

RYUKYU ISLANDS MARINE TURTLE INVESTIGATION--PILOT SURVEY, 1965/66  
DIARY REPORT (VISIT NUMBER 1 OF THREE SCHEDULED VISITS)

J.R. HENDRICKSON, EAST-WEST CENTER, HONOLULU

August 10-11, 1965

Travel from Manila via Hong Kong to Naha, Okinawa, arriving Naha on Japan Airlines 722 at approximately 1730 hours on August 11th.

August 12-13, 1965

Logistic preparations and conferences at USCAR, GRI Fisheries Research Institute, and University of the Ryukyus.

August 14, 1965

Field party departed Naha at 0830 on Air America flight for Miyako-Jima.

Party composed of:

J.R. Hendrickson, East-West Center, Honolulu  
~~Olo J. Heggen, Fisheries Industrial Specialist, Economic Affairs~~  
Department, USCAR

Juro Isa, Fisheries Industrial Specialist, E.A.D., USCAR

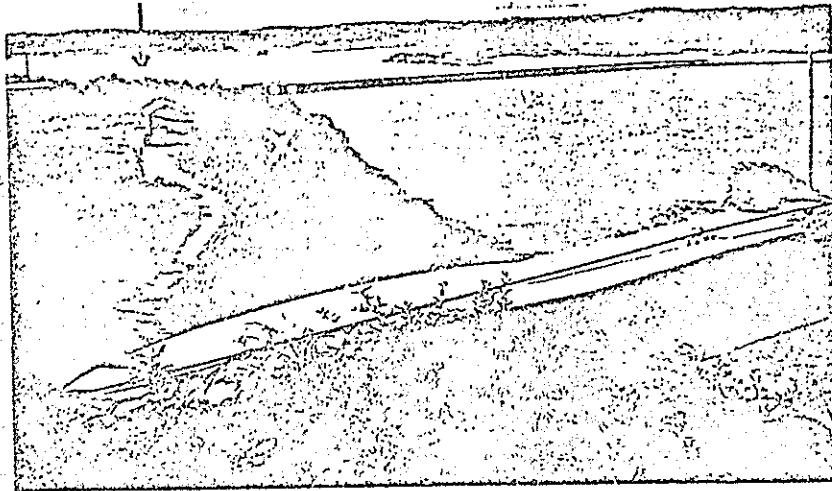
Kiyoshi Yamazato, East-West Center (student), Honolulu

Conference with GRI (Fisheries) personnel and with Mr. Akio Yonamine, the local resident who has been mentioned in public media stories about rearing young sea turtles for the taxidermy trade.

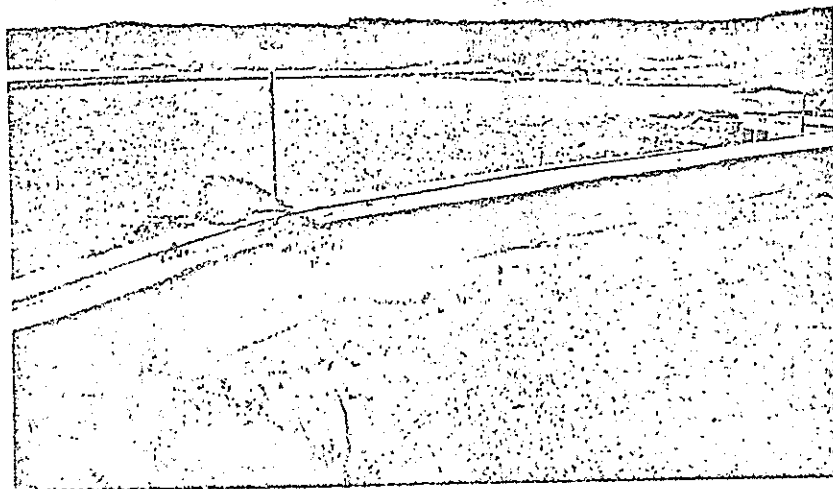
At 1230 hours drove to North end of Miyako-Jima and took boat to Ikema-Shima. Short conference at the office of the Ikema Fishermen's Cooperative, attended by Mr. Hiroshi Taira, Chief, Fisheries Subsection, GRI Miyako Branch, then inspected Yonamine's establishment. At his house, saw accumulated living turtles purchased for stuffing, the preparation tanks, and his stock of prepared (stuffed, polished) turtles ready for sale. Ratio of Green Turtles (Chelonia mydas) to Hawksbills (Eretmochelys imbricata) in his stock on hand was about 3:1. Also at his house was a large basin containing about 20 living Hawksbill hatchlings about 1 week old. Yonamine did not know how to differentiate between the newly-hatched Green and Hawksbill species, which is important to him since Hawksbills are much more valuable than Greens in the stuffed turtle trade. Taught him how to positively identify hatchling Hawksbills by the fact that they have two visible claws on the leading edge of the fore flipper, while Greens have a single claw.

Went on to a second building where Yonamine kept the main mass of his young turtles. He had about 200 week-old and month-old young turtles (all Hawksbills) on hand. He feeds principally on Mosquito Fish (Gambusia affinis) and other small fish netted in nearby brackish water pools; he also feeds bits of fish and shellfish flesh when available (viz. dead lobster which he opened and fed while we were there). He changes sea water daily; all the basins appeared to be clean and all the baby turtles were in good condition.

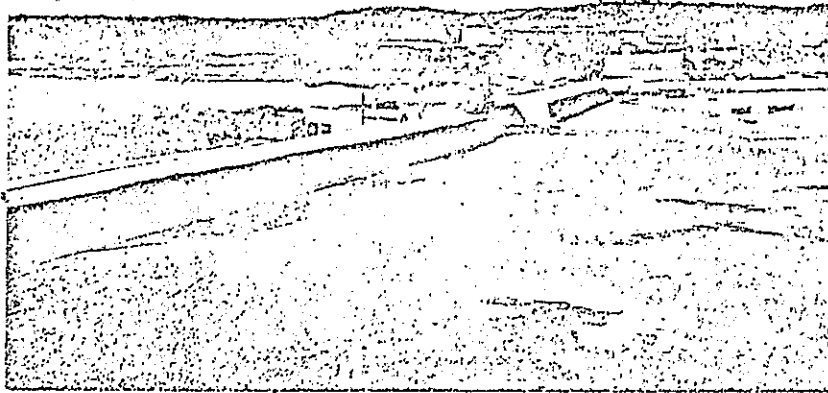
Later inspected Yonamine's "hatchery" where he had two incubating nests in a patch of sand; he opened one nest to demonstrate, and one egg broken accidentally contained a well-developed (approximately 35 days) Hawksbill embryo. Adjacent to the "hatchery" is a large tidal pool formed by two sea walls thrown across the estuary leading to Ikema harbor.



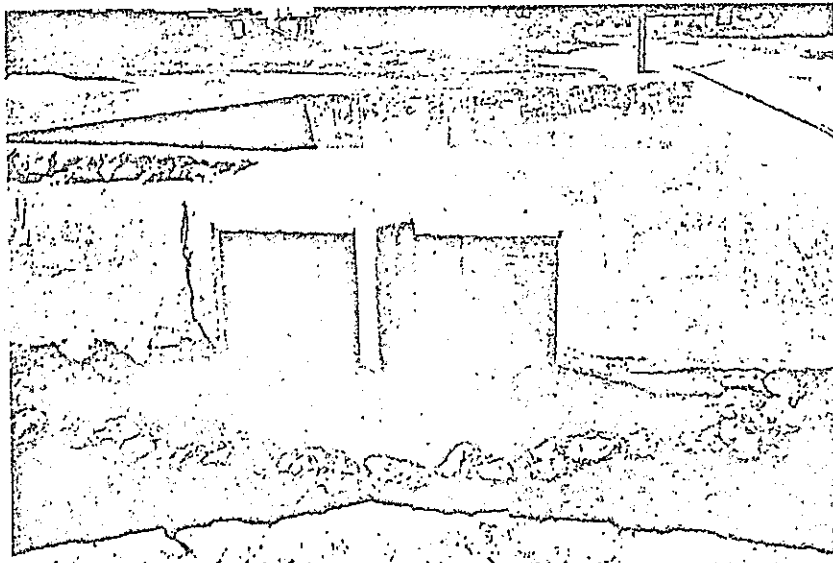
Large, enclosed tidal pool in mouth of estuary behind Ikema harbor (looking northward, inland). White "x" marks approximate location of Yonamine's hatchery site. Black arrow indicates floating cage where Katsuran and Oxoku keep hatchling turtles (see page 7).



The two sea walls were constructed for the purpose of reclaiming agricultural land farther back up the estuary by excluding tidal sea water; they have gates for keeping back the high tide and allowing stream effluence during low tide periods.

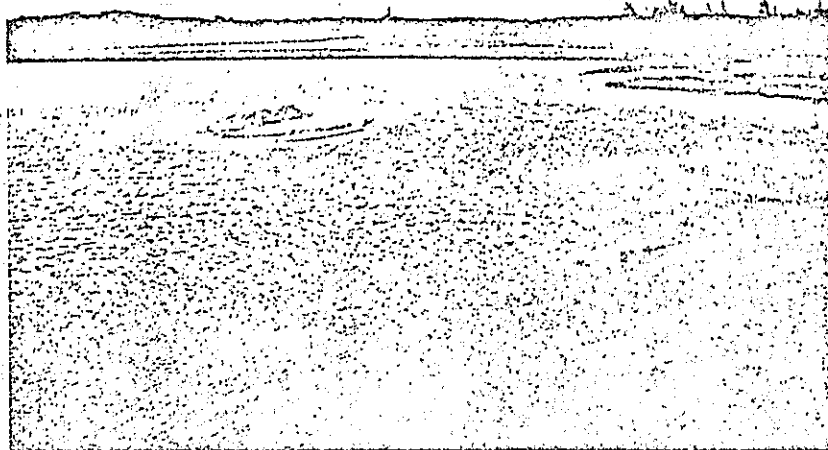


Outer (seaward) wall of tidal pool showing baffle complex behind tide gates.



Baffle complex behind seaward tide gates, as seen from lagoon side (note semi-circle of rocks placed around shiceway to prevent escape of Mr. Yonamine's large turtles, which are kept in the lagoon).

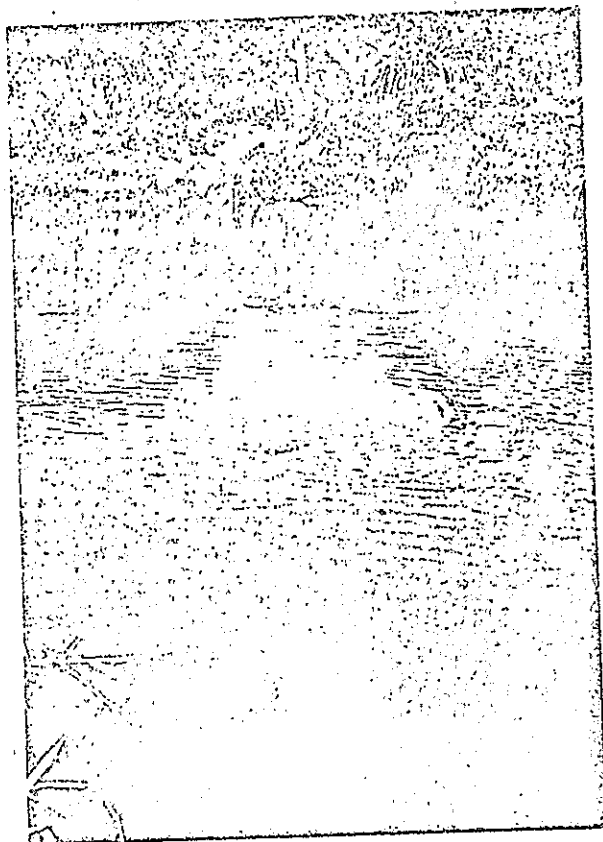
In the large pool between the two walls, he has released 6 sub-adult and adult Hawksbill turtles and one sub-adult green turtle (all females), with idea of promoting breeding. The water appears to be saline enough to support ordinary marine shore fishes. Yonamine has constructed one 18' x 10' pile of beach sand in the pool as a simulated breeding beach.



Artificial, "breeding beach" constructed in tidal pool by Mr. Yonamine (view northward from outer wall).

The maximum depth of water in the pool appears to be about 18"-24"; the simulated beach rises to about 18" above water level. I pointed out to him the necessity of having male turtles present before he could expect any breeding, and the low probability of breeding even then in such a limited environment. I believe the area of the pool is sufficient, but the water would have to be deepened considerably and I believe that nesting sand would have to be provided at least 6 feet above water level. He does not feed at all in this pool, and I believe that supplemental feeding would be essential before any breeding could be expected. Yonamine says that dredging plans for the adjacent harbor include dumping of sand to fill about  $\frac{1}{2}$  of the present pool.

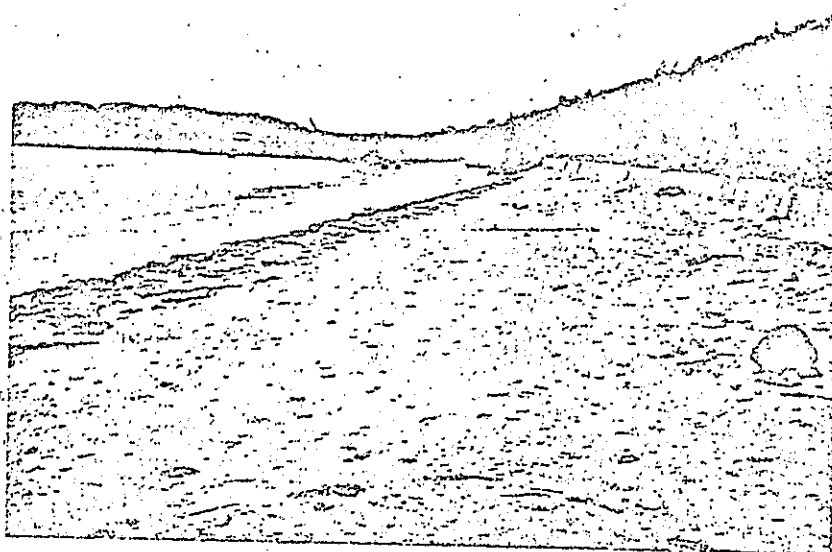
Went on to inspect a brackish pool into which he had introduced about 80 yearling Hawksbill turtles two days previously.



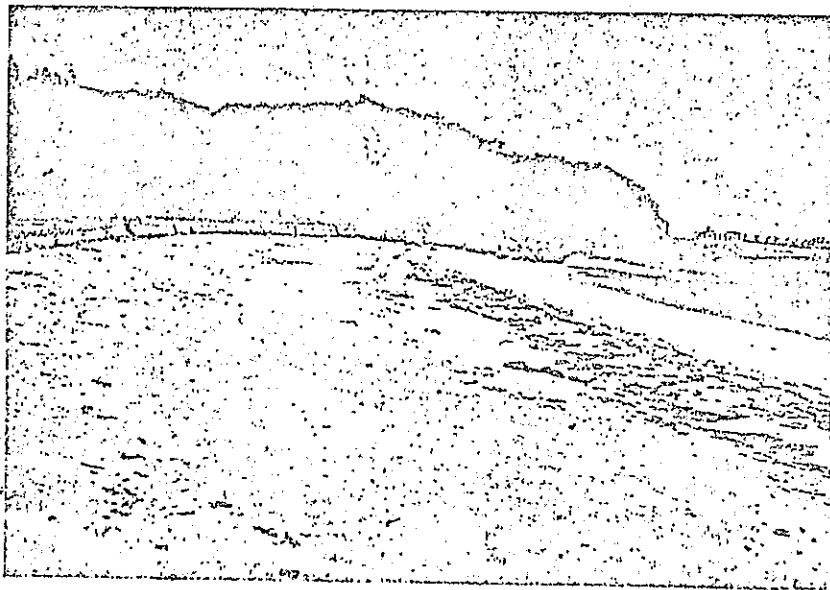
Young Hawksbill turtles (hatch of previous year) in brackish pool.

These yearlings are only 5"-6" long (very small for 12 months), but appear well-fleshed and active. The water is barely salty to the taste, and I doubt very much that the young turtles will do well at this low salinity. Warned Yonamine to watch them carefully and to return them to at least 50% sea water if they appeared listless, lost flesh, or lost their ability to dive below the surface.

Went on to inspect the beach immediately E. of the new sea wall being built to protect Ikema Harbor, where they reported three Hawksbill nests harvested during April, May and June of 1965. (See photos of this beach on the next page.)



Beach on S. side of Ikema Island where Hawksbill turtles are reported to nest (view westward toward Ikema town; crane used in building new sea wall is visible against skyline).



Same beach on S. Side of Ikema Island, looking eastward.

The sand is clean and suitable for nesting (it is of coral origin), but at a depth of 24"-36" I found much finer, darker, sand of terrestrial origin. I told them I did not think this beach could have been an important nesting site for very many years, in fact I doubted that it had even been much of a beach a few years ago; they confirmed that it was a new beach, formed largely from typhoon action since the new sea wall had been built across the mouth of the harbor. Under these circumstances, the beach may continue to build and may prove to be permanent; it may, therefore, receive increased nesting and offer good possibilities for management as a reserve where adult turtles are protected, but where eggs for hatching could be harvested to supply a rearing industry and simultaneously ensure return of a proportion of hatchlings to the wild population.

Mr. Yonamine buys hatchlings from this island (Ikema), and also has arrangements with fishermen on the islands of Tarama and Minna to buy hatchlings from them. The major portion of his supply comes from Tarama and Minna; he believes that (hearsay only) Tarama may have as many as 40 nests per season and Minna may have more than that. He knows of no other islands where really heavy nesting may occur, although he mentioned turtles brought in previous years from the Taiwanese island of Platas by seaweed collectors.

After inspection of Yonamine's operation and the beach, met Mr. Hideichi Katsuran, a partner of Mr. Kenu Oroku, who received a \$4,000 loan from R.D.L.C. for development of his turtle-stuffing business. He said they have 200 month-old hatchlings in a floating cage, located in the estuary above the second sea wall which forms the inland boundary of Mr. Yonamine's large pool for adult turtles (see photo on page 2). The cage was not inspected except from a distance; it appears to be approximately 4' x 8'; Oroku says it is in about 18" of water. He says he feeds two or three times a day, but claims that the young turtles do not eat so readily at mid-day (probably an erroneous belief on his part, carried over from his knowledge of the adult habit of resting during the brightest part of the day?) I am doubtful of the adequacy of this operation; I suggest that it is probably a half-hearted copy of Yonamine's much more vigorous and intelligent efforts. These latter people buy hatchlings from a fisherman at Nagama beach (Nagama-no-Soko), according to Katsuran (see diary for August 15).

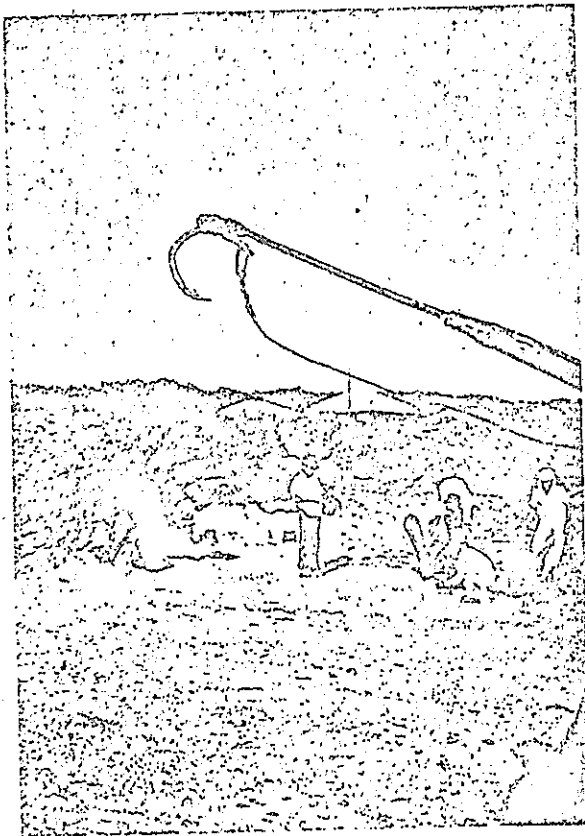
Yonamine says he stuffed about 700 turtles (both species included) last year; he estimates that he supplies about 70% of the Miyako trade. He says the fishermen catch about 20% Hawksbills, 80% Green Turtles. He says turtles are taken here from about April to about August (the closed season on Hawksbill runs through April, May, June). Yonamine has no idea where the turtles go in winter; he believes both species feed principally on seaweed (has opened thousands of stomachs). He says the Hawksbills caught here range around an average of 1.7 feet in carapace length, the Green Turtles averaging slightly larger. He claims few "Chicken Greens" (18" and smaller) are taken. This last observation will bear checking (see size of catch inspected, below).

Yonamine and the GRI Fisheries personnel report at least occasional nesting on four beaches on Ikema Island.

At 1730 hours returned to the Fisheries Station to await the return of a turtle-fisher's canoe. It was reported that four canoes regularly go out after turtle during the season (weather permitting), with 3-5 men per canoe. One canoe came in at about 1800 hours. They had one Hawksbill measuring 20 sun

along mid-dorsal curve of carapace\* and two small Greens measuring about 13 sun and 16 sun. The Hawksbill brought \$20 at \$1 per sun, while the Greens brought a flat price of \$5 each (see later account of Ishigaki price for Green Turtles for slaughter and for stuffing trade).

The head fisherman said this day (3 turtles) was a bad day; a "good" day might bring 7 or 8 turtles. They go out at about 0800 and return at about 1800 (estimated 8½ to 9 hours active fishing). He estimates from 80 to 100 turtles per boat per season, of which 20% to 30% are Hawksbills, the rest Greens. They fish by snagging turtles which are found resting quietly on the bottom. All the divers (using wooden goggles) carry 3-fathom bamboo poles with a ½" steel rod at the tip; the rod fits into a metal socket wired to back of the shank of a lg. ordinary fish-hook; from the eye of the hook a strong line runs back up the pole to the diver's hand.



Tip of pole used for snagging sea turtles, showing socketted hook in place on end of steel rod.

By holding the cord taut, the hook socket is held firmly on the steel tip of the pole; after snagging a turtle, the pole can be released to float to the surface for later recovery and the turtle can be played on the line (about 30 fathoms est. length). They say they find the turtles resting on the bottom in 12-15 fathoms of water during the bright part of the day (they have the concept of "nests" for resting on the bottom; it is easy to confuse this with actual nests when talking with the fishermen). The fisherman dives down and snags the hook deeply into the neck of the resting (they say "sleeping") turtle;

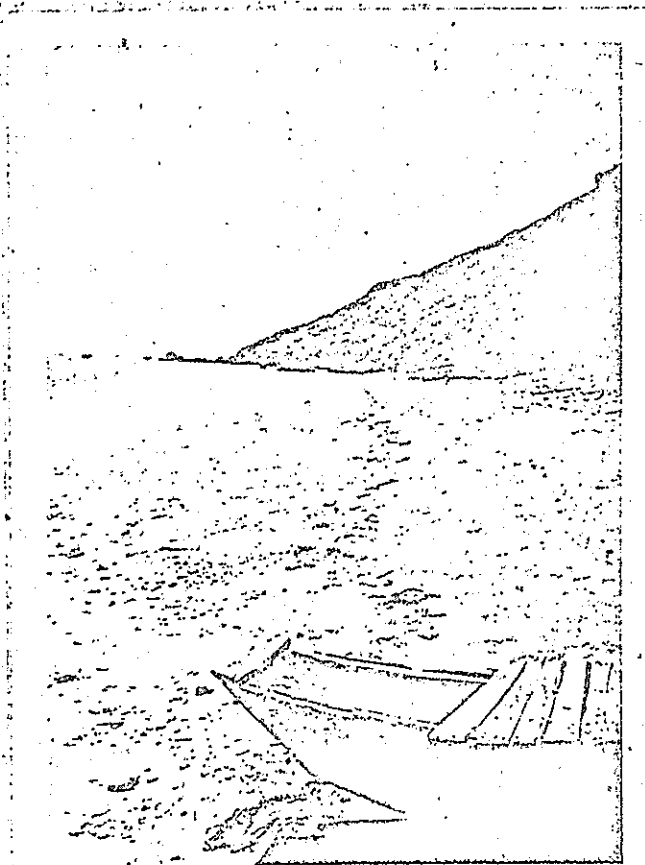


12 fathoms of water minus a 3 fathom pole means a dive 9 fathoms down. (It is probably important to avoid having the diver's shadow give warning to the turtle, but didn't ask about this).

The fishermen say the water is too cold for this sort of work during the period from November to March.

August 15, 1965

0800 hours drove to Nagama beach ("Nagama-no-Soko") on Miyako Island (refer to notes of 14th on Messrs. Katsuran and Oroku). Long drive and 1 mile walk to reach the beach (at the foot of a steep slope from main level of island). There is a wide reef here; most of the beach (est. 800-900 yards from end to end) is of coarse foraminiferan sand.



Nagama-no-Soko beach on E. coast of Miyako Island (view southward from about mid-point of the beach).

The people accompanying said they found 3 nests here this year, 7 nests last year. I counted 6 (possibly 7) signs of old nests on the high beach platform -- all would have been made this year. Assuming that at least some may have been false starts, I believe they missed only one or two nests at the most.

Returned to the Army compound for lunch, then drove to Bora beach, near the Loran Station. This is a small (400 yards?), high beach behind a fairly wide reef on a southerly exposure of the island near its eastern tip. It presumably receives heavier wave action than many other parts of the island. They are removing sand from the center of the beach and carrying it up to the main level of the island (200'?) at the Loran station. I am doubtful that much nesting occurs here.

August 16, 1965

0830 plane to Ishigaki-shima. After moving in at the Army compound, took jeep into town and visited turtle slaughter establishment:

(Mrs.) Shizu Kinjo  
Mimui-shoten  
36 Arakawa  
Ishigaki-shima  
Ryukyu Islands

Mrs. Kinjo handles Greens only (the others species are known to be poisonous from time to time). She buys only the large greens; the others sold to stuffing establishments. She says she killed about 100 adult greens last year, only about 30 so far this year; she is expecting the season to pick up from now on for a month or two.

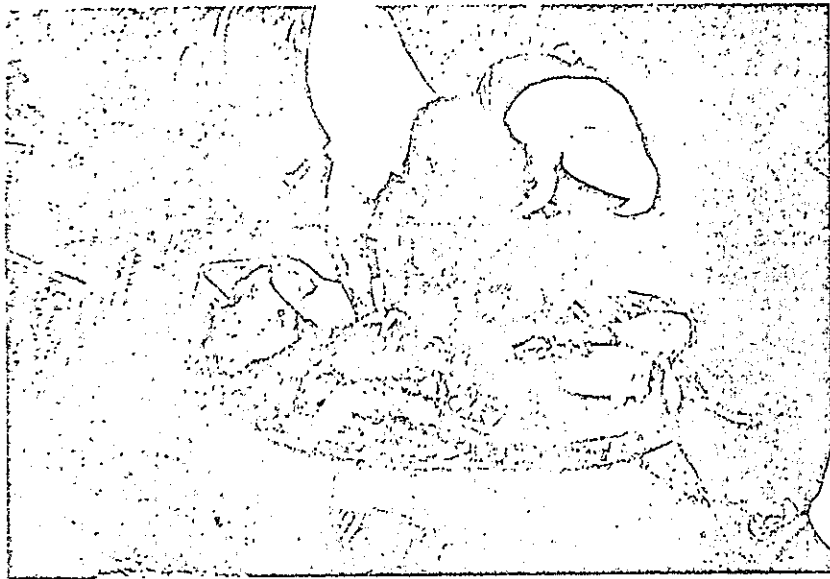
Seven adult greens (living) were on hand, three of which were adult males. The proprietor and a helper had already finished cutting up two turtles by the time we got there. They said they had cut up three on the 15th (3 plus 2 plus 7 equals 12 accounted for -- over 1/3 of the claimed total killed that year).

They buy the live turtles for 6¢ per "kin" equals 600 grams, approx. the same as 1 kati) and sell the red meat for 25¢ per "kin" (they estimate approximately 1/3 of the live weight is salable red flesh. They give away the green fat free and throw the shells away (I looked over the sea wall fronting the establishment and saw two carapaces and two plastra, presumably relating to the two turtles slaughtered earlier that day ... I saw some other bone fragments which appeared to be from previous days, but no other signs of carapaces or plastra -- what happens to the others at high tide if they are all thrown there? (Efficiently disposed of by crabs, etc.?) They also skin out the front and hind skin areas, including head, tail, and flippers, salt these, and sell them at \$3 each to the tanning industries in Naha (N.B. -- \$3 for front skin plus back skin from one turtle). The leather is made into wallets, etc.

Mrs. Kinjo says they get more females than males. None of the females killed so far this season have contained eggs; she expects to begin finding eggs about now. She offered to slaughter the biggest live female on hand that afternoon -- says she thinks it will contain eggs.

Returned to the Army compound for lunch and then back to Mrs. Kinjo's at about 1:30. They proceeded to slaughter the very large female mentioned earlier. They roped up the flippers, then proceeded to cut away the plastron of the living turtle as it lay on its back; death occurs through blood loss as they work. The blood was dipped out of the body cavity with a bowl after the ventricle was slit open; they poured the blood into a bucket rather than down a nearby drain, and they report that the blood can be used for food, but they say they don't use it.

The large female (est. 4' length along curve of carapace) contained 138 shelled, mature eggs in its oviducts and had 546 enlarged ova (yolk only) of several size classes (the smallest were over 1/2" in diameter). The total complement of 684 was equivalent to 5 or 6 clutches; I believe that this female could well have contained her total season's complement of eggs, not having nested yet this season.



Mrs. Kinjo and assistant butchering a large female green turtle. In the photo, the women are gathering the eggs from the body cavity and the oviducts.

Following observation of the slaughtering, we went to a turtle-stuffing establishment (family of Uema). The son was not there; his mother showed us the 8 immature Greens on hand alive and the stock of stuffed turtles, but could not do much more by way of information.

We then went to a 2nd turtle-stuffing establishment (family of Tamaki). This is presumably the most active establishment on this island. They had many stuffed turtles on hand. Tamaki buys Hawksbills at \$1.00 per sun (3.03 cm.), sells at \$1.80 per sun (measurement taken along the mid-dorsal curve of the carapace). He buys Greens at \$4 each, regardless of size; sells stuffed Greens under 24" at \$8, over 24" at \$13.

From information obtained, I assume that about 40 kg. live weight is a critical commercial size for green turtles. At 40 kg. (about 66 kin), a Green turtle would bring \$3.96 from Mrs. Kinjo for meat, or \$4.00 from Mr. Tamaki for stuffing. At greater weight, Mrs. Kinjo would pay more; at lesser weight Mr. Tamaki would still pay \$4.00.

So far this year Tamaki has processed between 200 and 300 turtles, of which between 70 and 80 were Hawksbills. He estimated that he processed about 1,000 turtles last year. He says he has had three turtles with Chinese characters carved on them (inference is that they are of Taiwan origin).

At 2100 hours, returned to Mrs. Kinjo's slaughter house in an attempt to meet a fishing canoe which she expected to come in at that time. The canoe had not come in by 2300, but we talked with her brother (in-law?) and another man who was also a turtle fisher. They know of 4 canoes (2 to 3 men per canoe) engaged in full-time turtle fishing out of Ishigaki. They catch mostly Greens, more females than males. Again they estimate an average daily catch of 7 to 8 turtles, but say that only 2 or 3 of these are commonly mature Greens. (Ref. Aug. 14 notes on interview with Yonamine; I suspect this information on size is more accurate than his.) The catching method is similar to that used in Ikema-shima. These men knew little or nothing of nestling; only one of the two had ever seen a turtle on the beach. They believe that Iriomote and northern Ishigaki have beaches where nesting occurs.

When asked where they think their turtles come from (are hatched), they had no clear idea at all, but thought it must be "far off" somewhere. They recalled that they used to sail 4 hours to a fishing ground (S. or SSE, apparently) where they used to see and accidentally catch 5"-6" young turtles.

They believe there is also nesting on Yokumura and Yoshikuni on Kuroshima Island.

August 17, 1965

At 0820 hours left the Army compound in an LST; arrived at Kuroshima Island at 0930. (at high tide, the LST can cross the extensive reefs and reach Kuroshima in about 70 min.; at other times, the trip takes at least 2 hours).

To Hori Village, to talk with the headman, Mr. Hori, at his home (the village is named after his father). He reported about 10 nests per year on the beach between Hori village and Myasato village. He says the rest of the coast is rocky, with no good nesting beaches. He says they find mostly Greens nesting there, with Hawksbills rare. They harvest every nest they find, and don't think any escape them.

He estimates that about 1/3 of the large turtles caught are killed and eaten on the island, the other 2/3 are sold to Mrs. Kinjo on Ishigaki. All the small turtles caught are sold to the stuffers. (N.B. He says they sell mainly to Mr. Yamashiro, of Tonoshiro on Ishigaki... this would be a third turtle-stuffer on Ishigaki).

I could not get an estimate of the annual catch by Kuroshima fishermen... Mr. Hori does not himself fish for turtle; the principal fisher lives on another part of the island and is gone just now. His name is Yoshikuni Kinjo; he lives in the Iko village on Kuroshima.

Returned to Ishigaki Pier at about 1600, with typhoon winds increasing rapidly.

August 18, 1965

Day spent confined in Army compound, with typhoon blowing strongly. Return to Naha cancelled.

August 19, 1965

Drove to Ugan-zaki point (W. Ishigaki, N. side of Nagura Bay) and walked about 1 mile from road's end to small bay on N. side of the point where Mr. and Mrs. Gabin Takaesu, 100 Arakawa, Ishigaki-shi, Yaeyama, operate a sea snake industry. (Laticauda semifasciata - no other species used). The small, semicircular bay with a fine sand beach at the back indents the coast in an area of raised coral limestone. An alluvial slope leads down to the beach, and both ends of the bay are bounded by sheer limestone cliffs extending down to sea level. The bay faces out to the open water of the East China Sea. A short distance back from the beach Mr. Takaesu has a hut where he lives while collecting and preparing snakes. The snakes are smoked in a small limestone cave about 100 feet away from the hut. Mrs. Takaesu maintains their house and place of business in Ishigaki town.

Although some snakes were being smoked at the time of our visit, we saw none alive and much of what follows is as reported to us by Mr. Takaesu through an interpreter.

Mating apparently begins in March. At this time, the male Laticauda semi-fasciata come ashore first, followed by the females about 2 weeks later. Mating takes place at night on the exposed rocky shore, and the snakes form tangled masses with many males congregating around one female. These mating aggregations could be easily collected, but the fishermen claim to deliberately avoid taking them at this time (a conscious management procedure, protecting the resource until after the eggs have been laid and re-seeding of the population has been ensured).

According to Mr. Takaesu, about one month after mating the snakes begin to return to shore for egg-laying. This season lasts from about April to October. According to the report, all the snakes nest in caverns in the eastern limestone wall of the bay, accessible only through two small holes about 3 inches in diameter, located at about intertidal level. Apparently, incoming snakes enter the bay and the caverns during the daylight hours, and spent, outgoing snakes leave during the hours of darkness. During this season the 4 or 5 fishermen involved in the operation set a gill net (about  $\frac{1}{2}$ " mesh) around the entrances (across the mouth of the small bay??) in the evening and take it up each morning, capturing spent individuals but not gravid ones. (Details of this will bear further examining and double-checking). One gathers that the snakes actually become caught in the mesh of the net, rather than remaining free-swimming, encompassed within its span. Hatching snakes are reported to begin appearing in November.

Our informant assured us that the snakes are taken from the net with no regard whatever for the possibility of being bitten. He said that the snakes are not at all prone to bite (this conforms with reports of Laticauda in other parts of Asia), and that bites are not common although they do occur from time to time. Surprisingly, he said that the bite was not serious and he denied that the snakes were poisonous. When pressed for details of possible consequences of bites, he mentioned skin irritation, fever, vomiting, etc. -- more suggestive of symptoms of secondary (or unrelated) infection than of snake bite poisoning. When it was suggested that he might have developed a natural immunity, he countered with the claim that his helpers changed from time to time and that many cases of first-ever bites showed no more alarming symptoms than he had described, and only occasionally produced even those symptoms.

During the season, fishing is carried on every night when the weather is favorable. From 70 to 120 snakes are caught by the 4 or 5 fishermen each night. The snakes are killed by flicking their heads against a rock and are thrown into a vat of boiling water for a few minutes to loosen the outer, cornified skin. They are then taken out of the vat and vigorously kneaded and stripped from head toward tail, removing the loosened outer skin and expressing the contents of the digestive tract out through the anus. Mr. Takaesu says the stomach contents are mostly polychaete worms; he believes that the snakes feed on the sea bottom in up to 100 fathoms of water (inferred from fishing experience where these worms come to bait on the bottom in such depths).

The stripped, evacuated carcass is placed back in the boiling water for about 30 minutes. No cuts of any sort have been made; in addition to sterilizing the internal regions, this second cooking bloats the body cavities with vapor

under pressure and fixes the soft tissues in the bloated state. The snake is then taken from the boiling vat and arranged in the desired form for smoke-curing (coiled, if to be shipped; straight, if for local consumption). The carcasses are placed on wooden racks about 18"-24" above slow, smouldering fires in a small cave with a low ceiling and are maintained at a fairly high temperature for about four days. After the first day or so, the carcasses are sufficiently hardened to allow them to be loosely stacked on top of each other to conserve rack space. After about four days treatment on the site, the carcasses are sufficiently firm and dry to allow transport to the establishment in town, where they are smoked in the same manner for a further seven days or so. When fully smoked, the carcasses are hard and coal black in color, with an oily texture and a not-unpleasant odor of smoked fish. The sustained heat has caused the fat to diffuse generally through all the tissues, presumably with a preservative effect. Males are readily distinguishable from females, not only on the basis of their generally smaller size but also because the hemipenes are at least partially everted. Mrs. Takaesu reports that male specimens are preferred over females in the market.

Smoked sea snake is, we were informed, most commonly eaten in soup form. To prepare soup, the smoked snake is chopped into two-inch lengths and cooked until the flesh begins to fall away from the bones. All the bones are then picked out by hand and the remaining material is prepared as a rich, stimulating broth, seasoned to taste.

The described merits of sea snake soup are various. According to our informant, it is thought by some to be good for asthma and it is generally recommended for rheumatism, but it is most widely known (and used) as a broad-spectrum, general libido-builder and aphrodisiac for men who find their prowess diminishing with age or exhaustion. With a sparkle in her eye and fluent sign language, the source of this recipe extolled its virtues with enthusiasm. The writer is not an economist and hesitates to predict the success of this product in the Western market, but feels that a recommendation such as we received would probably gain some attention on Madison Avenue.

According to the Takaesu's, the smoked weight is about one-fifth of the live weight. Individual snakes weigh from  $\frac{1}{2}$  to 1 "kin" (300 to 600 grams) when smoked and have a retail price of \$1.20 per "kin". The Takaesu's apparently are the sole producers of smoked sea snake on the island of Ishigaki; they say (according to my notes) that they produce about 2,000 "kin" of product a year. The weight figures per smoked snake are appropriate; either we misunderstood their figure for annual production by weight, or there is something inconsistent about their figures -- a catch of from 70 to 120 snakes each night for seven months would produce from 14,000 to 25,000 animals. If a decimal place is moved, making it 20,000 "kin" of product per year, one would have a 5-figure estimate of the annual harvest of snakes which would more closely correspond with the daily catch figures quoted. Even assuming that a daily catch of 70-120 per day is a figure for the peak season only and projecting a normal curve with daily catches of as low as 20, one obtains an estimate of over 10,000 snakes taken per season.

August 20, 1965

Return from Ishigaki to Naha. Completion of business in USAMRU offices and attempts to arrange bookings to Japan and Hawaii.

August 21, 1965

Recipe for Smoked Sea Snake Soup, as prepared by  
Mrs. Gabin Takaeu of Ichigaki Island, South Ryukyus\*

Take a fat, mature specimen of Laticauda semifasciata which has been taken at the beginning of the breeding season. Boil the freshly killed snake for a few minutes to loosen the outer, scurfed skin so this can be removed. Express the contents of the digestive tract out through the anus by vigorous kneading and stripping from the head toward the tail. (No cuts of any sort should be made in the carcass.) Return the snake to the boiling water for about thirty minutes; in addition to sterilizing all internal regions, this bleats the body cavities with vapor under pressure and heat-fixes the soft tissues in the bleated state.

After the second cooking, the snake is arranged in the desired form for smoking (coiled, if to be shipped; straight, if for local consumption) and is cured for about seven days over a fire which is maintained low enough to avoid charring the wooden rack on which the snake rests. When finally cured, the snake should be hard, black, and thoroughly permeated with its own body fat. If properly prepared, it will keep indefinitely in a cool, ventilated place.

To prepare soup, chop the smoked snake into two-inch lengths and cook until the flesh begins to fall away from the bones. Pick out all the bones and prepare the remaining material as a rich, stimulating broth, seasoned to taste.

The described merits of sea snake soup are various. It is thought by some to be good for asthma and it is generally recommended for rheumatism, but it is most widely known (and used) as a broad-spectrum, general libido-builder and aphrodisiac for men who find their prowess diminishing with age or exhaustion. With a sparkle in her eye and fluent sign language, the source of this recipe extolls its virtues and gives a warrantee . . . five or six fingers enthusiastically held up for counting.

. . . Further supplies of this rare material are available when you run out . . .