

TWO SIDES TO THE TURTLE QUESTION

On May 30 of this year Hawaii adopted a rule to save the green sea turtle by banning all sales of turtle products...with one little exception. From that little exception, two men have started selling frozen green turtle steaks to restaurants throughout Hawaii. A memo from the Attorney General's office says they are acting in a perfectly legal way.

Their legal standing aside, conservationists and scientists have started complaining that the two men are circumventing the intention of the new turtle regulation in Hawaii. They say green sea turtle will wind up in as much, and probably more, danger than it was before the regulation was adopted. The importers counter by saying they are actually helping to save the turtle, not hasten its extinction.

The legal hassle in Hawaii may or may not be repeated elsewhere. Meantime, the company that is providing the turtles to the Hawaiian importers is Mariculture, Ltd., a predominately British-staffed firm, on Grand Cayman Island in the Bahamas. Mariculture, Ltd., founded in 1968, has recently achieved a major goal: raising green turtle from egg to marketable meat. This unprecedented step makes the men of Mariculture pioneers twice over, for not only have they ventured far into the field of aquaculture but they also have introduced into the fray a species of marine life never before dealt with aquaculturally.

Green sea turtles by the tens of thousands are being raised on the small Caribbean island, only a one hour trip by jet from Miami. The company has developed a turtle farm on 6 1/2 acres of land at Goat Rock. The present farm has a total stock of more than 100,000 turtles on feed, ranging from hatchlings to three year olds, being raised in salt water tanks. The main feature of the farm is the million gallon breeding pond with a nesting beach. There, turtles began laying eggs this year for the first time in captivity. More than 11,000 eggs were laid.

Mariculture, Ltd., processes the turtles when they reach a weight of approximately 100 pounds. That takes three years. A 100 pound turtle normally yields about 31 pounds of steak and other meat, 11 pounds of fat and oil, 15 pounds of offal, 16 pounds of shell and 8 pounds waste. Besides being nutritious, turtle steak is quite tender and resembles veal in flavor. Flesh of turtles raised in captivity is more tender than flesh of wild turtles.

Wild turtles no longer exist in the Cayman Islands and Mariculture's farm is said to hold more adult turtles than the rest of the Caribbean combined. The 100,000 strong herd at Goat Rock has been built up by the Mariculture egg collecting teams. They, with the agreement of the local government, have gathered up an abundance of eggs on the beaches of such places as Costa Rica and Ascension Island in the South Atlantic. The major portion of eggs laid on those beaches in the wild are doomed because they are laid in volcanic sand or on eroding beach. To conserve the natural population of green sea turtles, a percentage of the hatchlings are released on the beaches where the eggs were collected. In that manner the numbers of wild turtles can be maintained and even increased, according to Mariculture, Ltd. In addition, research is being conducted on mating and egg production of mature turtles at Mariculture's farm. Mating, nesting and egg production have been successful in captivity and problems in fertility are being investigated.

The eggs are flown to Grand Cayman in Styrofoam boxes and are sandwiched between sand and Dacron. They are stacked on metal racks in the company's hatchery. Mariculture then begins its long involved task of keeping records, dating each chest with markings on when and where the eggs were collected. Styrofoam boxes serve as incubators.

Meanwhile, back in Hawaii, George Balazs, turtle scientist at the Hawaii Institute of Marine Biology, disagrees with Mariculture's claims regarding their saving the creature by raising it domestically. There are problems with these claims according to Balazs. Most of the argument centers around whether or not Mariculture Ltd., can breed the turtles in captivity on the scale necessary for commercial operations (reportedly Mariculture, Ltd., represents a \$3-million investment at this time). No conclusions will be reached herein except to report that you needn't bother ordering turtle soup when you're in Hawaii.

☆ **Investment Opportunity:** We are aware of several excellent aquaculture investment opportunities. If you as an individual or institution are looking for an entry into this field, we would be happy to put you in touch with the principals.

☆ **Salmon & Trout Farming in Norway:** The Norwegian Fisheries Department states that breeding in Norway in 1971 produced 104 tons of salmon and 445 tons of trout. In 1972, breeding in enclosures produced 155 tons salmon and 460 tons trout, and last year the yield increased to 269 tons of salmon and 1,265 tons of trout. Production has developed to such a level that a law was adopted in Norway last year, issuing concessions to fish farmers. Production takes place in enclosures in the fjords from the coast. In each enclosure it is possible to produce 100 to 200 tons of salmon and trout a year.

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ABALONE FARMING: CALIFORNIA MARINE ASSOCIATES

CALIFORNIA MARINE ASSOCIATES (P.O. Box 136, Cayucos, Ca. 93430) began operation in 1968. The principals include David Leighton, John Perkins and Hugh Staton. Leighton is a Ph.D. and formerly was associated with the National Marine Fisheries Service. Perkins and Staton have business backgrounds. The trio formed their partnership in '68 and subsequently brought in 20 investing individuals as limited partners.

Since so little was known regarding culture of California abalones at the time of their start, the trio essentially had to develop technology and a hatchery-seawater system simultaneously. Not until 1970 was California Marine producing significant numbers of juvenile abalone.

Innovations in tank design and in several other areas have allowed improvement of culture environments and although survival of post-larvae has been a continuing problem area, they now can boast a success rate of five percent (i.e., the number of three-month old juveniles succeeding from a given starting number of healthy veliger larvae). Research has occupied nearly half the partners time. Presently they are able to produce approximately 100,000 juveniles per year and anticipate crops of about 1,000,000 within three years. Growth rate has been one inch (shell length) per year, but with completion of special concrete raceway tanks (in their expansion program) they expect to approach a doubling of that rate.

Sales have been largely of "seed" abalone for introduction to areas in Japan, Mexico and the California coast (California Department of Fish and Game purchased 2,000 of their second field plant off Palos Verdes this last June; a follow-up to a very successful plant off central California last year). Others have gone to research and private aquaculture programs in this country.

Future markets for California Marine abalone will include as well the fresh or live gourmet shellfish markets in the Orient and eventually the local restaurant trade. In the latter case abalone will be reared to a size of about 5 or 6 inches, large enough for two steaks each. A price of \$1.00 each to Cal Marine is anticipated.

Cal Marine is one of a hand-full of abalone growers, mostly found in the Monterey region of California (see May, 1974 issue Abalone Farming). They are the pioneers. And they are also tough to contact. They don't have any phones at the Farm.

WORLD MARICULTURE SOCIETY MEETS IN SEATTLE JANUARY 27

The 6th annual meeting of the World Mariculture Society will convene in Seattle, Washington, from January 27 through 31, with registration beginning on Monday, the 27th, at 10 a.m. Keynote address for the meeting will be delivered at 9 a.m. on Tuesday, the 28th, by Dr. Peter Korringa, noted mariculture expert and Director of the Netherlands Institute for Fishery Investigations. Dr. Korringa is well known for research in aquaculture and fishery biology and is the author of a recent book *Farming the Sea*. His topic will be: "From Fishing to Farming the Sea." Papers on fish, crabs, mollusks, shrimp, lobsters, freshwater prawns, turtles, mariculture engineering, and other topics will be given during the meetings. Registration fee is \$25 per person. Contact Harvey L. Moon, National Marine Fisheries Service, 1700 Westlake Avenue North, Seattle, Wa. 98109. Make checks payable to World Mariculture Society.

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