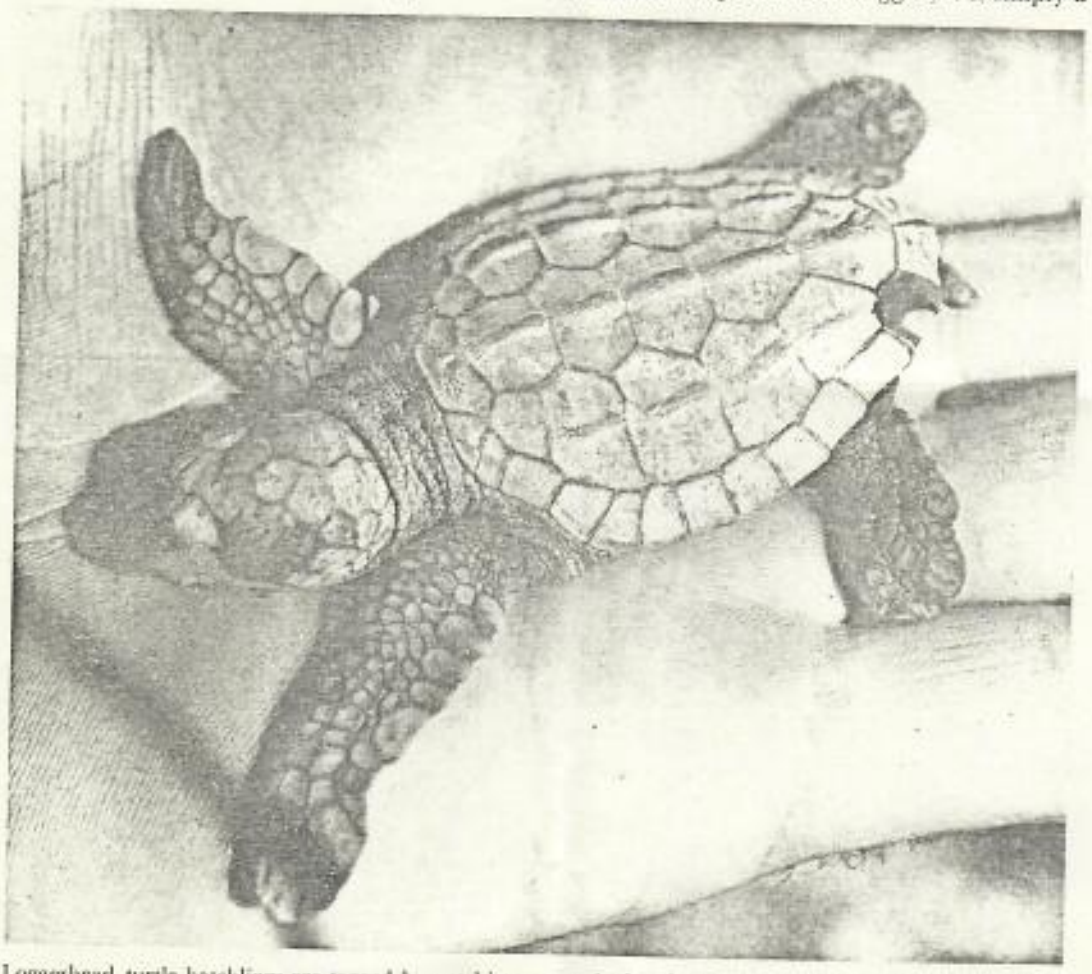
Of equal importance but not generally obvious is the data provided by turtles returning to Tongaland to lay in seasons subsequent to the one in which they were originally tagged. Do they return with accuracy to the same spot where they laid during their previous visit? Are they consistently accurate? Results in Tongaland have shown that loggerheads can return with great precision to renest in later years. It is thought that each loggerhead female has a 3,2km nesting zone wherein she nests consistently even after absences of two years or more. Some turtles are far more accurate than that and can home in on a 400m stretch. This may not appear spectacular

at first glance but consider a turtle in the sea having swum, say 1 600km, along a coast which to the human eye differs little in appearance and structure between St. Lucia and Bazoruto Island, being able to select the same 400m stretch that it nested on 2 or 3 years before.

Tags also tell us how many times a turtle must emerge onto the beaches in order to lay its full complement of eggs for the season, and how long it takes for each batch of eggs to ripen within the turtle. As mentioned above each female loggerhead lays upwards of 500 eggs during the season and she will emerge four or five times during the three-month season to achieve this. Each clutch of eggs numbers about 120 and the time interval between clutches varies from 20 days to 12 days depending on the sea temperature. It is a very simple relationship which means that the warmer the sea the faster each clutch of eggs will ripen within the female. One should expect this as turtles are reptiles and therefore dependant, to a large degree, on the ambient temperature which dictates the efficiency of their body functions.

Some questions will, of course, take many years of sustained tagging to answer. One is often asked how old a turtle is, or what is the greatest age ever achieved by a sea turtle. At the moment the answers are quite simple . . . we don't know!

From captive specimens in aquaria it has been suggested that it takes between ten and twelve years for a loggerhead to reach maturity although this has still to be proven with wild turtles. Once a turtle has reached maturity, started to nest, and, we hope has been tagged, it is simply a



Loggerhead turtle hatchlings are tagged by notching a marginal scale. If you find one of the 10 000 released, please keep the specimen and contact this Institute immediately.

matter of patience and each time the animal returns to lay, those extra few years are added to her known lifetime. The longevity record for the loggerhead turtle in South Africa is held by a captive animal in the East London Aquarium that survived contentedly for 26 years before succumbing to fatty degeneration brought on, as in humans, by the good life. No results from Tongaland can match this as yet but two females have been recorded over nine year periods which, if we add this to an assumed age of 11 years at first arrival makes them at least twenty. Of course, they may have been very much older than eleven years when they were first tagged. All that can be said at present is that loggerhead females (we never get our hands on males) live at least twenty years in the wild state but we may yet find that they live to five times that figure.

This brings us to the hatchlings. How does one try to trace their movements in the sea? A loggerhead hatchling is only 4cm and an extremely difficult object to attach a tag to without causing it to swim in circles or sink like a stone. One could try, as we did, to implant a small piece of stainless steel wire inside the animal and then trace it by x-rays, the only drawback being that it might prove awkward trying to persuade the adult turtle to sit still in the x-ray machine. The ideal would be to implant a radio-active tag which would be easily traced by means of a geiger counter. There is, however, a frequently heard protest against this method because of the possibility of some gourmet imbibing a succulent piece of turtle meat and by so doing irradiate his intestines in a spectacular fashion. A more serious drawback is the possible ill effects on the turtle itself.

The only alternative left was to cut a piece out of the turtle. Dr. Bob Bustard of the Australian National University, showed that one of the marginal scales (the scales around the edge of the carapace) could be excised with no apparent effect on the activity of the hatchling and, further, that after four years the notch was clearly visible (see photo). It appeared that the notch would last throughout the lifetime of the turtle.

During the 1971-72 season in Tongaland all hands were brought to bear on the problem and guards and students marched out at 15 minute intervals to search and collect hatchlings. This sounds easy but these little animals have but one idea in mind as they break through the surface of the beach and that is to get to the sea as quickly as possible. In Tongaland an emerging clutch is often safely in the surf within ten minutes or less thus reducing the chances of being encountered by the staff. Despite the odds, however, by the end of the season 5 000 hatchlings had been caught, notched using an ordinary leather punch, and released safely into the sea. Of these 5 000 only one was recovered, at Port Elizabeth. This little fellow had travelled some 1 200km in less than two months.

If these notches do persist throughout the turtle's lifetime there is a hope, albeit slim, that some of these notched specimens will turn up in Tongaland again, this time as laying females. This will answer the question as to whether hatchlings from one nesting area return to the same area as adults. A returning female will also inform us of the length of time required to reach maturity in the wild state.

Answers to these questions are vital to any sound conservation programme and by this is not implied preservation programme. Although it would be naive to suggest that the Tongaland populations will reach an exploitable level in the near future, it is expected that one day the possibility must be considered. A full scientific understanding of the biology of sea turtles is essential before any exploitation of a population should take place.

The help of all members of the public is needed to ascertain distributions, speed of travel, etc., but above all we need help with the recovery of hatchlings. If one considers their mortality rate the chances of us ever seeing one again are remarkably small but not impossible as has been shown by the hatchling from Port Elizabeth. All we can do is pray that the person finding a turtle hatchling, notched or not, will return it to the Aquarium in Durban, or a Museum or similar Institution which will forward the specimens to Durban.

Please don't give the hatchling to baby to play with, don't take it back to De Aar for the school collection, and above all please don't throw it away. Send it to those who pray for the odd tag in ten thousand.

That's us.

LOGGERHEAD TURTLE NOTCHING EVALUATION

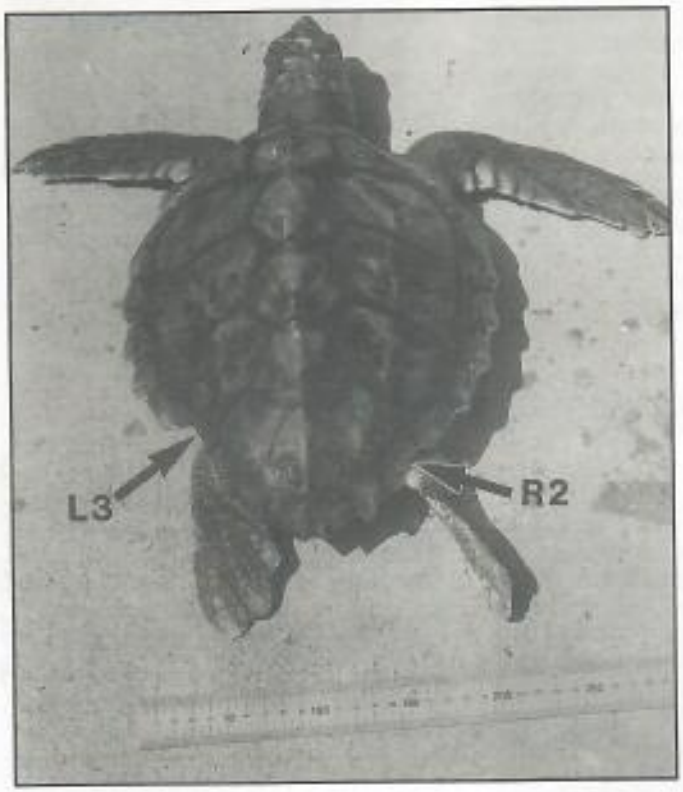
G. HUGHES

The Natal Parks Board has marked thousands of day-old loggerhead turtle *(Caretta caretta)* hatchlings in the St Lucia Marine Reserve since 1971. This is done each season by notching marginal scales in the hope that future recaptures will reveal growth, migration patterns and homing behaviour. The notching practise has been studied in more detail at ORI to determine long-term effects on the turtles. The objectives of the study were to evaluate hatchling survival and notch-induced mortality, and to assess persistence of the notches with growth of the hatchlings.

Sixty loggerhead hatchlihgs were transferred from Bhanga Nek (Maputaland) to the aquarium at ORI on 16 March 1990. Forty hatchlings were double-notched, ten were single-notched and ten were kept as controls and not notched at all. The survival rate of the hatchlings was 72% and no mortalities were recorded after they had reached 9 months in age. Preliminary results indicate that hatchling mortality was not influenced by notching.

The success rate of the double notches at an age of 2 years was calculated to be at least 83%. Six turtles are to remain at the aquarium so that the notches can be monitored until adulthood, while the remainder are to be released.

L. Guastella



A loggerhead turtle with notches at L3 and R2 indicating that the turtle was marked in 1990.

A loggerhead turtle nesting at Sodwana Bay.

AGULHAS CURRENT ICHTHYOPLANKTON

Most marine animals produce planktonic eggs and larvae to enable dispersal of their young.

In the case of fish, the early life history stages are termed ichthyoplankton. A project has been underway since 1990 to investigate whether the Agulhas Current is implicated in the southward dispersal of the larvae of several species of fish along the eastern seaboard of South Africa as is commonly believed.

Larvae were collected using plankton nets from the research ship "Sardinops" during three cruises which covered the area from Algoa Bay to Tugela and extended some 100 km offshore. Hundreds of hours of microscope work were required to sort the fish larvae from the other plankton. Identification of the larvae proved difficult as the larval stages of many of the nearly 2 000 species of fishes occurring off the east coast have not been described.

A visit to ORI in September, 1992 by Dr Jeff Leis, a world authority on the larvae of Indo-Pacific fishes, provided a major boost to this project. Thousands of larvae were examined and identifications were confirmed or corrected. Larvae of several tropical species were identified which represented new records for South African waters. At present, results of this project are being analysed and written up for scientific journals.

L.E. Beckley

Bongo nets being deployed in the Agulhas Current to collect ichthyoplankton.

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