

for three hours. However, she automatically froze and kept her eyes fixed on the spot to see what would happen. The turtle crawled beachwards until it was resting in the area of wave action. It then turned about and faced the sea and remained motionless. Kay was most surprised at this and decided to wait and see what would happen next. Idly she thought that the turtle looked rather like Ruth but she rejected the idea at once as wishful thinking. That the turtle was a female was obvious from the start. Firstly, males never left the water - had this turtle left the water? - and secondly, when it about-turned, the short stubby tail which characterizes females was clearly visible.

The tide had been full shortly after sunrise and had now started to fall fairly rapidly. Kay wondered what the turtle would do as the tide fell. At present it was still in shallow water most of the time and when an occasional largish wave came in it was half submerged. In the intervals between, however, it was almost out of the water. After half an hour the turtle was high and dry and appeared to have gone to sleep. Kay wondered if it was sick. She vaguely remembered some of her older relatives telling her that turtles sometimes sat on the beach by day but she could not remember any details. Never having seen it herself she had relegated it to the talk of the 'before times' and dismissed it as probably untrue. Yet here she appeared to be seeing just this herself.

She waited a little longer and then got up and walked over to the turtle. It was indeed asleep with eyes closed and head lying on the sand. There were no visible signs of injury. Kay stopped with an exclamation of surprise. It was Ruth! Kay's first reaction was to wake her up, but on second thoughts it occurred to her that this would probably frighten Ruth who

CHAPTER THREE

Lying in the sun

*

SEVERAL days after Ruth's second successful nesting Kay was on a small island only a mile or two from home but rarely visited as it was seldom used by nesting turtles and no sea-birds nested there. She had rowed across soon after daybreak with no particular purpose in mind. She frankly admitted to herself that she had been restless since befriending Ruth and the next fortnight, until Ruth was due to lay again, would seem an age. She had thought that the first nesting she had witnessed was probably Ruth's first for the season and that Ruth would probably nest a total of four to six times. Hence there would be plenty of future opportunities for them to be together but the first of these would not occur for about a further ten days.

Kay was sitting on the beach near the water's edge, wearing a light green cotton micro-mini over a scarlet bikini and enjoying the early morning sun on her back. She was gazing out to sea, unlooking, deeply immersed in thought about Ruth. Her attention was attracted to a turtle swimming along parallel to the beach in the shallows. This was a common sight so Kay did not take much notice of it until it veered beachwards and seemed about to come out of the water only a few yards to her left. Kay was most surprised as she knew that green turtles only nest by night and it had now been light

would swim out to sea first and 'think' secondly, if turtles did think in the way that we understand thinking. Having just found her friend she was reluctant to lose her so soon so she did nothing. The tide continued to recede and Ruth remained fast asleep. Kay decided to take a stroll to think about this strange new situation.

When she returned about two hours later Ruth was fast asleep exactly as she had left her, except that it was now almost low tide so that she was some twenty yards from the edge of the sea. Kay sat down beside her and gently rubbed her head. Nothing happened. Kay rubbed harder, still nothing happened. Clearly Ruth was either sick - very sick - or in a very deep sleep. Kay wondered what she should do. Now genuinely worried about her friend she was eager to see that she was still alive. She thought of the most sensitive area of Ruth to touch - rubbing the front flipper produced no response at all so she moved round to the sensitive tail and gave that a gentle tug. At once the rear flippers moved so Ruth was alive after all. Returning to the head, Kay saw Ruth slowly open her eyes and blink a few times. She then raised her head and drew air into her lungs, placed her head back on the sand and looked at Kay. There were so many things that Kay longed to ask Ruth. Time and close observation would provide most of the answers, she knew, but that is little consolation to a young girl!

The next morning she returned to the same spot and sure enough Ruth soon made her appearance exactly as she had done on the previous day. It was the same the following day also.

On the third day, which was extremely hot with the full tropical sun beating down out of a cloudless sky and not

even the vaguest indication of a sea breeze present, Kay noticed for the first time other turtles behaving similarly further along the beach. That afternoon she went for a walk right round the island and counted twenty-three turtles lying asleep on the beach at varying distances from the water's edge, it now being low tide.

During this walk Kay was surprised to see five turtles lying on their backs on the beach. All twenty-three sleeping ashore were females - she had checked this with each one. Yet three of the five lying on their backs were males. Kay thought that someone had turned them to take away for food. Islanders often turn a turtle and return to collect it later knowing that when it is on its back the turtle is helpless. However, Kay could readily see that some of these turtles had been there much longer than others - one male appeared about all in, was seriously desiccated, and must have been there for several days. Two others had clearly only been turned over that morning as they would be floated off by the next tide. However, there were no footprints other than Kay's on the island so that cut out a human predator. Furthermore, humans turned turtles they found on the beach, namely nesting females. Since males never left the water it was impossible for humans to turn them! Kay was quite at a loss to decide what had happened. She naturally tried to turn them right way up again. This was easy with the three males, the desiccated individual seemed extremely light and made very slow movements across the sand to the water. Kay wondered if he would reach the sea but suspected that if he did he would soon recover. It was also just possible for Kay without help to turn the smaller of the two females after a number of attempts. She was unable even to move the larger female.

She was on the point of turning back when she saw a male turtle with a large tail lying on the beach not far from the water. She went along towards it moving slowly, to see if it was all right. She had never previously seen a male basking out of the water. When it lifted its head to breathe she remained motionless. The turtle returned its head to the sand, closed its eyes and presumably went back to sleep. Kay walked straight towards it, sat down and carefully examined it. This was her first opportunity to examine closely the huge thumb claw that the male uses to hook on to the female during mating. Kay leaned forward and very gently stroked its head. Remarkable as it may seem, this was Kay's first meeting with Barry as she was later to name this enormous male who hauled out from time to time to sleep in the sun. When she stroked his neck he opened his eyes and seemed to realize that she meant him no harm for he merely lifted his head to breathe, returned it to the sand and watched her. After a few minutes he closed his eyes and went to sleep again. Kay was often to see Barry in the water, and watched him mating several times, as like all male turtles, Barry was very promiscuous. Unlike most males, however, he was always very gentle with Kay and never showed any sign of fear.

Kay noticed over the next few days that the sequence of sleeping ashore was exactly as had happened on the first day with Ruth. Turtles came right up to the shallows and turned round to face seawards in the region of wave action. As the tide had been high in the morning, soon after sunrise, and there was only one tide cycle every twenty-four hours, the tide then continued to drop all day leaving the turtles stranded, further and further from the sea. Neither then nor subsequently did Kay ever see a turtle take the trouble to crawl

any distance up the beach. The fact that turtles were later found there was purely a result of tide fall.

Kay wondered why they rested ashore. The fact that they only entered extremely shallow water was to provide her with a clue. When she was sitting ashore with Ruth by day and they were still in the shallows or right at the water's edge, Kay saw many male turtles patrolling, obviously looking for females. These turtles never noticed Ruth or others in a similar position. Furthermore, as Kay was to discover (see Chapter 5), males cannot mate with females unless the water is about eighteen inches deep. Kay decided that females came into the shallows to get away from the males though she was uncertain why they should want to do this.

The final piece of evidence which clinched this in her mind came some days later when she was on the reef flat with Ruth and the mating season was in full swing. To Kay's surprise, every mated pair was surrounded by several males and the males seemed to be continually on the look-out for mates. Once any mating was completed that female was then considered fair game and harassed by other males. Kay now felt sure that females beached by day to avoid male encounters. About a year after Kay came to this conclusion, a scientist came to the same conclusion after observing similar evidence and wrote a paper in a scientific journal on the subject.

All the beached turtles returned to the sea in the late afternoon as the sun was setting, although this usually necessitated a long crawl down the beach and sometimes across exposed sandflats. Kay wondered why they did not remain ashore all night also. She wondered if their difficulty in breathing ashore might be responsible. She knew that male activity was largely diurnal so presumably their reason for having

hauled out disappeared with daylight. However, each evening when Ruth returned to the sea Kay worried that she might be taken by a shark that night. She need not have worried; Ruth had a particularly secure retreat in which she wedged herself completely under a deep, over hanging ledge of coral.

About a week later Kay had again come across the same enigma - stranded turtles on their backs. While trying to turn them over she again wondered how this occurred. She now had a clue with regard to the males. She had seen several mating attempts in shallowish water and on one occasion the male had fallen off the female's back and had almost tipped over. Now, if this had happened in very shallow water, and a large wave had then moved him landward, and the tide had been receding . . . Well, it was an idea at least. This lead provided no clue as to why females were found upside down on the beach, and about half of those she had seen were females. She simply could not believe that something with the low centre of gravity and stable shape of a turtle could be caught and flipped over by a wave. Anyway, she had seen little strong wave action around this island during the past week.

Incidentally, Kay, of course, was not surprised that some of these stranded turtles had clearly been there for some days. Someone lacking her knowledge of the sea would have attacked her theory of their stranding by saying, 'Ah, but if they are stranded by the tide then the next tide will float them off again.' Kay knew that this need not be the case. If the tides were 'making' it would, of course, certainly be the case. But if the daily high tides were dropping, as they had been markedly this week, then the next high tide would not come sufficiently far up the beach to rescue a turtle

stranded the previous day at around the time of high tide.

Tide height variations, of course, also complicated the issue as they indicated that the observed strandings upside-down were only a fraction of those that in fact occurred. Firstly, only those happening when the tide cycle was falling would be there to observe the following day and even then only if the accident had happened at around the time of high tide. All other turtles would be floated off by the next high tide. Furthermore, one could not come along and expect to find dead turtles or turtle skeletons as a result of this since any which did die would be removed by the next (fortnightly) tide cycle.

Kay also had another problem concerning beached turtles. From time to time she came across individuals, not necessarily exceptionally large adults, dead ashore, lying the right way up and not lost in the vegetation zone but on the high beach platform in full view of the sea. What, Kay wondered, had happened to these turtles. She had examined several freshly dead turtles over a period of a couple of years and had never detected any external damage. It had not occurred to her that these were probably old turtles which had found the nesting process too arduous for them and had died of a sudden and severe heart attack.

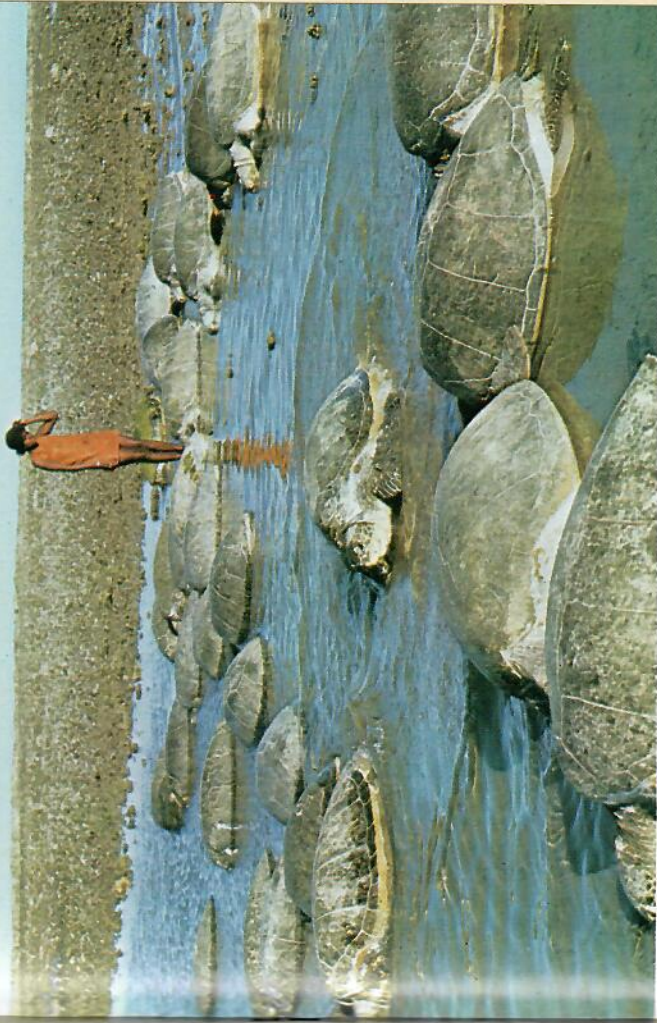
Seeing turtles ashore on the beach by day was a completely new experience for Kay so that she spent considerable time with Ruth and Gemai, the latter another female turtle which she had befriended, and had named after her grandmother. However, it was not all that exciting as they did nothing and had it not been for her intense sense of friendship towards Ruth and Gemai, it is unlikely that Kay would have returned after the initial few days.

KAY'S TURTLES

of movement to provide the greatest resistance possible to the water and so maximize the turtle's forward motion. Between the power stroke and the return the angle of the flippers was subtly altered so that during the forward-downward stroke the flipper cut the water side on so that resistance was minimal. Although Kay did not know it, the movements were remarkably similar to those of a bird's wings seen in slow motion. Their gracefulness, of course, was a result of the great resistance imposed by water compared with air so that the movements were slow enough for the human eye to follow without the aid of a slow-motion camera.

The turtle, a large pale olive green fellow with only a very few blackish spots and an enormous tail, approached Ruth and Kay saw how it used its rear flippers as a rudder so as to position itself exactly in front of Ruth. This achieved, it nuzzled Ruth just as had happened with the other male several days previously. The nuzzling continued for some minutes, the turtle made a biting action in the soft flesh near the neck and then moved round to the rear - exactly as Kay had observed in the previous mating attempt.

The turtle made a gentle biting action at Ruth's right rear flipper and nuzzled the area for several minutes. He then backed away a few feet and with two powerful strokes of the front flippers, shot forwards and upwards coming to rest squarely on Ruth's back with his front flippers drooping down her sides somewhat behind her flippers so that her swimming action would not be impeded by them. Kay noticed that his flippers were positioned so that the thumb claws were just over the sides of the upper shell, clinging to the shell margins and digging into Ruth's soft flesh. His head lay flat on the front of her upper shell and the rear flippers



Which turtle is Ruth?

Kay stroking Gemai's head



dangled over the edge on either side. To Kay's surprise, Ruth showed no signs of any response. She was floating, head down, just below the surface with a small area of her upper shell out of the water. The male turtle was completely out of the water except for the distal portions of his front flippers and his hind flippers.

Occasionally the male raised his head and breathed with a slow rasping noise, and a couple of times while Kay watched, Ruth did the same. Following breathing, she made a few slow swimming movements with her front flippers which seemed to make the male extremely alert. Perhaps he feared she was about to try to dislodge him. As she watched, Kay reflected that there could be no such thing as rape among sea turtles. No male could ever position himself in the mating position without the tacit approval of the female and even when there, at least until copulation was achieved, his position did seem extremely precarious should the fickle female invoke her female prerogative and change her mind.

Kay slowly moved round towards the rear of the paired turtles. She had been watching from the side but they had drifted slightly so that they were not face on. Looking at them from underwater she at once realized just how functional the male's long tail was. It ended in a claw-like extension and this was firmly wrapped under the edge of Ruth's upper shell. The tail tip was prehensile and was able to secure the rear of the male's body firmly to the female. This would be particularly important prior to commencement of copulation. Kay saw the male's tail was rubbing slowly from side to side, probably in an attempt to stimulate Ruth to permit copulation to begin. Kay surfaced. For several minutes Kay floated on the surface and then had another look. This time

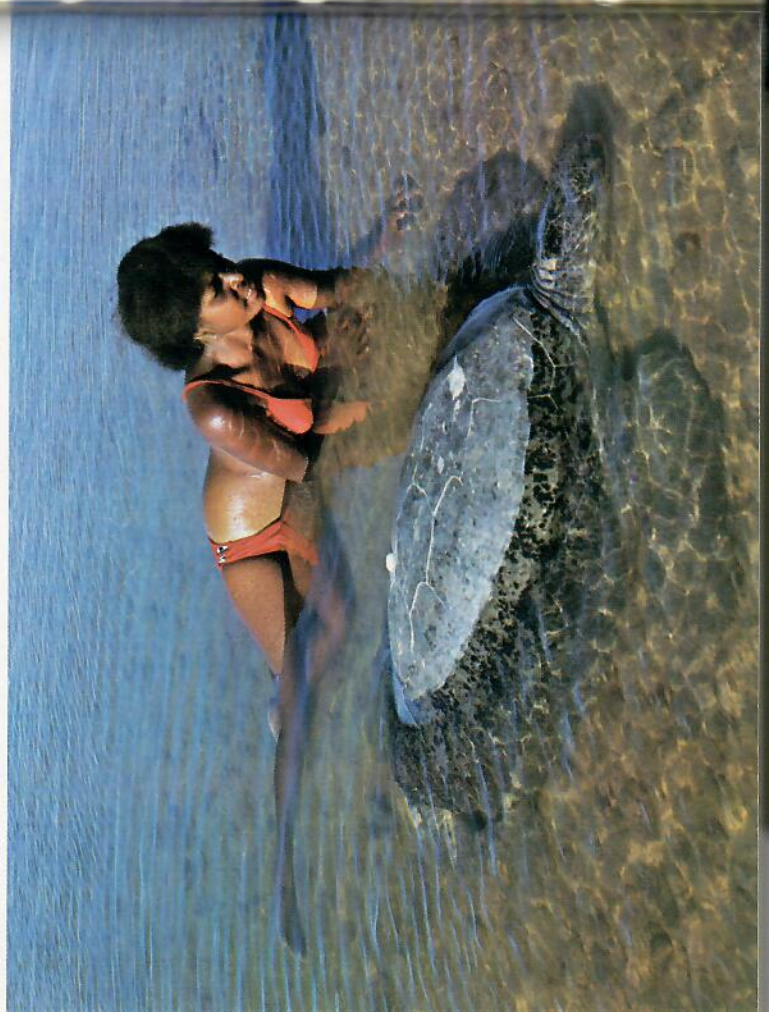
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Kay and Barry in the late afternoon



Kay and Barry lying in the shallows

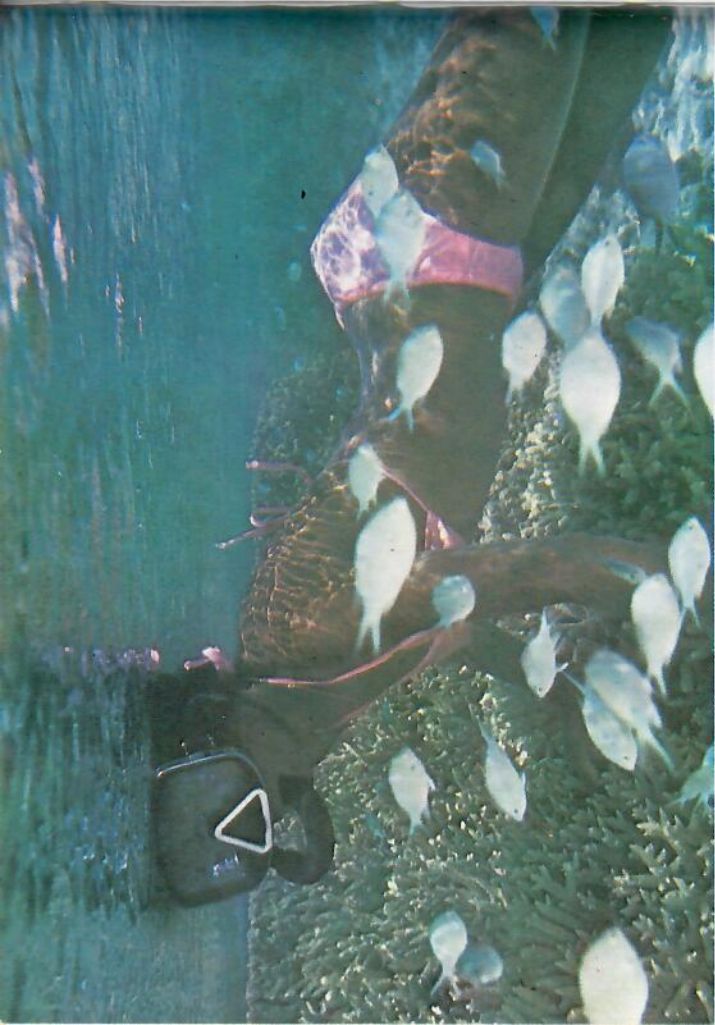
being crushed by her great weight. However, Gemai moved slightly to the right and came abreast of her, the extremity of her left front flipper just touching her bare leg as if in recognition. Gemai rested again and then moved past Kay into the vegetation zone but not without a backward glance when she next stopped to breathe. Immediately in front of Kay the bank was ill-defined, nevertheless the sand was extremely soft and the incline fairly steep and Gemai obviously had some difficulty making progress up the bank. She now lay motionless for some minutes before making for a large messerschmidia bush under which she literally disappeared. Soon Kay heard the sound of dry sand showering against leaves and turning round saw that Gemai had commenced digging her nest. Kay had often noticed that green turtles seemed to like vegetation and most often nested under or close to it rather than on open areas of sand. She had never known green turtles to nest on developing cays which were little more than sandbanks and lacked vegetation other than grass and bindweed although she knew that some other kinds of turtles used these cays for nesting.

Kay watched Gemai. She was literally swimming into the sand with powerful synchronous movements of the front flippers which sent sand showering backwards for distances of several yards. As Kay watched, Gemai adopted a head downwards posture. A major purpose of the nesting process is to place the eggs in a suitable incubation environment at a depth in the sand where moisture is generally present even during dry spells, since turtle eggs have soft shells and rapidly dry out unless they are in a very humid atmosphere. The depth of the egg mass also ensures that the temperature is not subject to changes between day and night. The purpose of

K.T.

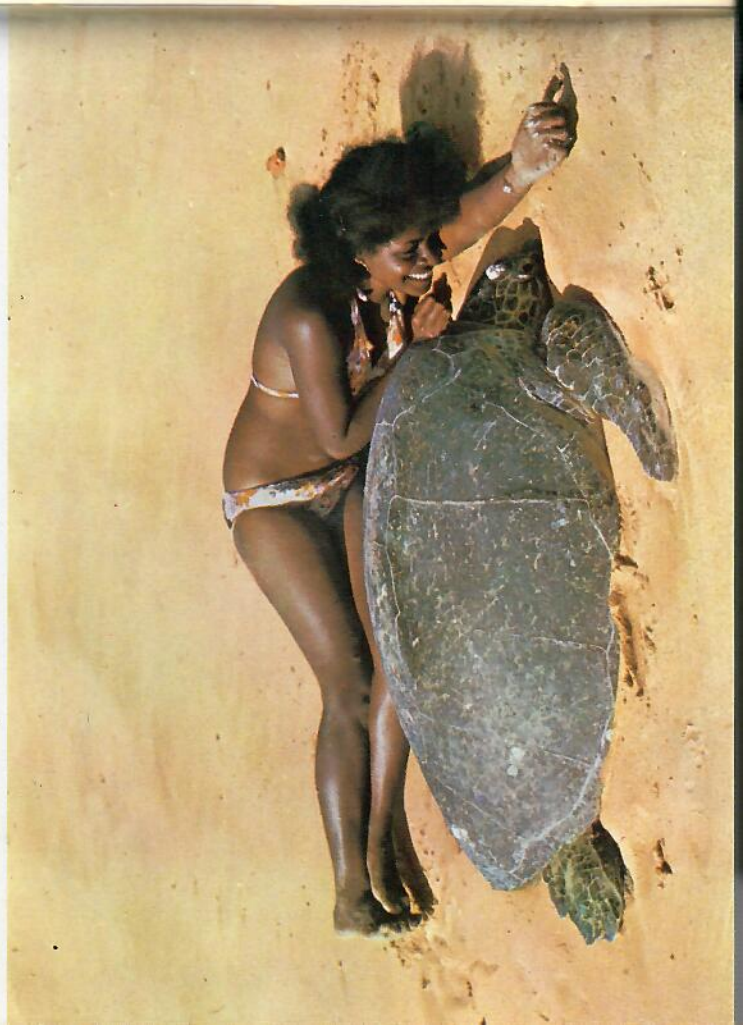
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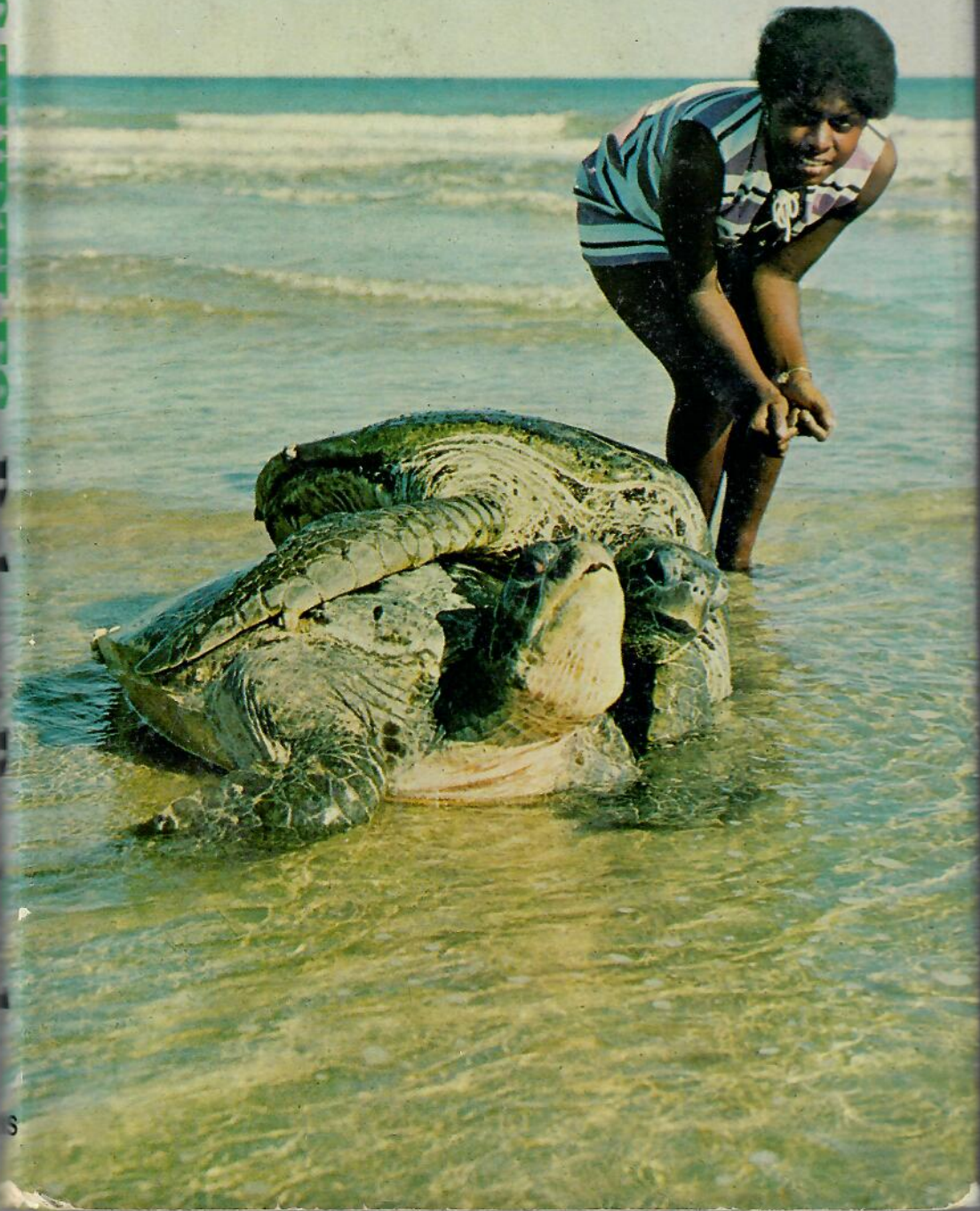
Kay in a coral pool surrounded by curious blue pullers and sergeant-majors

Kay and Ruth lazing in the heat of the day



KAY'S TURTLES

Robert Bustard



KAY'S TURTLES

Y's Turtles is an authentic account of a young Melanesian girl's extraordinary relationship with a most unusual animal—the turtle. Turtles are survivors from the age of the dinosaur and it is almost incredible that these creatures should have outlived the predations of time and chance to be alive today. The enormous sea turtles are the well-known relations of the small tortoises, and sea turtles are so popular as pets in so many parts of the world.

Y, now twenty, comes from the remotest group of islands in the Torres Strait which lies between Australia and Papua-New Guinea. The Islanders have a long and extremely complicated relationship with turtles—they worshipped the turtle as a god until recently but, at the same time, hunted and ate it. Kay vastly extended this primitive contact.

Robert Bustard, an expatriate Scot at the Australian National University in Canberra, tells us Kay's astounding story of her close relationship with the two turtles Ruth and Mai, and to a lesser extent with Barry, the male. Sea turtles are extremely shy creatures and yet Kay was able to befriend them and introduce us to their primary life cycles—nesting, feeding and propagating in a way that combines rare observational skill with a high degree of interest and drama.

George Balazs

KAY'S TURTLES



Robert Bustard is an ecologist with special interests in animal behaviour and conservation. He has been fascinated by reptiles since his early childhood in Hong Kong and Western Australia. Educated in Scotland and a graduate of the University of St. Andrews, and the Australian National University in Canberra, Dr Bustard spent ten years in active scientific research on lizards, sea turtles and crocodiles.

In 1971 he gave up his research career for 'ten years' in order to use his special skills to help indigenous Australians (aborigines and Torres Strait Islanders) achieve the sort of life which they themselves desire, and to be able to devote more time to conservation.

Jacket Photo: Kay watches Ruth mating

