

MARICULTURE, LTD. - CAYMAN ISLANDS

1 of 2 GBALAZS



WILSON & JONES

ST. JOHN'S, CAYMAN ISLANDS



RICHARDSON SECURITIES OF CANADA

SENIOR PARTNER: GEORGE T. RICHARDSON

WEST WIND BUILDING, N. CHURCH & FORT ST., GRAND CAYMAN, B.W.I. TEL: 9-4066 TELEX CP241

P.O. BOX ~~675~~X 1095

4th November, 1974.

Mr. John Wheeler,
3180 Pacific Heights,
Honolulu,
Hawaii, 96813,
U.S.A.

Dear Mr. Wheeler,

Your enquiry to Mariculture Ltd. has been passed on to us for reply.

The current price for Mariculture shares is \$6.25 net US per share. In other words if you wish to purchase 100 shares kindly send us a draft in the amount of US\$625.00 along with the registration instructions and we will have a certificate registered in your name in about three weeks time.

We are out of the last annual report on this company, but take pleasure in enclosing a write up from last week's local paper regarding the company, plus an information booklet from The Northwester magazine.

Yours sincerely,

A. GEORGE COLWILL
Resident Manager

AGC/JAB
Encs/

GERMAN FIRM BOOSTS MARICULTURE

A large commitment by a German firm has bolstered the financial outlook at Mariculture, it was learned yesterday.

After several inquiries, Mariculture's Managing Director Mike Goodier finally confirmed that the firm, Lacroix, owned by IT&T, has committed itself to buy all of Mariculture's edible products through 1975. "This could mean over a million dollars to us," said Mr. Goodier. "It is our largest single forward-buying ever and is a tremendous help to the farm. Mariculture is the World's only live green sea turtle farm.

"TREMENDOUS BOOST"

As a result of the failure of Interbank, Mariculture was strained financially. "But this will give us a tremendous boost," said Mr. Goodier in a telephone conversation yesterday, "and with it comes other benefits."

Lacroix is one of Europe's largest canning factories which mainly cans turtle soup. Negotiations are also underway about the future of the non-edible products which will still probably be shipped to New York, Japan, and other places besides Germany.

FINALISED IN TWO WEEKS

The complete deal has not been finalised as yet but "things should be completed in about two weeks," Mr. Goodier noted.

Lacroix has also indicated their desire to purchase stocks available after the end of 1975.

TRAVEL July 1976

Grand Cayman is not an Unspoiled Tropic Paradise sitting naively in the blue Caribbean one hour's flight south of Miami like some dormant beauty awaiting the kiss of tourism that will awaken it from a centuries-old economic and cultural sleep. Praise be! For UTPs, after all, are fragile things. Face to face with the Twentieth Century, the twentieth-century tourist, they often dissolve—beauty into litter, innocence into resentment, hard-to-get-ticket into empty hotels. The pattern is too familiar in the Caribbean. Gambling casinos sit where once bright empty beaches lured and the same people who once came back raving about how *friendly* the people were now insist on double locks and security guards.

By WALTER WETHERELL

LIBRARY OF
GEORGE H. BALAZS

The strength of the Cayman Islands (comprised of three islands, the biggest of which and by far the most important to visitors is Grand Cayman) — and the reason I'm optimistic about its future—is that it has already made its adjustment to the Twentieth Century and it seems to be both a happy and mature one. The standard of living is one of the highest in the Caribbean; the residents do not pay taxes (albeit about a fifteen to twenty percent duty on all imports); George Town, the capital, is home to incredible number

Grand



from the first permanent English settlement at Jamestown via the smooth, scenic, modern Colonial Parkway, sits historic Yorktown. This small Virginia town, so close in miles to our nation's birthplace, still bears witness to the raging battles that won America's independence after years of terribly discouraging encounters with their British opponents.

A portion of Yorktown has been restored to its Revolutionary war-time condition by the federal government. A visitor's center, museum, interpretation center and ship exhibit are maintained to aid each visitor in reliving the days of our country's victorious battle for independence.

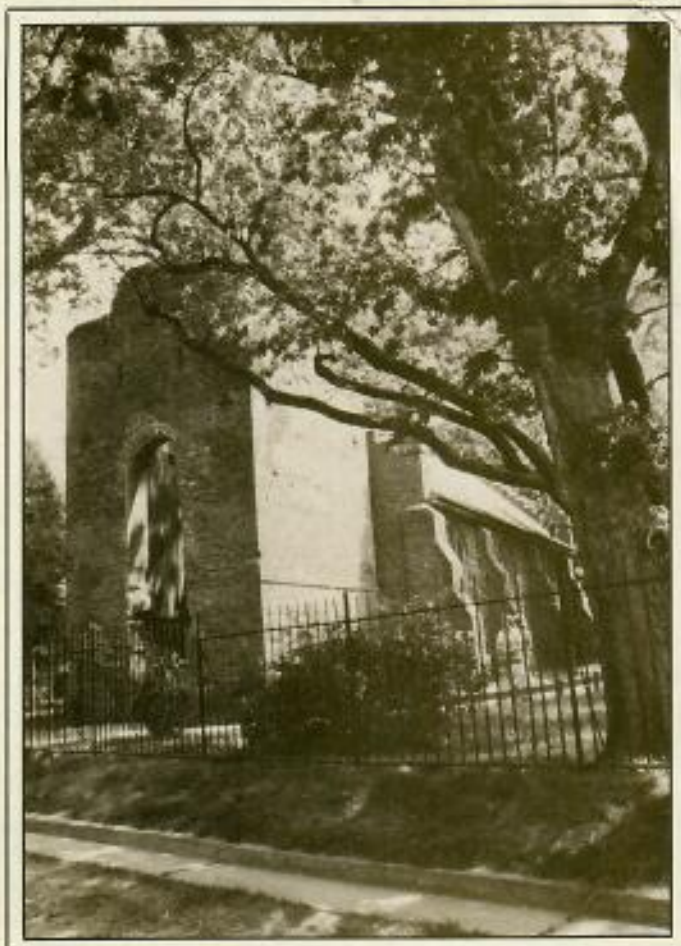
Many old Colonial buildings survive in the now quiet streets of old Yorktown. Among them are Grace Episcopal Church, established in 1697, the old

The Raleigh Tavern was popular Williamsburg rendezvous.

Customhouse and the Nelson house.

In the convenient comfort of your car, you can follow a self-guided tour to view Washington's headquarters, walk the swelling green flower-dotted hills that once rang with the dreadful sounds of war. Mounds of earth rimmed with spikes to shield the cannon and soldiers, now stand quiet and still, but the cold steel of the cannon and the wicked looking spikes unceasingly shout to us of the struggle that took place here and perpetually echo the cries of the men who manned those weapons. The flame and smoke of the raging battles still live in the imagination, though most of the scars of the bloody encounters are healed and invisible to the casual eye.

The auto tour carries on to the Moore house, where on October 18th, 1781, the Articles of Capitulation were drafted. The lovely old house sits on the outskirts of town, surrounded by fields



The Old Church tower is Jamestown's oldest remnant.

aglow with flowers. How taut the nerves of the soldiers of both sides must have been on that fall day as they waited for news from their commanders.

On the tour goes to Surrender Field. It too is now a peaceful place, covered with nature's carpet of grass and blossoms. Let the mind wander back through the years to that sunny October afternoon. For all practical purposes, the war ended that day.

Yorktown did not recover as a busy, growing city after the war. It remains a small quiet town, a reminder of that victorious day in 1781.

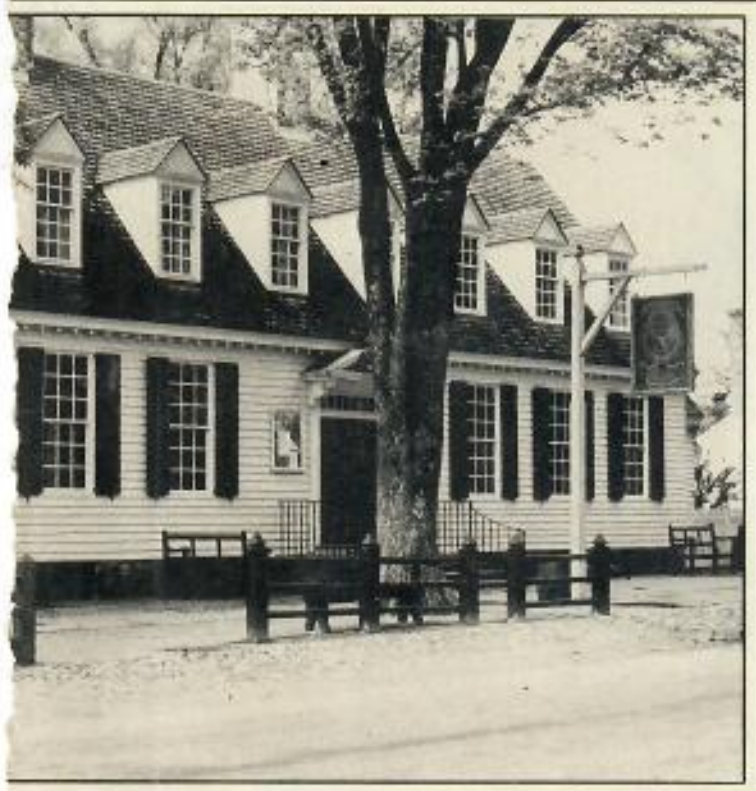
How appropriate it is that America's dream of freedom became a reality just a few short miles from the spot where her first English settle-

ment took hold, and so near the place the first Colonial Resolutions for Independence were drawn up. Virginia is indeed the fitting home of America's childhood.—END

Jamestown

The entrance station is open mid-June to Labor Day 8:00 a.m. to 5:00 p.m.; rest of year to 4:30 p.m. The attractions on Jamestown Island are open until dark. Admission is \$1.25 per car. I-64 east from Richmond, or northwest from Norfolk, will lead you to The Colonial Parkway which carries you through the stages of our nation's childhood. Virginia state highway 31 from the south will enable you to enjoy a ferry ride across the James River on your way to the parkway.

continued on page 72



of huge banks and multi-national companies (tax shelter, mon, tax shelter); there are more telex machines per capita than anywhere else in the world; the people ride Fords and Chevys, not bicycles, shop in supermarkets, not local street-side stands, and are much more apt to buy you a drink than pester you with souvenirs. Combine this with the fact that the population is color-blind and classless, that the democracy is a popular one, and that people are still sincere when they raise the first toast to the Queen (although there is a little hurt resentment over the fact she has never visited the island), and you end up with a place that seems very much at home in the present.

Increased tourism 1976-style, then, comes to the Cayman Islands not as a panacea for a variety of economic and social ills, but as a reasonable, fairly well-thought-out addition to an already flourishing society. Thus, the potential impact of dollar-spending tourists—with all the potential for dislocation they inevitably bring — is considerably lessened. Then, too, Grand Cayman sits on the western edge of the Caribbean, — a

Cayman

The skin-diving in Grand Cayman's crystal-clear water is Caribbean's best.

Cayman Islands Department of Tourism photo



George Town harbour has seen some strange craft tie up, but none so romantic as this old sailing ship.

vantage point that allows it to learn from the mistakes of its neighbors to the east. Last winter I spent a morning talking to Eric Bergstrom, the personable Director of Tourism (an expatriate American who is now an English citizen and a valued member of the island's rugby side). In the course of our conversation he pointed half-wistfully to a sheaf of papers on his desk—the blueprint for the next fifteen years of Cayman tourism.

"Everyone on the island has a right to question any part of this plan," he said. "And they do!"

One of the things we discussed was a pending application to build a hotel out on the relatively undeveloped East End. Next day, driving past the site, I saw the Minister of Tourism there on his hands and knees with a tape measure . . . the Caymans are going into tourism with their eyes open.

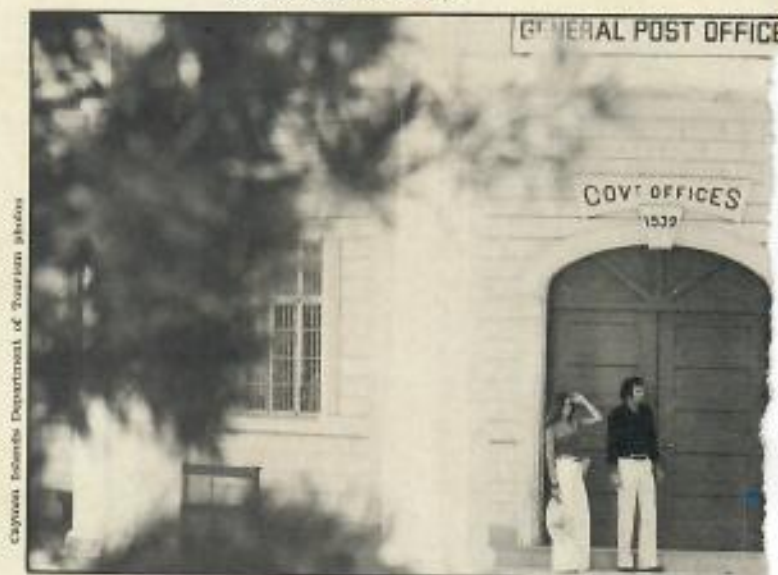
The powers-that-be are not only trying to place reasonable limits on the growth of tourism, but on the variety of tourist that comes there, as well. Everybody connected with travel on the island is quick to remind you that the Caymans are not for everyone. A list of who they definitely are not for would have to include: the gambler, the nightlifer, the golfer, the man in search of unspoiled virgin beauty (though Little Cayman and Cayman Brac remain pristine), TV addicts, mountaineers (Grand Cayman is unrelievedly flat), those on strict budgets, souvenir hunters (few local artifacts or crafts are available), lovers of the exotic (the prevailing architectures and atmospheres are much more suburban than exotic), people who need social directors, people who are easily bored on small islands.

That leaves the fisherman, the beachcomber, the bird watcher, the snorkler and skindiver, the sunbather, and—above all—the man or woman who just wants to relax. Grand Cayman is a paradise for them all. The fishing is excellent—particularly the wahoo fishing in winter, or the bonefishing at Little Cayman and Cayman Brac; the beach—and *THE* beach on Grand Cayman is lovely Seven Mile or West Bay Beach, miles of perfect crescent-shaped sand and gentle turquoise waves—is ideal for strolling along, day or night; the snorkling and skin diving perhaps the very best in the Caribbean; the tan guaranteed and the relaxing . . . Well, the relaxing comes very, very easy in the Caymans.

Currently, the hotels on the island fall into five general categories: the diving lodge, the condominium/hotel, the smaller hotels (Beach Club, Royal Palms, etc.), the apartment/guest house/villa group, and the Holiday Inn. The first, like Ron and Nancy Sefton's lovely Spanish Bay Reef Club up on the northwest tip of Grand Cayman, cater primarily to experienced divers, with a variety of plans which include diving trips, night dives, rental equipment, the use of a guide, courses in underwater photography, etc. (Though scuba-diving lessons are available on the island it is recommended that you learn before you come in an approved course near your home.)

Another club that has its beginnings as a diving resort, but now caters to wider interests as well, with honeymoon and "lovers" packages, is the comfortable Tortuga

George Town, the capital, reflects a British-West Indian blend. The post office is a good spot to find some of the famous Cayman stamps.



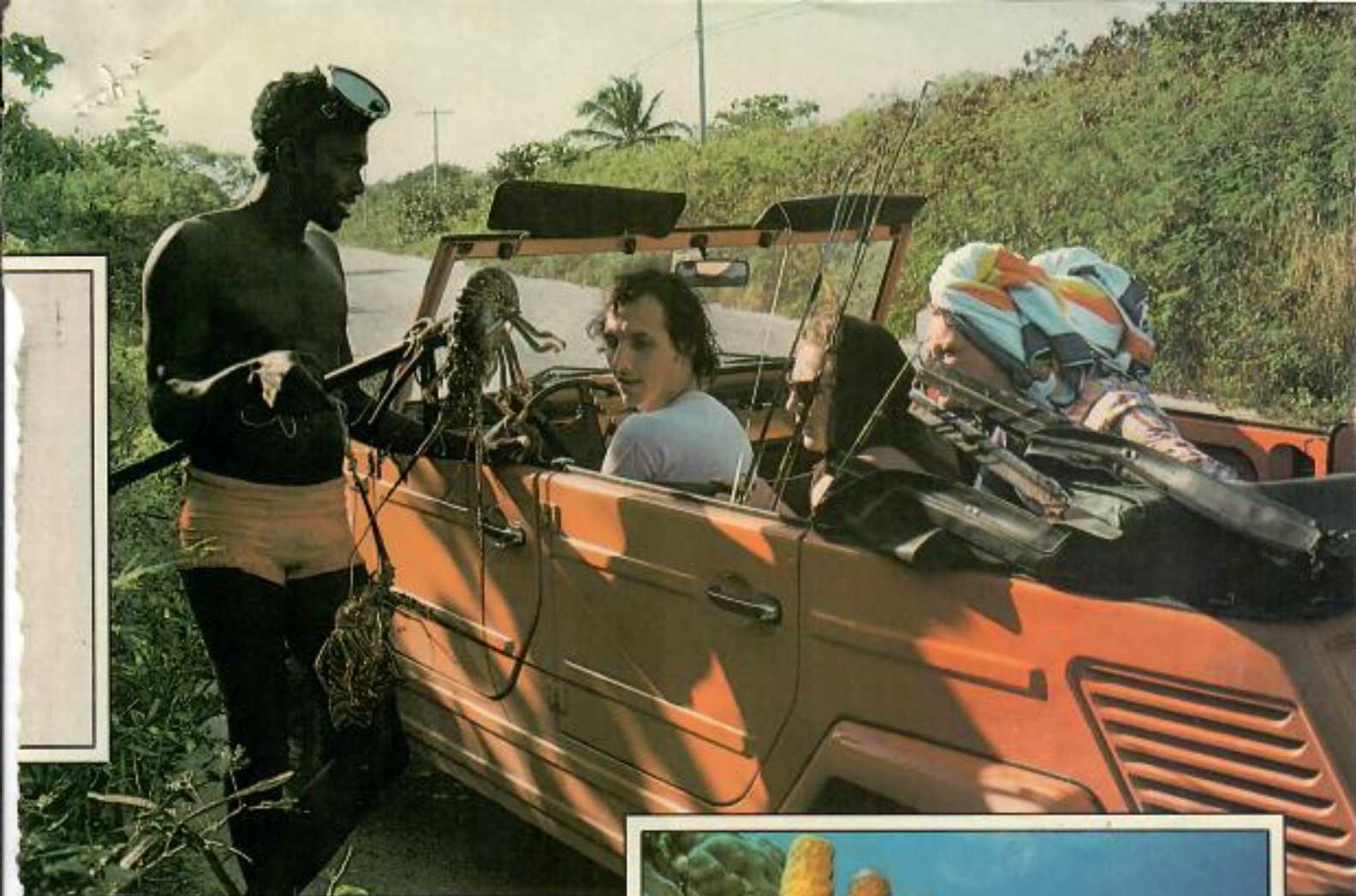
Club, out on the East End away from West Bay's "madding crowds." Like many of the hostleries on the island, guests staying at other hotels are welcome for lunch, for a swim, etc.

The second category is the condominium/hotel, typified by places like the plush Caribbean Club, the luxurious Victoria House, or the equally luxurious Cayman Kai. These are complexes of condominium villas, rented to guests when their owners are not in occupancy. Many of these offer the option of eating in your own villa or dining in the dining room—often the option depends on the season. European Plan and doing your own cooking is not necessarily less expensive, though. Food prices at the supermarket are very, very high on Grand Cayman.

The last category is the Holiday Inn. This particular one has 183 rooms in Holiday Inn style on Seven Mile Beach and is fairly unobtrusive as modern hotels go. It's probably the most predictably comfortable place to stay on the island if you're not in the mood to try something different.

Rates at none of these are cheap, though summer brings sharp discounts. Grand Cayman currently does not have the kind of visitor room capacity to attract many package tour wholesalers or a low cost charter business (and is not likely to in the future). When tourism people on the island speak of limiting the type of visitor that comes to the island they are speaking primarily in terms of pocketbook size. But off-season rates (mid-April to mid-December) are considerably lower and the weeks just before or just after the winter high season are probably the best time to go if you want good weather combined with the lower prices.

Grand Cayman's most memorable attraction is undoubtedly the people who live there. Friendly, cosmo-



Southern Airways-Redmond Tyler photo

politan (generations of Cayman islanders have earned their living as merchant seamen and they have the seaman's tolerance, sophistication and breadth of view), they make perfect hosts and are the island's best advertisement. People who have been there know what I mean; people who haven't have something to look forward to. It's the one aspect of your visit you'll remember longest, along with lying on Seven Mile Beach at night with more stars over your head than you've ever seen before, lightning flashing on the horizon, unimaginably far away; the bright dresses hanging on the wash lines Saturday mornings, the girls in their curlers getting ready for Saturday night; giant green turtles gliding through the water of Mariculture Ltd's breeding pond like prehistoric saucers; the rusting hulks of ships stranded out on the reef off the south shore; the postmistress at Hell (a locality which is the butt of many bad jokes and postcards) watching approvingly as a grandson—great-grandson?—stamps a visitor's postcard; the airport, its slowly turning ceiling fans . . . the pleasures of Grand Cayman are gentle ones and reward the patience that finds them.

Future problems? Mosquitoes are bad in summer — efforts to totally eradicate them will probably run up against the problem of insecticide-resistant strains and the mosquito sanctuary of acres of mangrove swamp, but the problem seems no worse than Maine's or Florida's. Water is another problem. Much of the water supply is collected from rainwater into cisterns à la Bermuda. In-



Southern Airways photo

Above and below: lobster fresh from the sea and the underwater splendor of Spanish Bay Reef.

creased use of desalination plants, if the money can be found to build them, is a possible solution. Waste disposal, as on almost any island, will have to become more sophisticated if many new hotels are built, but the problem seems to be recognized and dealt with frankly now, not swept under the carpet.

But one problem, at least, the Caymanians seem determined to avoid. Everyone on the island seems to agree that their home should not be oversold, not pictured as something it can't live up to. Honesty, sincerity—a realistic appraisal of what they are and what they offer, these are the best signs for the Caymans' future as the resort for people who know what they're looking for.—END

Background: The Cayman Islands are located about 480 miles south of Miami, 178 miles west north-west of Jamaica. On the basis of distance to the next point of land, they are the most remote of the Caribbean islands. Of the three islands, Grand Cayman, Cayman Brac and Little Cayman, the first is by far the largest, roughly 22 miles by four miles in area. The other two are approximately one fifth as large. The islands are a British dependent territory with internal affairs largely self-controlled by an elected legislature. A governor is appointed by the Queen. The language, of course, is English, but a very special, delightful kind, described in the island's brochures as "a mixture of American southern drawl and the English slur, with a Scottish lilt to end a statement." Currency is the Cayman Islands dollar; current exchange rate is one Cayman dollar equals U.S. \$1.25.

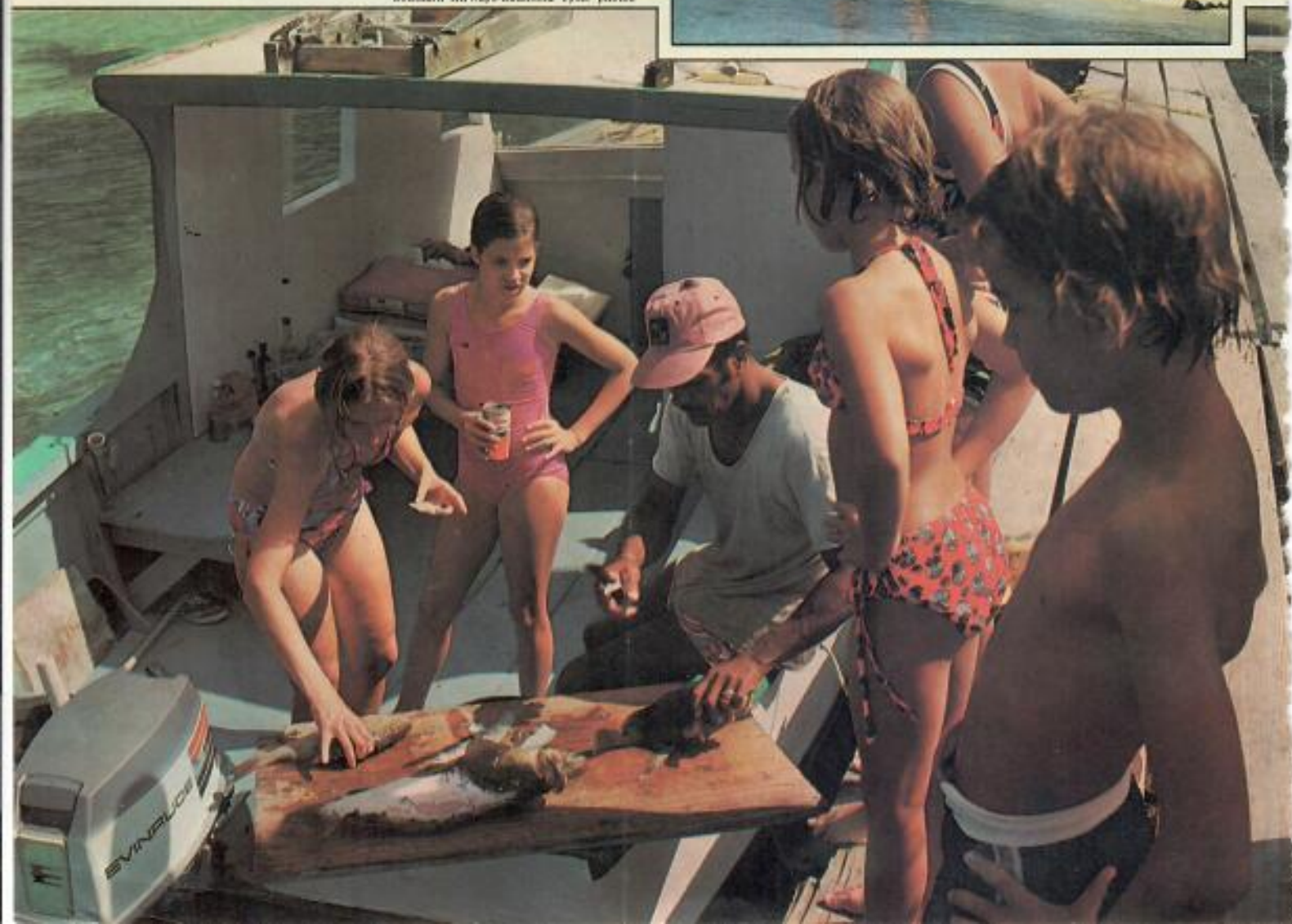
Weather: Temperatures average near 80 and above from May to October and the rain is also most frequent (brief showers) in this interval; November to March the temperature is seldom over 75, seldom less than 65, and rain is infrequent. Prevailing winds often mean the dif-

ference between tropically muggy weather and tropically refreshing weather.

Customs: American citizens entering the Caymans need proof of citizenship, such as birth certificate or voter registration cards. Also, a return ticket to his or her country of origin or another country to which admittance is permissible. There is a departure tax of US\$2.00 per person. Each U.S. citizen is eligible for a \$100 duty-

Walking on the beach or meeting the fishing boats are two Grand Cayman pastimes.

Southern Airways-Bedmond Taylor photos





Southern Airways-Rodney Tyler photo

politan (generations of Cayman islanders have earned their living as merchant seamen and they have the seaman's tolerance, sophistication and breadth of view), they make perfect hosts and are the island's best advertisement. People who have been there know what I mean; people who haven't have something to look forward to. It's the one aspect of your visit you'll remember longest, along with lying on Seven Mile Beach at night with more stars over your head than you've ever seen before, lightning flashing on the horizon, unimaginably far away; the bright dresses hanging on the wash lines Saturday mornings, the girls in their curlers getting ready for Saturday night; giant green turtles gliding through the water of Mariculture Ltd's breeding pond like prehistoric saucers; the rusting hulks of ships stranded out on the reef off the south shore; the postmistress at Hell (a locality which is the butt of many bad jokes and postcards) watching approvingly as a grandson—great-grandson?—stamps a visitor's postcard; the airport, its slowly turning ceiling fans . . . the pleasures of Grand Cayman are gentle ones and reward the patience that finds them.

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Southern Airways photo

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free exemption on purchases if he has been outside the U.S. for at least 48 hours.

How To Get There: Currently three airlines service the big island. *Southern Airways* flies daily jets from Miami. *LACSA* and *Cayman Airways* also fly this route and the latter also operates a Grand Cayman to Kingston, Jamaica service. *LACSA* has a San Jose, Costa Rica-Grand Cayman service, too.

Getting Around: Rental cars are available (driving is on the left!) Visitors must present a valid U.S. driving license to obtain a temporary C.I. driving permit when renting. *National Car Rental* at the Shell Service Centre near the airport has a weekly rate of C\$72.00 for a standard shift; C\$78.00 for an automatic. A rental car is a good idea if you intend to do a lot of exploring or are doing your own grocery shopping, but if you are content to stay at your hotel with only an occasional trip elsewhere, the abundant taxi cabs will take care of you. There is also public bus transportation from south of George Town up to West Bay.

What To See: Mariculture Ltd., the world's only commercial turtle farm and home to giant green sea turtles—self-guided tours. The "blow holes" along the south shore where the surf breaks against the coast; the little post office at Hell; Rum Point out on the North Side, a popular spot for cook-outs. Not to mention Seven Mile Beach, considered by many the finest strand of sand in the Caribbean.

Diving: The clear waters and spectacular reefs of the Caymans make it one of the best diving areas in the world. Dive shops on the island require that divers present a certification card from a national diving school like PADI, NAU, NASDS or BSAC before they will rent you scuba gear or supply you with air. Gear and guided trips are available from *Bob Soto's Fishing and Diving Headquarters* (P.O. Box 894, Grand Cayman, B.W.I.); *Sunset Divers* (P.O. Box 479); *F.L.A.C. Underwater Services* (P.O. Box 446); *Bertmar Aqua Sports* (P.O. Box 637), and at resorts like *The Tortuga Club* (which now has a divers certification course), *Buccaneer's Inn* on Cayman Brac, and *Spanish Bay Reef*, as well as at other shops and hotels.

Grand Cayman Hotels: Following is a list of some of the more popular places to stay on Grand Cayman. Summer rates at these are approximately \$20.00 cheaper than high season; some summer discounts are more than this. A five percent government tax is added to room and meals and often a fifteen percent gratuity fee is added on, as well.

Grand Cayman Holiday Inn (P.O. Box 904); *Victoria House* (P.O. Box 636); *West Indian Club* (P.O. Box 703); *Caribbean Club* (P.O. Box 504); *Spanish Bay Reef* (P.O. Box 800); *Tortuga Club* (P.O. Box 496); *Galleon Beach* (P.O. Box 71); *Royal Palms* (P.O. Box 490); *Cayman Kai* (P.O. Box 1112); *Sea View* (P.O. Box 260); *Beach Club*

Colony (P.O. Box 903); *Coral Caymanian* (P.O. Box 1093); *Sunset House* (P.O. Box 479). In addition there are a variety of condominiums, apartments, cottages and guest homes, most of which are comparatively expensive and often booked months ahead of time.

Eating: Given the fact that Grand Cayman has to import almost 100 percent of its foodstuffs, the quality of the cuisine in the island's restaurants and dining rooms is superb. Especially recommended are the dining room of the *Caribbean Club*; the plantation-style *Grand Old House* on South Church Street outside of George Town; *Ports Of Call*, opposite the House of Merren on West Bay Beach; the *Lobster Pot* over *Bob Soto's* dive shop in George Town; and the *Cayman Arms*, a good spot for lunch with its view of the George Town harbour. The most famous local dish is turtle steak.

For More Information: Anyone whose curiosity is at all active must read Peter Matthiessen's novel, *Far Tortuga*, before or during a Grand Cayman trip; its depiction of the lonely end of the last of the Cayman turtles ("Modern times, mon. Modern times.") is filled with insights into Cayman life and speech. Among the guidebooks, *Fodor's Caribbean* is sketchy on the Caymans; *Sydney Clark and Margaret Zellers' All the Best in the Caribbean* is a bit out of date, but pretty well sums up what's there; *Fielding's Guide to the Caribbean* is alternately supercilious, hasty and amusing, but its description of the Cayman Islands can at least be considered an alternative to the tourist brochures. Additional details on the islands can be obtained by writing the *Cayman Islands Department of Tourism*, 250 Catalonia Ave., Suite 604, Coral Gables, FL 33134; 270 Madison Ave., New York, NY 10016; 2711 W. 183 St., Homewood, IL 60430.—W.W.

A turtle is beached at Mariculture for data tagging.



Southern Airways/Rehmond Tyler photos

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VIVID COLOURS
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GREEN SEA TURTLE POLISHED SHELLS

- ALL SHELLS ARE FROM OUR FARMED THREE YEAR OLD GREEN SEA TURTLES (CHELONIA MYDAS)
- FOR EXPORT ALL SHELLS ARE INDIVIDUALLY WRAPPED, PADDED AND PACKED, FIVE PER SPECIALLY DESIGNED AND STRENGTHENED CARTON 30"x23"x12".
- ALSO AVAILABLE: Smaller Polished Shells: Dimensions from 12"x18" and White Shells, Scutes Removed—Cured and Polished — Standard Size.
- MARICULTURE IS ACTIVELY CONCERNED WITH THE CONSERVATION OF THE WILD GREEN TURTLE. PURCHASE OUR FARMED PRODUCTS AND SO ASSIST MARICULTURE'S CONTRIBUTION TO ENSURING THE SURVIVAL OF THE WILD SPECIES.

MARICULTURE, Ltd.
BOX 645, GRAND CAYMAN ISLAND, B.W.I.
TEL: 9-3313





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Duval Building
9450 Koger Boulevard
St. Petersburg, FL 33702

June 20, 1979

IMMEDIATE RELEASE
William H. Stevenson
Regional Director
(813) 893-3141

IMPORT RESTRICTIONS ON MARINE SEA TURTLES AND TURTLE PRODUCTS
NOW IN EFFECT

Regulations prohibiting the importation of all marine turtles and marine turtle products produced in mariculture operations are now in effect.

Import restrictions went into effect May 25, 1979, by order of the U.S. District Court for the District of Columbia.

The regulations provide that supplies of turtle meat and products may be sold in interstate commerce until September 6, 1979. After September 6, 1979, it will be unlawful under the Endangered Species Act to deliver, receive, carry, transport, ship, sell or offer for sale, marine turtles or marine turtle products in interstate commerce. The purpose of this Notice is to allow persons the opportunity to dispose of present stocks of marine turtle meat and products.

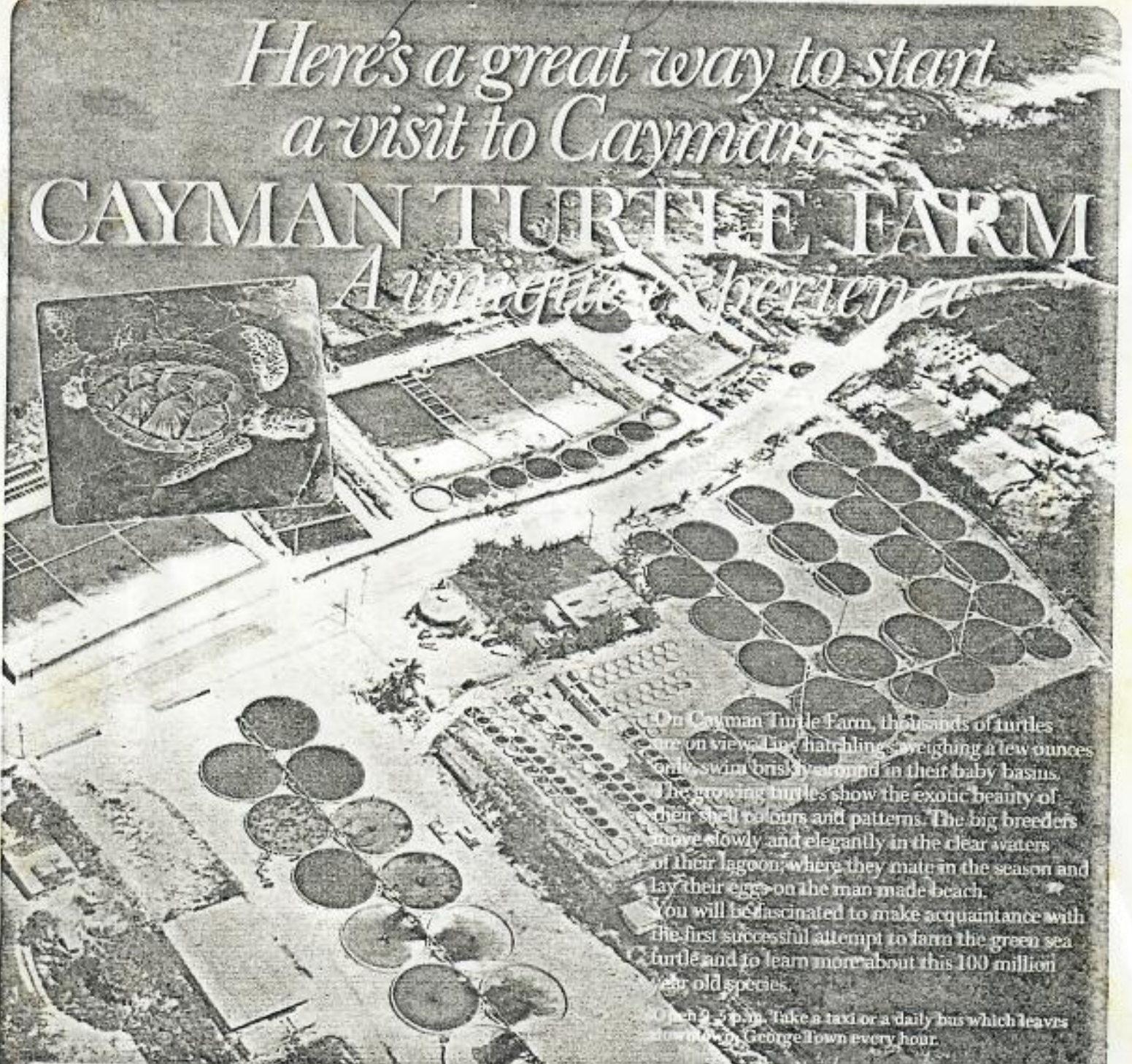
For further information contact Joseph R. Sylvester, National Marine Fisheries Service, 9450 Koger Boulevard, St. Petersburg, Florida 33702, phone number (813) 893-3721.



Here's a great way to start
a visit to Cayman

CAYMAN TURTLE FARM

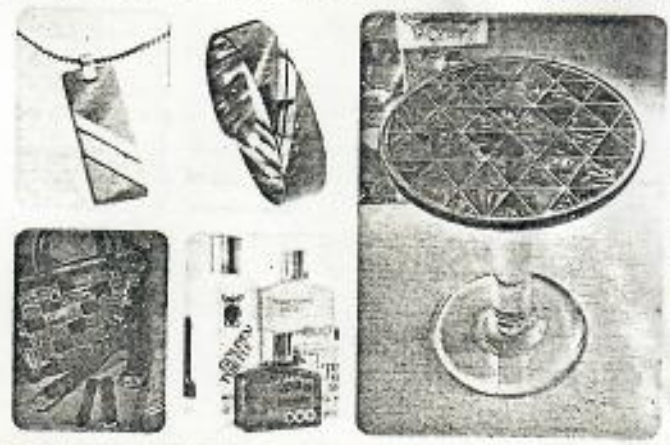
A unique experience



On Cayman Turtle Farm, thousands of turtles are on view. Tiny hatchlings, weighing a few ounces only, swim briskly around in their baby basins. The growing turtles show the exotic beauty of their shell colours and patterns. The big breeders move slowly and elegantly in the clear waters of their lagoon, where they mate in the season and lay their eggs on the man made beach. You will be fascinated to make acquaintance with the first successful attempt to farm the green sea turtle and to learn more about this 100 million year old species.

Open 9 a.m. Take a taxi or a daily bus which leaves downtown Georgetown every hour.

This visit to Cayman Turtle Farm will be one of your most memorable holiday activities. When travelling further watch out for our logo - it marks our high quality products, which you may find in many countries round the world. Our gift shop offers a wide range - come and see.



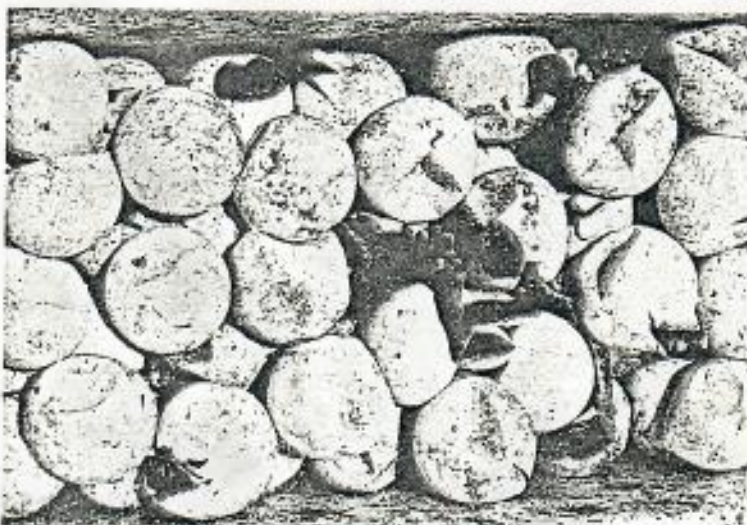
Cayman
Turtle

Enquiries: P.O. Box 645,
Grand Cayman,
British West Indies,
Tel: 99324/3313,
Telex: cp 257

Situated five hundred miles south of Miami, in the blue Caribbean Sea, lies the island of Grand Cayman, the largest of the three Cayman Islands. Its latitude (18°S) and its clear waters which vary in temperature from 25°C in the winter to 30°C in the summer make an ideal environment for breeding turtles. In past years, the Cayman Islands were noted for their abundance of wild turtles, but severe over exploitation during the 18th and 19th centuries and the inevitable encroachment of man's building activities on

year and the emergence of hatchlings. The turtles are housed in concrete or fibre-glass tanks of different dimensions, depending on the size of the turtles, through which clean fresh sea water is continuously pumped. This necessitates an overall pumping capacity of over three million gallons of water an hour.

In the early days when the farm was developing it had to rely, naturally, on wild products to build up its stock. This necessitated wild turtle eggs for providing growth stock, and mature



Turtle eggs and hatchlings

CAYMAN TURTLE FARM -UNIVERSALLY UNIQUE

the beautiful beaches has woefully interfered with the turtles' nesting activities so that wild turtles are now no longer plentiful.

In 1968 a unique venture was started on Grand Cayman, the first commercial farm to breed and raise the Green Sea Turtle (*Chelonia mydas*). The original concept was to fence off a narrow inlet to a tidal creek which has an abundance of turtle grass (thalassia), the natural food of turtles, and let the turtles grow and breed in comparatively unconfined quarters. The difficulty in maintaining the sea fence led to the instigation of holding turtles in floating pens. For a number of reasons this was not successful and the operation was transferred to its present situation on Goat Rock, on the North Western point of the island. Here a flourishing industry has grown up with a population of turtles fluctuating between 40,000 and 80,000 depending on the time of the

males and females which would acclimatise to farm conditions and form the nucleus of a breeding stock. At no time has the farm imported wild turtles and marketed their products, the only sales of turtle products have been from animals which have been hatched from eggs on the farm and raised in captivity to processing weight.

The nucleus of the breeding herd was made up of animals from various localities, Costa Rica, Suriname, Guyana, Ascension and Mexico, the majority of which would have been destined for slaughter in their native lands. At the time when a group of turtles each year became large enough for processing (about four years old) a proportion of each group was held back as future breeders. This group known as Farm Reared Stock as distinct from Captive Wild Stock) rapidly surpassed in numbers the original nucleus of breeders.

The first breakthrough in

breeding came in 1973 when Captive Wild Stock mated in captivity, producing eggs and viable hatchlings - the first time this had been reported. The second landmark was in 1975 when a Farm Reared female produced the first live hatchlings, thus proving that self-sufficiency could be attained. Since then increasing numbers of eggs have been laid each year on the Farm, with a corresponding decrease in the requirements of wild eggs. The last egg collection was made in 1978. Thereafter the farm became wholly self-sufficient and no further wild eggs will be required. The current breeding herd consists of approximately 180 Captive Wild Stock and over 1,000 Farm Reared Stock;

our experience indicates that sexual maturity is not achieved until nine to twelve years of age, consequently the majority of the Farm Reared Stock must be regarded as potential breeders. The breeding herd is divided amongst two breeding ponds (each of approximately 800,000 gallons capacity) during the mating season, each pond being provided with its own man-made nesting beach.

After successful matings, female crawls onto the beach, laying its eggs as it would do in the wild, but with the difference that the eggs are immediately collected and transferred to a temperature controlled incubator/hatchery. After about sixty days the

Contd. on page 29

TURTLES

from page 27

small hatchlings appear.

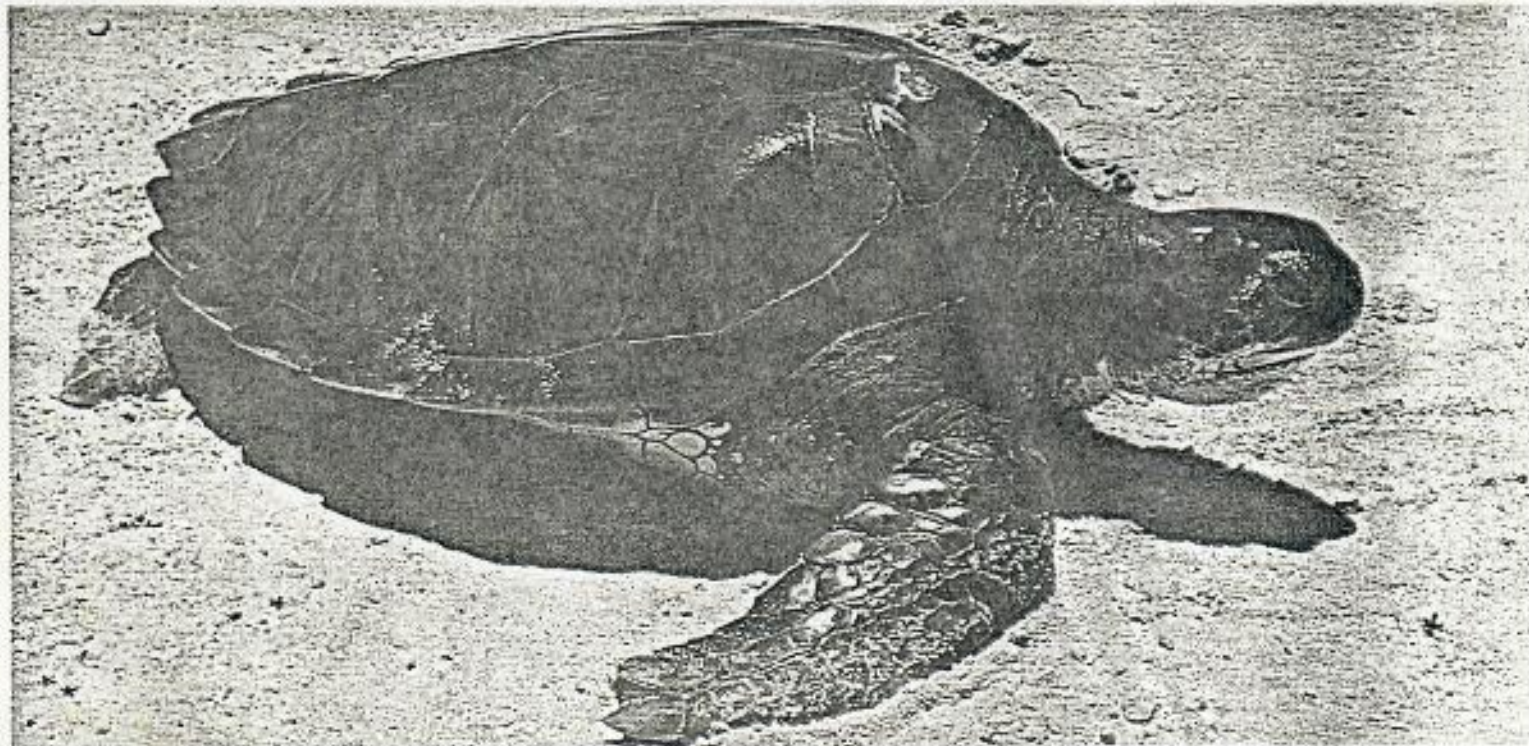
Very careful treatment is afforded these fragile creatures both before and after their transfer to water. They are fed on a small floating pellet of high protein content until twelve months old, when the hazards of rearing are safely passed. They are then transferred to the growth tanks, fed on larger pellets and move through the Farm tanks, the number per tank being reduced progressively with growth. At about four years of age, weighing around ninety to one-hundred pounds, they are ready for processing.

The main saleable products are Meat, which is used for exotic dishes, stews and chowder; Calipee, or Calipash, (a gelatinous material) used in soup. The skins yield a high grade leather and oil is an ingredient used in cosmetics and pharmaceutical preparations. The shell is used for decorative object d'art and jewellery.

Contd. on page 31



Baby turtles take to the water



Green Sea Turtle (*Chelonia Mydas*)

TURTLES

from page

The Farm concentrates on the sale of primary products - secondary products, e.g. cosmetics or leather goods, are not produced on Grand Cayman. Sales are made world-wide.

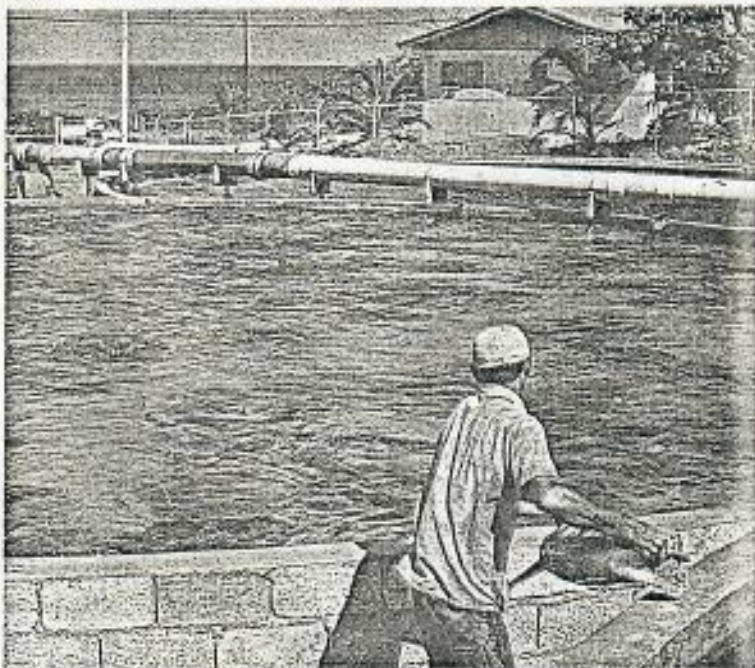
The Farm devotes a large amount of effort to research work in areas of particular importance to its welfare, namely reproduction, disease and nutrition. This is carried out chiefly by its own staff researchers, aided by noted specialists in these fields from Universities in the United States and elsewhere. In addition, it encourages the use of its facilities and its materials by workers in different fields of turtle research, as shown by the publication of a large number of scientific papers.

The Farm has a good record

in helping the conservation of the wild species. When wild eggs were required, these were bought from Suriname, where turtle conservation is taken very seriously. Not only did the money paid for the eggs help finance conservation efforts, e.g. beach patrols, hatching programmes, but technical assistance using know-how developed at the Farm has been freely given. Furthermore, a percentage of hatchlings (and in some instances animals up to three years of age) were returned to Suriname and released to the sea in the "head start" programme. The shareholders of the Farm have also given direct financial assistance to the Suriname conservation programme. Probably the most enduring contribution to the future conservation of the turtle is the Farm itself. The fact that it has been demon-

strated that turtles can be bred without recourse to make up from wild stocks will overcome the fears of one noted biologist, Professor Sir Alan Parkes, C.B.E., F.R.S. who has written - "In the final resort, when the last nesting

beach has been overrun by hotels, barbeque parties, power boats and waste products, the preservation of the species will depend on having found out how to handle the animals on farms and ranches."



Growth tanks at Cayman Turtle Farm

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SINCE NINETEEN-HUNDRED



"THE VOICE OF CONSERVATION"

Dr. W.A. Johnson
Chief Executive
Cayman Turtle Farm, Ltd.
P.O. Box 645
Grand Cayman
British West Indies

April 14 1977

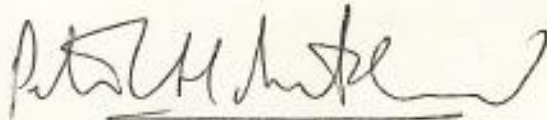
Dear Dr. Johnson:

I am sorry we didn't get to talk at the recent sea turtle importation hearings in Sacramento; I guess our being on opposite sides of the fence would have made it a little difficult anyway. But I hope that it was evident from what I had to say that I am not a member of the group that will routinely oppose everything the turtle farm does on principle. I believe we are now narrowing down the objections to commercial turtle farming, and indeed I found virtually nothing to disagree with in the letter Dr. Schulz wrote to you on November 3 1976 supporting the aims of the farm. I am personally satisfied that your withdrawing from Costa Rica and Ascension Island and only collecting eggs under Schulz' supervision in Surinam has taken care of the argument that your egg collecting activities have a negative impact upon wild populations. I am also impressed by much of the scientific work conducted at the farm and the new insights it provides into the biology of the green turtle, and hope that you will keep me in touch with new findings as they develop.

The essence of the remaining difficulty is this question of creating new demand for turtle meat. While I notice on page 3 of Schulz' letter that you claim that it is unlikely that new markets would be established, I see in the March 14 1977 issue of Pacific Business News that one of the retailers who handles your product, Tropic Seas Foods of Hawaii, is quoted as saying: "We're trying to generate interest for the farm from the state, but the first step is to get people accustomed to eating turtle meat." I detect a conflict between this statement and yours; and I am still persuaded that if such efforts to "get people accustomed to eating turtle meat" are successful, local entrepreneurs will move in and undercut your necessarily expensive product by catching wild turtles. I know this would be as undesirable to you as to us, but it is a fact of life that

conservation law is often splendid in concept but totally derelict in enforcement, and I do not believe that present or foreseeable mechanisms would be sufficient to ensure that only farmed products are handled and consumed. This is admittedly suspicion rather than proven fact, but it is a little more than "unsupported allegation" as Schulz called it, and I really think that it is essential that you attempt to put the answer to the "market stimulation" question on a sounder basis than at present. Would it really not be feasible to check whether your retailers - and their competitors - were indeed selling only farmed turtle meat, and whether national and state enforcement techniques were equal to the task of keeping the wild turtle product off the market? I think it would be more to your advantage to have this done yourself rather than to have it done for you; before long, the conservation groups are likely to demonstrate themselves how easy it is to smuggle wild turtle meat into the U.S. and into California; and it would also be revealing to see whether the retailers of farmed turtle are receptive to offers from convincing sources of wild turtle meat at a lower price. There is also the serious problem that the very existence of your protein-fed green turtle scutes makes it very difficult for enforcement officers to seize shipments that they suspect are hawksbill; if these turn out to be farmed green turtle scutes, the officers run a risk of being sued.

Yours sincerely,



Peter C. H. Pritchard Ph.D.
Vice President - Science and Research

George: for your information.



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TEL: 93324/93313/93250•CABLES: TURTLE•TELEX: CP 257

P.H.

May 18, 1977

Dr. Peter C.H. Pritchard,
Vice President-Science and Research,
Florida Audubon Society,
921 Lake Sybelia Drive,
P.O. Drawer 7,
Maitland,
FLORIDA 32751,
U.S.A.

Dear Dr. Pritchard,

Your letter of April 14th was most welcome. My apologies for the late reply, but I am sure you know I was in Sacramento again when it arrived and have further been travelling to the States and only just had a chance to reply. Further, I wanted to consult the Mittags on a possible course of action which, when I outline it to you, I feel sure will meet with your approval.

I am pleased to see that the gap between our opposing views is narrowing and was indeed gratified by the fair way in which you publicly stated in Sacramento that you had no quarrel with our egg collection programme. Although statements to the contrary, based on ignorance or wilfull misrepresentation of the facts, are constantly being made about our progress to egg self-sufficiency, we still have faith in our programme and consider the 1976 results are a good indication.

However, we realise that even when we are self-sufficient in eggs, the argument regarding market stimulation leading to increased slaughter of the wild turtle will still be with us, and I realise that this possibility disturbs a number of thoughtful conservationists. I would like to see an economist with a strong marketing background undertake a study for us to evaluate the impact that our marketing efforts have in stimulating the sales of wild turtle products.

I shall be going to Europe middle of June and will discuss this matter fully with the Mittags. I also have a good friend who is a professor of marketing at Manchester University and has an international reputation, whom I will talk to about the possibilities, although, I would prefer him to recommend someone from the United States actually to do the survey as I think this would get a wider acceptance, particularly in the States.

Cont'd/...

Dr. Peter C.H. Pritchard.

- 2 -

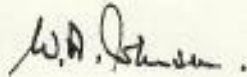
May 18, 1977

I would welcome your views as to this approach to a very difficult problem. A firm cannot exist without selling its products and any sales promotion is liable to raise the cry of stimulating new markets.

My view is that the enforcement techniques are adequate if properly applied - if an enforcement officer has doubts as to the origin of any turtle product, he can always ask for the name of the supplier, and check with us if necessary. As you know, the documentation and labelling procedures are pretty strict.

I will get back to the subject when I return from Europe and let you know what is decided.

Yours sincerely,
CAYMAN TURTLE FARM LTD.



W. A. JOHNSON
Chief Executive.

WAJ:dd

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UNIVERSITY OF HAWAII

Hawaii Institute of Marine Biology

**LIBRARY OF
GEORGE H. BALAZS**

Subject: Cayman Island trip November, 1974

MEMORANDUM

Sample weights of turtles unloaded at Capt. Ertis tidal holding pond on Nov. 27 newly arrived from Miskito Coast.

300 plus F	260 F	35 ?	taken specifically for mounting, requested by Ertis.
290 F	238 F	40-60 ?	
115 F?	132 F?		
200 F	215 M		
257 F	276 F		

3 males total in shipment; 2 plus? hawksbills (1-approx. 50lbs; 1-approx. 75plus)
Estimate total number of turtles in shipment to be 20 (total weighed while there- 12)

Frozen turtle meat now available in town from farm- CI\$1.50 lb (reported same as wild caught) mixture of different turtle parts not available-tried by farm but not continued-reason unknown.

Reported to be considerable theft of turtles from farm, possible vandalism of equipment?

No stuffed turtles from farm for sale in town.

Japanese would buy farmed scutes if price was low enough. \$30 for farmed green scutes vs \$8 for Nicaragua hawksbill. Reported to have been big shipment of green bought by Japanese but subsequently offered to sell back for %25 of original cost. WHY ?

Capt. ERTIS FISHING TOURS

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Interesting Informative Sight-Seeing.

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ABSTRACT

World Mariculture Society Workshop, Charleston, S. C., Jan. 21-24, 1974
(Section on Green Turtle Culture)

Amino-Acids Essential for the Growth of Young Green Sea Turtles (*Chelonia mydas*)

James R. Wood, Jr., Dept. Biol. Sci., Univ. of Arizona, Tucson, Ariz. 85721

The development of a completely defined amino acid test diet suitable for hatchling sea turtles is briefly discussed. The results of a series of experiments designed to determine the nutritionally essential amino acids required by the hatchling Green sea turtle, *Chelonia mydas*, are presented. Of the eighteen amino acids of nutritional significance, nine are shown to be clearly essential, eight are shown to be clearly non-essential, and one amino acid is shown to be possibly semi-essential. Possible relationships of the reported results to the protein and amino acid requirements to turtle age classes other than hatchlings are mentioned. Directions of future research and implications for the development of commercial turtle feeds are suggested.

NESTING OF CAPTIVE GREEN TURTLES (CHELONIA MYDAS) AT
MARICULTURE LIMITED

G.F.Ulrich

Mariculture Limited, Grand Cayman Island, B.W.I.

and

David^{W.} Owens

Department of Biological Science, University of Arizona,
Tucson, Arizona 85721, USA

ABSTRACT

Wild-caught turtles held in an artificial breeding enclosure for three years have mated and laid viable eggs at Mariculture Limited, Grand Cayman Island, B.W.I. This is the first recorded instance of production of hatchling turtles under completely artificial conditions. Captive re-nesting interval, seasonal egg production, mating-nesting time sequence and implications of this development to turtle culture are discussed.

Nineteen females from Surinam, Guyana and Costa Rica have produced 95 nests for a total of 11,579 eggs. Hatching and infertility rates are detailed. The nesting season of the captive turtles corresponds to that of the former nesting population on Grand Cayman rather than that of their native Surinam and Costa Rican beaches. Mating and nesting behaviour is identical to observations made under natural conditions.

GRAY PATCH DISEASE: A HERPES VIRUS DISEASE OF FARMED
GREEN TURTLES

Arkadi Rywlin

Harold G. Haines, Ph. D., ~~Arkadi Rywlin~~, M. D., and Gerbert Rebell

Young green turtles (Chelonia mydas) raised commercially on Grand Cayman in the British West Indies contract a skin condition which we call gray-patch disease. In some turtles the lesions of gray-patch disease evolve to serious proportions leading to severe maceration of the skin and eventual death of the animals. In other turtles the lesions are less severe and regress spontaneously with no obvious harm to the animal. Histological examination of the lesions is consistent with a viral infection. Electron microscopic examination of the lesions reveals the presence of a herpes-type virus. Transmission experiments indicate the virus is transmissible by inoculation and perhaps by contact. Stress factors such as crowding, temperature changes and tank contamination may play a maintenance role in these infections, and will be discussed along with potential methods of prevention and treatment.

Coccidiosis in the Green Turtle in Mariculture

Gerbert Rebell, Arkadi Rywlin, J. Walter Beck, and Glen F. Ulrich,
Mount Sinai Medical Center, Miami Beach, Florida, and Mariculture Ltd.,
Grand Cayman, B.W.I.

An epidemic of disease in recently hatched Green Turtles, *Chelonia mydas*, was found to be associated with a coccidial intestinal parasite, provisionally identified as Teisseria sp.

The disease and associated mortality appeared in the young turtles 30 days after hatching, and ran a sixty day course through the stock hatchlings at the farm. The oocysts of the parasite when matured in dichromate solution contain eight sporozoites. Sporocysts are not formed. Schizonts, merozoites, and gametocytes develop in the cells of the intestinal mucosa of the turtle, without evident spread to other organs. Turtles in older age groups were not effected. Symptoms of the disease are emaciation and lethargy. Tube-like sloughs of intestinal mucosa and impaction of the gut with caseous masses of oocysts occur late in the disease. Experimental therapy with sulfamethazine was attempted.

Observations on the David W. Ehrenfeld paper "Conserving the Edible Sea Turtle: Can Mariculture Help?"

In the preamble, it is interesting to note that Dr. Ehrenfeld received his Ph.D. in Zoology from the University of Florida, where our friend Archie Carr is, of course, a big cheese in the Zoology Department. It's very impressive to note that Dr. Ehrenfeld's research "on the sensory physiology and orientation behavior" and his "articles on the roll of vision in sea finding chemoreception and the open sea navigation of the green turtle" may be interesting, but has done nothing tangible in preserving the species. The preamble refers to "these endangered reptiles" - even though the I.U.C.N. lists the turtle as only "threatened". It is noted that the article was adopted from a paper presented at the New York Academy of Science, but there is no reference to Antony Fisher and his criticism - although "helpful" criticism from Archie Carr and Richard Tennant is acknowledged!

1. Not necessarily "commercial demand" - the endangerment could come from any one of a series of pressures, one of which could be commercial demand.
2. Should include business men, particularly since the green sea turtle is the only marine species of substantial commercial interest.
3. Does not differentiate between products from wild green turtles and farm reared green turtles - it is unfortunate that Dr. Ehrenfeld does not understand the difference between/among the products.
4. It is unfortunate that Dr. Ehrenfeld is not familiar with Mariculture's work concerning the nutritional aspects of the meat and the fact that it is, nutritionally, one of the most beneficial foods that humans can consume, being higher in protein and lower in calories than red meat, fish or poultry and containing practically no cholesterol. He underestimates the value of the meat with his simple statement.
5. Not documented by more than heresay evidence.
6. Correct - too bad it wasn't. For the record, Dr. David W. Ehrenfeld has never been to Grand Cayman - to the best of my knowledge.
7. There are many more claims - note the 33 point Goodier telex to Naylor.
8. Not documented.
9. Simply not true - this man is totally unaware of our success with polyculture.

10. Conjecture on his part - "Farming the Seas" could be interpreted to mean farming sea "animals (reptiles, etc.)"; his definition of "farming the seas" is simply the way he has chosen to interpret a farming activity.
11. Makes no reference to the commercial aspects - pilot studies are fine if they are funded but no one will fund them (not even governments - look at Australia!) without a viable commercial bottom line.
12. Again, not true - note the various reports from Sir Alan Parkes and Dr. Amoroso.
13. There is no suggestion for the funding of this "rational screening procedure" which, according to Ehrenfeld should have proceeded the large scale commercial operations.
14. The word "parasitize" as it is defined in Webster's dictionary is not descriptive of our egg collection operation and is a charged and emotional word used for effect by the author.
15. No reference to the positive consequence.
16. Again, the unjustifiable use of what is becoming one of our favorite words.
17. To the best of my knowledge, Mariculture has always had greater than "75%". Also, I believe the figure 0.2% to Archie's - does anyone know the origin of this statistic?
18. A, B, and C all refer to the possible negative aspects of the controlled releases. In other words, all that is said is conjecture - there is no fact available to indicate that we are not increasing the net number of turtles in the wild through our "headstart" and "repatriation" programs.
19. Perhaps correct - but it can also not be dismissed as a "substitute" on the basis of present knowledge.
20. Proper public relations help with this difficulty and we have several press clippings from San Jose newspapers to prove it.
21. There are "convincing ecological rational for such actions" - Ehrenfeld has simply chosen not to acknowledge - publish them.
22. Of course not - but it is planned and will surely be a reality - eventually.
23. Ehrenfeld does not know that we hope to produce eggs on a less than 2 year cycle.

24. Is reasonably accurate as to the number of adult sea turtles we plan, eventually, to keep.
25. This sentence is not only erroneous and inconclusive but is not based on any fact to which Ehrenfeld can point with confidence as he has never visited our farm, met with our Division of Conservation and Research and/or had more exposure to Mariculture than the exchange of a couple of letters and a meeting at the New York Academy of Science. If he had done his homework, he would be apprised of the degree of precision about which our breeding facilities have been thought out.
26. Again, except by Ehrenfeld's self-serving definition, the green turtle is not "endangered".
27. To whom? This man has no knowledge of our financial position and, unfortunately, has not made it his business to try to become informed.
28. Is an extension of the same and his statement about economical homologous with chickens is not supported - it's just a slap at Antony Fisher!
29. Is one of the most myopic comments I have yet seen in the Ehrenfeld paper. If this had been the philosophy in the early days of poultry, beef, hogs and other commercial animal production, job farmers would still be in business and chicken would still cost \$2.50 per pound and be considered a "Sunday treat".
30. "Never" is a long time - and it's nice to know that Archie Carr is such an economist as well as prognosticator.
31. Ignores the meaningful trade restraints as established internationally by the Convention on International Trade in Endangered Species of Wild Fauna and Flora signed on May 3, 1973 in Washington, D. C. It is presumptuous of any scholar to assume that any government cannot enforce its own trading laws.
32. Another unfounded assumption not correlated with the facts as known to merchants of wild turtle.
33. Again, pure conjecture - just as we can't prove that the price will diminish with volume, he cannot prove that it will increase.

34. Ehrenfeld, again, is absolutely wrong and Mariculture's contention that its "reliability and volume" will encourage and monopolize trade is correct.
35. He speaks of an expert when he is not and the fact that he makes the statement impresses me with a total lack of knowledge concerning the difference between the wild and domesticated products.
36. If this were true, the fishermen would be selling their products now and I doubt that many turtle fishermen would agree with Ehrenfeld's contention.
37. Could possibly happen, but is terribly remote and if we start listing remote possibilities the list would be endless - further, I doubt very much if the tipping into the sea of all of our turtles would substantially "distort or obliterate" the natural zoogeographic patterns, etc.
38. Again, Ehrenfeld knows nothing about the scientific work which we have done and the various papers which we have published. We have compromised secrecy on the alter of almost reckless disclosure.
39. I am quite sure that Carr has questioned this - although he, apparently, has given his complete support to the farming of green turtles in Australia and this purportedly on a "commercially viable" basis (reference the December 5, 1973 issue of the "Australian" newspaper). In view of his 20 years or so of conservation undertakings, it must be very frustrating for a man like Carr to have seen the claimed continued diminishment of the number of green turtles on Tortugaro beach and elsewhere and to have seen the July, 1970 I.U.C.N. recommendation of the green turtle as "threatened" to now be "endangered". If there is one conclusion that can be drawn in my humble and non-scientific opinion, it is that whatever Carr's (et al) conservation techniques, they have been dismal failures and at least Mariculture, Ltd. may have a possible answer. It must be frustrating as hell to these ivory tower scientists to see us and our Division of Conservation and Research producing answers from a commercial vehicle that they have been unable to produce and to acknowledge that we may now be on the brink of saving a purportedly endangered species whereas none of their endeavors have demonstrated as much potential in species "saving".
40. Unsupported.
41. Again, Ehrenfeld may criticize commercial farming but he has no better substitutes, since, apparently, worldwide conservation programs are not working.

42. Ehrenfeld has certainly played down our releases - particularly the "headstart" program.
43. I wonder who he thinks will sponsor these "non-profit turtle ranches".
44. Surprise! This happens to be Archie Carr's program, sponsored by the Fricks and others.
45. Sounds like Carr's record.
46. He mustn't have read the same article I read - which brings up an interesting point about which I wrote to Mike last week - how can we find out the "true story" in Australia and document what a miserable failure that program apparently is - "remember the "paint can" discussion! When we respond, formally, to Ehrenfeld (and I do not think we should respond until we do so formally) we must include the letter of November 20 to Sir Alan from T. J. Robinson, Professor of Animal Husbandry at the University of Sydney and Sir Alan's superb response of December 12.
47. Again, the unrealistic approach - wouldn't it be wonderful if we all lived in Alice in Wonderland and could mold the world as we would like it to be instead of having to live in the world as it is.
48. Thank you, Dr. Ehrenfeld, we were beginning to feel neglected.
49. Unsubstantiated and not a problem if countries are able to enforce the endangered species legislation, etc., etc.

Irvin S. Naylor
February 25, 1974

TO THE PERSONAL ATTENTION OF B. J. RAYBURN FOR IRVIN S NAYLOR

FURTHER TO OUR LAST TELEX, WHICH I WOULD LIKE YOUR ADVICE AS TO WHETHER IT WAS SENT OUT OR NOT, I WOULD ALSO REQUIRE CONFIRMATION ON QUERY AS REGARDS STOCK ON HAND AT 28 DECEMBER. FOLLOWING TELEX GIVES MORE DETAILED REASONINGS FOR OUR TWO ARGUMENTS, I E THREATENED, ENDANGERED AND FARMING. WE BELIEVE THAT IF SITUATION IS INVESTIGATED YOU WILL NEED GREAT AMOUNT OF DOCUMENTARY EVIDENCE WHICH IMPOSSIBLE TO PUT INTO TELEX. PARKES HAS AGREED THAT HE WILL ENDEAVOUR TO WRITE UP BY 15 FEB SCIENTIFIC PAPER WHICH WILL BE PARTLY IN ANSWER TO EHRENFELD PAPER AND WILL FURTHER HELP TO DETAIL EXTENT OF MARICULTURE'S WORK THROUGHOUT THE CONSERVATION AND SCIENTIFIC CIRCLE. THEREFORE TELEX IS STILL OF A STOP GAP NATURE TO GIVE SUFFICIENT INFORMATION FOR THE DEPT OF INTERIOR TO RECONSIDER.

CHELONIA MYDAS AND THE US ENDANGERED SPECIES LIST

1. ACCORDING TO THE ACT, AN ENDANGERED SPECIES IS ONE WHICH THROUGH ALL OR OVER A SIGNIFICANT PART OF ITS RANGE, IS IN DANGER OF EXTINCTION.
2. THE GREEN TURTLE HAS A WORLD WIDE DISTRIBUTION IN THE TROPICS AND A VAST REPRODUCTIVE POTENTIAL SO THAT 'SIGNIFICANT' CAN ONLY MEAN THE GREATER PART OF ITS RANGE.
3. 'DANGER OF EXTINCTION' CAN ONLY MEAN DECREASING IN NUMBERS OF FERTILITY TO A POINT OF NO RETURN.
4. THIS POINT VARIES WITH DIFFERENT SPECIES ACCORDING TO THEIR SOCIAL ORGANIZATION AND REPRODUCTIVE POTENTIAL AND THE EVIDENCE THAT CHELONIA MYDAS HAS REACHED IT IS FAR FROM CONCLUSIVE. OVER THE CENTURIES THE SPECIES HAS DECREASED DRAMATICALLY IN NUMBERS UNDER THE IMPACT OF MANS PREDATION AND POLLUTION. THE PROCESS CONTINUES IN CERTAIN PARTS OF THE WORLD, BUT THERE ARE CONTRARY REPORTS. INDICATIONS ARE THAT WILD NESTINGS ARE INCREASING IN SURINAM AND CARR (FAO ROME 1971) STATES "IN COSTA RICA MORE GREEN TURTLES ARE NESTING NOW THAN IN PREVIOUS YEARS".
5. AT A MEETING OF THE NEW YORK ACADEMY OF SCIENCES 1973, IT WAS STATED THAT UP TO 400,000 ADULT MALE AND FEMALE CHELONIA MYDAS MAKE UP THE WILD POPULATION. THIS FIGURE IS ENORMOUS COMPARED WITH THOSE FOR MANY SPECIES AT PRESENT ON THE ENDANGERED LIST. IN GENERAL, THE WORLDWIDE RANGE WITHIN THE TROPICS AND ITS VAST REPRODUCTIVE POTENTIAL DISTINGUISH CHELONIA MYDAS NOT ONLY FROM MOST OF THOSE ON THE ENDANGERED LIST BUT ALSO FROM ANIMALS KNOWN TO HAVE BECOME EXTINCT

IN MODERN TIMES. THERE IS NO CONCLUSIVE EVIDENCE THAT A SUDDEN CHANGE FOR THE WORSE HAS OCCURRED WORLDWIDE SINCE MARCH 1973 WHEN REPRESENTATIVES OF THE US AND 79 OTHER COUNTRIES AGREED THAT CHELONIA MYDAS WAS NOT AN ENDANGERED SPECIES.

6. THERE SEEMS, THEREFORE, NOT TO BE ADEQUATE JUSTIFICATION FOR TRANSFERRING CHELONIA MYDAS FROM THE THREATENED TO THE ENDANGERED LIST, A MOVE WHICH WOULD DO LITTLE TO INHIBIT THE TAKING OF TURTLES AND EGGS FOR LOCAL USE BY THE LITTORAL POPULATIONS OF THE TROPICS, A MAJOR SOURCE OF LOSS, AND WHICH, BY HINDERING THE DOMESTICATION OF CHELONIA MYDAS, WOULD IN THE LONG RUN FURTHER IMPERIL THE SPECIES. AT PRESENT THE 'THREATENED' LIST OF "LIKELY TO BECOME ENDANGERED" SPECIES IS THE CORRECT PLACE FOR THE GREEN SEA TURTLE.

FARMING THE GREEN TURTLE.

7. PROHIBITION MAY WELL REDUCE MAN'S PREDATION, THOUGH IT HAS NOT ALWAYS BEEN EFFECTIVE, BUT IT IS NOT LIKELY TO REDUCE MAN'S POPULATION PRESSURE ON CHELONIA MYDAS AND IN THE LONG RUN THE GREEN TURTLE AND ITS VALUE TO MAN MAY ONLY BE SECURED BY FARMING. THE NECESSARY TECHNIQUES ARE BEING DEVELOPED NOW AND NOTHING SHOULD BE ALLOWED TO OBSTRUCT THIS DEVELOPMENT OF TECHNOLOGY, OTHERWISE THE SPECIES WOULD UNDOUBTEDLY BECOME TRULY ENDANGERED.

8. THE DOMESTICATION OF A WILD ANIMAL POSES TWO PROBLEMS, BREEDING AND REARING UNDER FARM CONDITIONS. IN THE CASE OF CHELONIA MYDAS, AN EGG-LAYING ANIMAL WHOSE EGGS RECEIVE NO MATERIAL ATTENTION AFTER LAYING AND CAN EASILY BE INCUBATED ARTIFICIALLY, IT HAS BEEN POSSIBLE TO ATTACK BOTH PROBLEMS AT ONCE BY SIMULTANEOUSLY OBTAINING FROM THE WILD EGGS FOR INCUBATION AND ADULTS TO BUILD ^{UP} A BREEDING STOCK.

9. BOTH APPROACHES PROMISE TO BE SUCCESSFUL, BUT THE EXPENSE OF MAINTAINING LARGE NUMBERS OF LARGE ANIMALS OVER LONG PERIODS IS SUCH AS TO BE POSSIBLY ONLY FOR A COMMERCIAL ORGANIZATION PREPARED TO RISK CAPITAL. BUT A COMMERCIAL ORGANIZATION MUST HAVE INCOME AS WELL AS EXPENDITURE AND FOR THIS REASON A SUCCESSION OF INCREASING LARGE PILOT STUDIES OVER MANY YEARS, THE SCIENTIFICALLY OPTIMAL PROCEDURE HAS NOT BEEN POSSIBLE. MOREOVER, THE COMMERCIAL ELEMENT MEANS THAT THE MARKET FOR FARMED TURTLE PRODUCTS, ADMITTEDLY PARTLY A LUXURY ONE, SUPPORTS INDIRECTLY BOTH CONSERVATION AND RESEARCH.

10. IT IS OF COURSE ESSENTIAL THAT THE ESTABLISHMENT OF A TURTLE FARMING INDUSTRY SHOULD NOT DRAW UNDULY ON THE WILD STOCK AND THE ONLY COMMERCIAL FARM

IN EXISTENCE FULFILL THIS CRITERIA. THE FEW SCORE OF ADULTS FOR BREEDING STOCK AND THE FEW SCORES OF THOUSANDS OF EGGS TAKEN FROM THE WILD AS AN INTERIM MEASURE ARE NEGLIGIBLE IN COMPARISON WITH THE NUMBERS LOST BY NATURE HERSELF. IN FACT MARICULTURE LIMITED EGG COLLECTIONS ARE INVARIABLY FROM NESTS WHICH WOULD OTHERWISE BE DOOMED BY TOXIC SAND CONDITIONS OR TIDAL WASH OUT, IF THEY HAD BEEN LEFT IN POSITION ON NATIVE BEACHES.

11. FARMING THE GREEN TURTLE WILL PERMIT THE RESTOCKING OF THE WILD SO LONG AS SUITABLE HABITATS EXIST. A START HAS ALREADY BEEN MADE IN THIS DIRECTION BY MARICULTURE LIMITED, BOTH BY THE RELEASE OF YEARLINGS TO THE SEA OR BY ARTIFICIALLY INCUBATING EGGS WHICH UNDER NATURAL CONDITIONS WOULD BE DOOMED, AND IMMEDIATELY ESCORTING THE HATCHLINGS DOWN THE BEACHES TO HELP TO AVOID PREDATION.

12. THE QUESTION OF WHETHER THE MARKETING OF FARMED TURTLE PRODUCTS WILL INCREASE OR DECREASE THE DEMAND FOR WILD MATERIAL IS A VEXED ONE, BUT IT IS AS LIKELY AS NOT THAT THE REGULAR SUPPLY OF HIGH QUALITY FARMED PRODUCTS SOONER OR LATER WILL ABOLISH THE INTERNATIONAL MARKET FOR INFERIOR WILD PRODUCTS.

13. FARMING UNDER CONTROLLED CONDITIONS ALSO GIVES OPPORTUNITY FOR DETAILED RESEARCH ON THE PHYSIOLOGY AND REPRODUCTIVE BIOLOGY OF TURTLES. THIS IS OF DIRECT IMPORTANCE TO MANAGEMENT OF WILD STOCK POPULATIONS. MANY PROBLEMS WHICH WOULD BE DIFFICULT OR IMPOSSIBLE TO SOLVE IN THE WILD, BECOME COMPARATIVELY EASY UNDER FARM CONDITIONS. WE MAY EXPECT THEREFORE THAT TURTLE FARMING WILL RAPIDLY EXTEND OUR KNOWLEDGE OF TURTLE BIOLOGY, AT PRESENT MUCH RESTRICTED.

14. INTENSIVE TURTLE FARMING IMPLIES THE USE OF FOOD STUFFS GROWN SOMEWHERE ELSE AND THUS BREAKS THE NATURAL BIO-CYCLE, BUT SO DOES ALL INTENSIVE FARMING, NOTABLY THE POULTRY INDUSTRY. THE ALTERNATIVE OF RANCHING TURTLES ON NATURAL PASTURES IS ATTRACTIVE, BUT WOULD REQUIRE THE DEVELOPMENT OF PSYCHOLOGICAL OR OTHER NON-MECHANICAL METHODS OF RESTRAINING THE ANIMALS.

15. DURING HUMAN HISTORY THE HUNTER-GATHERER OF THE LAND HAS LARGELY BEEN REPLACED BY THE AGRICULTURIST, AND IT IS INEVITABLE THAT THE HUNTER-GATHERER OF THE SEA WILL IN TIME BE REPLACED, AT LEAST PARTIALLY, BY THE MARICULTURIST. IN THIS ADVANCE, TURTLE FARMING IS CERTAINLY NOT THE LEAST AND IS PERHAPS THE MOST PROMISING OF CURRENT PROJECTS AND SHOULD RECEIVE EVERY ENCOURAGEMENT.

16. IN THE WORDS OF ARCHIE CARR (1967) AT THE END OF HIS CLASSIC BOOK "A TECHNOLOGY OF GREEN TURTLE HUSBANDRY WILL HAVE TO BE DEVELOPED. ONCE THAT

IS WORKED OUT IT WILL BE A DOUBLE BELSSING: PEOPLE WILL BE FED AND THE SPECIES WILL BE SAVED".

17. AS MENTIONED ABOVE, MARICULTURE LIMITED IS ACTIVELY ENGAGED IN FINANCING ALL ASPECTS OF RESEARCH INTO THE LIFE CYCLE AND CONSERVATION OF CHELONIA MYDAS, REFER THE FOLLOWING BRIEF DETAILS:

(1) 1970/73 - OVER 200 TURTLES AGED 10 MONTHS WERE RELEASED FOR CONSERVATION ON ASCENSION ISLAND.

1972 - MARICULTURE SPONSORED A PROJECT FOR THE RELEASE OF OVER 700 HATCHLINGS ON ASCENSION ISLAND.

1973 - MARICULTURE HATCHED AND RELEASED 3426 TURTLES FROM EGGS COLLECTED FROM DOOMED NESTS. DETAILED DOSSIER RECORDINGS MADE ON THIS PROGRAMME.

(2) 1972 - 500, 1-2 YEAR OLDS RELEASED IN SURINAM FOR CONSERVATION. TWO PERCENT OF TAGS HAVE BEEN RETURNED FROM THESE ANIMALS.

1972 - MARICULTURE SPONSORED BUILDING OF SIX PENS FOR THE SURINAM GOVERNMENT TO RAISE BABY TURTLES ARTIFICIALLY HATCHED FROM DOOMED NESTS, FOR RELEASE IN LOCAL WATERS.

(3) BETWEEN 1969 - 1973 600 YEARLINGS RELEASED IN COSTA RICA TO HELP A CONSERVATION PROJECT.

1973 - MARICULTURE SPONSORED THE RAISING OF 469 ANIMALS FOR LOCAL RELEASE.

1973 - MARICULTURE FINANCED DEPARTMENT OF AGRICULTURE, COSTA RICA, FOR OVER 2,000 EGGS TO BE HATCHED.

(4) GRAND CAYMAN RE-SEED PROGRAMME.

1972 - OVER 700 TWO YEAR OLD ANIMALS RELEASED.

1973 - FURTHER 29 TWO YEAR OLD CAYMAN GREEN TURTLES RELEASED LOCALLY. 100 HATCHLINGS ALSO RELEASED TO THE SEA FROM MARICULTURE'S OWN CAPTIVE BREEDING PROGRAMME, OCTOBER 1973.

(5) MARICULTURE FORWARDED TO THE STATE OF FLORIDA NATURAL RESOURCES 60 OF OWN STOCK TO HELP RESTOCK FLORIDA'S RESOURCES.

(6) FUNDED UNIVERSITY OF MIAMI PROJECT ON DIVING PHYSIOLOGY OF CHELONIA MYDAS.

(7) SUPPLIED ANIMALS TO MAJOR US FEED MANUFACTURER FOR NUTRITIONAL RESEARCH.

(8) MIAMI SEAQUARIUM PRESENTED WITH ALBINO ANIMAL FOR DISPLAY.

- (9) KEY WEST AQUARIUM, USA, SUPPLIED SPECIALITY FEEDS FOR LOCAL US CONSERVATION PROJECT.
- (10) PRESENTATION OF FIVE YEAR OLD EX-BREEDING STOCK ANIMAL TO DR CARR FOR NUTRITIONAL STUDIES AT CEDAR KEY, ANIMAL ALSO USED FOR TRACKING EXPERIMENTS.
- (11) ANIMALS SUPPLIED TO UNIVERSITY OF ARIZONA FOR STUDIES TO DETERMINE ESSENTIAL AMINO ACID REQUIREMENTS (QUALITATIVE).
- (12) ANIMALS PROVIDED TO UNIVERSITY OF WISCONSIN FOR COCCIDIA STUDIES.
- (13) ANIMALS SUPPLIED TO UNIVERSITY OF MIAMI FOR VIRAL DISEASE RESEARCH.
- (14) ANIMALS SUPPLIED TO MT. SINAI MEDICAL CENTRE, UNIVERSITY OF MIAMI, FOR BACTERIOLOGICAL AND HISTOLOGICAL STUDIES.
- (15) ANIMALS SUPPLIED TO US ABC LABORATORIES FOR POLYCHLORINATED BIPHENYLS RESEARCH.
- (16) USE BIO-VIROLOGICAL LABORATORIES SUPPLIED WITH ANIMALS FOR RESEARCH.
- (17) ANIMALS SUPPLIED TO KISSIMMEE FLORIDA FDA LABORATORY FOR RESEARCH.
- (18) ANIMALS SUPPLIED TO ENVIRONMENTAL PROTECTION AGENCY LABORATORIES FOR RESEARCH.
- (19) ANIMALS SUPPLIED TO SCRIPPS INSTITUTE FOR BACTERIOLOGICAL RESEARCH.
- (20) 40 ANIMALS SUPPLIED TO DR. ROBERT SHOOP, UNIVERSITY OF RHODE ISLAND FOR EUROPIUM TAGGING EXPERIMENT.
- (21) FACILITIES GIVEN TO UNIVERSITY OF ARIZONA FOR EXPERIMENTAL WORK ON 160 42-MONTH OLD ANIMALS PLUS 16 3,000-LITRE CAPACITY TANKS FOR HORMONE RESEARCH OF REPRODUCTIVE BIOLOGY.
- (22) UNIVERSITY OF ARIZONA SUPPLIED WITH 60 ANIMALS FOR VITAMIN A RESEARCH.
- (23) OVER 3000 PITUITARY GLANDS SUPPLIED TO UNIVERSITY OF CALIFORNIA FOR RESEARCH ON LUTEINIZING HORMONE () (LH) IN THE REPTILIAN PITUITARY GLAND THE PHYLOGENETIC SURVEY OF THE NEURAMINIDASE SENSITIVITY OF REPTILIAN GONADOTROPIN.

(24) TURTLE BLOOD SERUM SUPPLIED TO UNIVERSITY OF MIAMI FOR PROTEIN ELECTROPHORESIS STUDIES OF GENETIC DIVERSITY IN TURTLE POPULATIONS.

(25) MATERIALS SUPPLIED TO VIRGINIA MEDICAL SCHOOL FOR COMPLETE NEUROANATOMY OF TURTLE BRAINS, BOTH DISEASED AND NORMAL IN PRELUDE TO EXTENSIVE LABORATORY-TYPE ANIMAL BEHAVIOUR EXPERIMENTS.

(26) DEPARTMENT OF BIOLOGY, UNIVERSITY OF MIAMI, 30 TURTLES FOR STUDY OF ION EXCHANGE.

(27) UNIVERSITY OF MIAMI - MATERIALS SUPPLIED FOR STUDY OF MEMBRANES OF THE SALT GLANDS BY SOPHISTICATED TECHNIQUE OF FREEZE ETCHING.

(28) UNIVERSITY OF CALIFORNIA - RESEARCH ON SERUM, CELL CULTURE AND DRUG EFFICIENCY.

(29) UNIVERSITY OF MIAMI, SCHOOL OF MEDICINE, FULL RESEARCH PROGRAMME ON TURTLE HERPES-VIRUS ELECTRON MICROSCOPIC CELL CULTURE.

(30) MATCHING FUNDS AND MATERIALS SUPPORT OF UNIVERSITY OF MIAMI NOAA SEA GRANT RESEARCH ON CUTANEOUS LESIONS IN MARINE TURTLES 1969.

(31) MONETARY AND MATERIAL SUPPORT OF GRADUATE STUDENT (MS) PROJECT UNIVERSITY OF MIAMI ROSENSTEIL SCHOOL OF MARINE SCIENCE FOR DEVELOPMENT OF EXPERIMENTAL COCCIDIOSIS IN THE GREEN TURTLE.

(32) TURTLES AND FEED SUPPLIED TO THE MIAMI SEAQUARIUM (DR. CARL CHAPMAN) FOR RESEARCH PURPOSES.

(33) COCCIDIAL OOCYSTS FROM GREEN TURTLE SENT TO DR. LOUIS LEIBOVITZ FOR IDENTIFICATION AND DESCRIPTION. DR. LEIBOVITZ WILL PUBLISH.

DIVISION OF CONSERVATION AND RESEARCH.

REGARDS MIKE

February 21, 1974

Mr. Michael Goodier
Mariculture, Ltd.
Box 645
Grand Cayman Island
British West Indies

Dear Mike:

I have just reread the November 20 letter from T. J. Robinson, Professor of Animal Husbandry, the University of Sydney, Sydney N.S.W. 2006 to Sir Alan Parkes and Sir Alan's response of December 12. From what little I know of the situation in Australia, Dr. Bustard was responsible for a turtle farm which appears to be a huge flop. Evidently, this got to be a political hassle and Dr. Carr was invited to Australia and, based on certain recommendations made by Carr, Bustard was put back in charge of the project on the basis that it be commercial and that the government's sustained contribution would be limited and only until it was "commercially viable".

Would it be possible, Mike, for you to have someone - probably in your Division of Conservation and Research - to get the "true story". As I understand the story, Archie Carr appears to have saved Bustard's hide - in which case, Bustard will be in Carr's pocket at the next Marine Turtle Specialty Group meeting. Regardless, apparently Archie went on record with a lot of commercial overtones not at all in keeping with the context of his letter of December 18, 1973 to me. In any event, I think we should track this down to try to determine how the straight scope can further our position - particularly as that position is now effected by potential endangered species legislation and Carr's apparent endorsement of commercial turtle farming when it's in his best interests to do so!

Yours very truly,

Irvin S. Naylor

cc: M. Fisher, K. Norman, J. Hendrickson

*Chasing - can
you help?*
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New Hope
For
The Green Sea Turtle

—(青海亀の新たな期待)—

和訳 菅沼 弘行

昭和52年10月

(1977)

(小笠原水産センター内)

new hope for the green sea turtle

青海亀の肉や甲羅やその他の製品の販売で商売をしている企業宣伝で、「青海亀の新しい希望」を主張するのは、逆説のように思われるようだ。しかし、その主張がMariculture社の販売人や学者によりなされているのは事実である。この主張を維持するように、このパンフレットは経済・研究・歴史やMariculture社の背景・精神を語っている。

最初に逆説に挑んでいるように思われることは、単なる事実ではなく真実であるということに心の広い読者は賛同してくれることであろう。そして、Mariculture社の成功と成長と *Chelonia Mydas* - 青海亀 - の残存との間に直接的な関連がある。

history in brief: the turtle

人類は地球上では比較的新しいが、亀類と比較してみよう。⁷⁹多くの亀はおよそ6000万年前の始新生に繁栄し、それに比べ *Hominidae* (人類の祖先) はほんの2000万年~3000万年前の中新生代まで現われない。そして *Homo Sapiens* は10万年前まで現われないのである。知識の存在した最も早い時代から、亀は人類の世界で重要な地位を占めている。北部Australiaの原住民は亀を族長として礼遇していた。あるBurmaの一族は亀を神と考え、Pagodaの神聖なる地にそれを住まわせ、特に用意された御馳走を捕えられた神々に与えた。反面、亀の肉の食用についても、歴史の中によく現われている。Romaの歴史家のPlinyは亀

の内の食用を充分味わい実用的な洞窟に住んでいて、反面亀を神の動物として崇拜していたRed Seaの入江の近くの一族のことを書いた。Mexico湾と大西洋の暖水域に住んでいたCaribbeanは亀の島に生活環境が悪まれていた。ここでも人類は亀のステーキを賞味しながら、宗教的に繁栄してきた。10世紀にUxmalという偉大なYucatanの町を築いたMaya族は多くの健物に器用に石に彫刻した亀を飾り、それを「亀の家」と呼んでいた。

その後、ColumbusがCubaの南の島々にやって来て、そこで彼は陸や海がまるで小さな岩を散りばめたように見える程の亀が海岸や浅瀬で泳いでいるのを見た。このことが彼にこれらの島々をLas Tortugas と呼ばわしめ、今日、我々はCayman諸島として知っている。Columbusの後、すぐにEuropeの探検家たちは、その当時の船の食卓のみじめなものから歓迎されるべきものとして、亀の肉を賞讃するようになった。18世紀の食通たちはこれを「肉は柔らかく、ある部分は鳥肉のようであり、ある部分は子牛のようである。」と説明した。この味のよいことが青海亀を有望にした。この種が海亀の中で最も価値がある。しかし、それはこの種が殆んど全滅する原因ともなっていた。西大西洋ではCaribbeanと暖水域の海岸の人々が住み、そして亀を獲り卵を殆んど獲った。12世紀の中頃より、青海亀が滅亡の方向へ向うのは無理はない。Florida大学の海洋生物学者Dr. Archie Carrは「群れをなした上り亀が集

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ま、それだけ多くの海岸を今では誰も見ることはない。そして過
利用の代償として卵の採集の減少を招いている。」と述べている。

今世紀の中頃にた。て、海洋科学や生物学などの研究の成果
を以。てして、人類は青海亀の乱獲と減少を関連付け始めた。
人間は自然の微妙な均衡をくらつかせている。それとわうのは
青海亀は500頭のうち1~2頭の仔亀しか親として生き残ること
できないからである。青海亀の将来の展望について、今日実用
化しているが、1960年初期に一連のものとして始まった。それは
Florida Keysで海の研究を始めた学者たちにより行なわれた。
ち。うどこの研究はCayman島に始まった。研究と思考は研究者
たちE. コッパンフレットの始めの逆説的結論に導いた。青海
亀の種としての残存は、もしその動物の肉や他の価値ある生産
物が事業化すれば保証できる。このようにしてMariculture Ltd
の計画が生まれた。

history in brief: mariculture, Ltd.

1960年の後期に新しい冒険の機が熟した。それは世界初の海
亀の「養殖」の企業化である。肉と骨による生産物の世界の
市場は大きくなり、成長していった。しかし未開地での亀の供
給が減少していた。率先的な自然保護者や学者は、すでにこの
パンフレットのテーマとして述べていることを次のように言
っている。

「もし海亀が残るとしたら、それは養殖に違いない。」

(Dr. Jacques Yves Costeauが彼の有名な海洋調査映画の一つでも、ている。)

「青海亀は世界の最も重要な輸出額であり、海産物の市場が必要である。」(Professor Harold F. HirthがU.N. Food and Agriculture Organizationへの報告で述べている。)

「Chelonia Mydasが半養殖の内食用動物として価値がないというのは事実ではない。養殖の望ましい発展は海から食糧を得る手段を広げるばかりではなく、広い海の海産物の量の減少を早く解決できる。」(Dr. Archie CarrがInternational Union for Conservation of Nature and Natural Resourcesで述べている。)

一方、標が熟しているという事は、青海亀の知識はまだ関連性に乏しいが、充分な研究は信頼できる科学性を以て、完全に基礎付けされた企業としてうまく運営して成功する可能性を暗示する番実があるということである。このような考えが1968年8月にMariculture社の設立を導いた。Grand Cayman島がいろいろの理由によりこの会社の本拠として選ばれた。最近では非常に減少しているが、歴史的にCayman島は自然の青海亀にとって恵まれた生息地であり、摂餌場所である。Cayman諸島は非常に安定した統治と健全な経済状態にあり、有能で勤勉な住民のいる大英帝国の植民地である。航空便が中南米・カリブ海の島・マイアミと結んでおり、ヨーロッパからでもマイアミ経由で島に手軽に行ける。Cayman島の人々と同様、全ての環境・政治的・経済的・気象的に一歩都合がよい。

会社の管理・運営は、地域的Cayman島の特色を反映し、連合王国とアメリカ合衆国から管理者と科学者の強い連帯感を以って、行なっている。最初に会社の方針として、青海亀の飼育・交配・繁殖地・孵化・生態の現実面の研究に重きを置いている。これは海亀に関しての知識が豊富ではないし、陸上や海上で養育するにはこれらのものによるからである。Mariculture社は又、種としての青海亀の維持管理を目標とする計画にも重きを置いている。即ち、その計画では亀の孵化や成長に関して、自然のものより率がよいという結果によるものである。これはMariculture社自身の、種の保護における商業的関心と自然保護者の関心と同じ目的でいかに一致しているかというよい例である。会社の設立以来、Mariculture社は研究と保護に多くの投資と多くの人材の補充を行なってきた。そして、これらの事を経けて行く事はMariculture社の仕事の一貫として当然の事である。実際、会社は継続する結果として、海亀の産卵行為により健康的な仔亀の孵化が行なわれる歓迎や者を、もとのような休息地にしていく。会社が研究や保護を継続するのに増大する投資の為に、会社が商業的な方面に重きを置くのは当然のことではあるが、亀に関して言えば、その事自体が歴史上始めて世界中の青海亀の減少を逆転させる確証があるので、非常に有益な最終結果を得ることが出来る。

Grand Cayman島にあるMaricultureの本部と、そこから遠く

離れている場合もあるが、全ての研究や保護活動には三つの関連した事柄がある。それは先づ第一に商業的目的、第二に自然保護者たちが *Chelonia Mydas* の保護と復帰に貢献していること、第三に科学者達が青海亀についてより深い研究に従事していることである。実直で着実な計画をいろいろな分野で遂行している Mariculture 社の背景には、この関連した事柄がある。

則ち、荒れ果てた沿岸から健康的な稚化をさせる為には「定められた運命」の卵を救うこと、最も有益な食糧であるということとを立証する実験、そして数が非常に少ないということである。

(さらに Mariculture 社の研究と保護活動は、自然保護者や科学者の為には意味深長な言葉で会社の業績の価値を文書で証明するように討議されている。)

作業を毎年通した結果、Mariculture 社は共同作業をやめ、亀に従事する科学者と海洋生物学研究室を会社の内部に組み入れた。会社は亀についての科学的技術を発展させる為、亀の健康と高揚の為、通常と臨時に顧問として、生理学・微生物学・ウイルス学の分野で優れた科学者を保有している。多くの研究者の為には、受精した卵・孵化した仔亀・充分成長した亀を供給することで援助を行っている。そして、それは Grand Cayman 島で実験用の囲いや水槽を使用することにより可能になっている。

Mariculture 社のより重要な計画の一つに非営利的な Division

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of Conservation and Research の後援ということがあり、Grand Cayman 島の養殖場に本部を置いている。会社は資金と実際的な援助で Division を促進している。要するに Mariculture 社の広範囲に渡る研究や保護活動の援助の最初の企業目的は確かに事実上商業的であったが、最終的な結果として利益は少しもない。多くの研究や保護の任務は商業的には会社に直接的な利益をもたらさない。それ故に「又、役に立つ副産物と呼ばれてもいる。一つの側面としての会社の容態は、この点でも記載するに値する。

動物を本当の姿で扱っており、これは低開発の熱帯の島々に紹介されているわずかな企業の中の一つである。創立より2〜3年で今日まで Mariculture 社は、すでに Grand Cayman 島で最も大きな民間の雇用者になっている。1973年の販売では亀の生産品がこのイギリスの植民地で一番の輸出商品となっている。これまでになるまで Mariculture 社は300万ドル以上投資してきている。この面に於ては味濃たるものがあるが、他の面では非常に恵まれて来ている。会社の継続する成長と成功は一として今後の利潤追求は—Mariculture 社の能力が亀の卵を採集し続けることにはよっている。(これは大部分孵化が起らない不妊な土地からのものである。) そして Mariculture 社の養殖された亀の製品の主な世界市場への継続する紐がりによっている。しかし、これらの Mariculture 社の活動は、自然の亀の乱獲による生産品と養殖された亀の生産品及び秩序ある採卵との間に相違をなくしてい

る。自然法則と確固たる目的を持つ、大国際協定を設定することによりその相違を指摘できるかもしれない。もしこれらの協定とこの法則がこの重要な相違を表面化しなければ、その影響は会社とまじめな科学者と誠実な自然保護者によって進められている目的と逆の結果を招くことになる。

電の乱獲と世界の「黒い市場」を通して、その生産品の供給は増々増大するばかりである。全ての人々がその種の保護を望んでも、電は減少し、絶滅の方向へ向かっている。会社が完全に電の研究と保護活動を絶てて行ったり、それに関する研究や保護に援助をするのは不可能なことになるであろう。

A major breakthrough by Mariculture and "new hope for the green sea turtle"

青海亀の種の復讐に関与している人々にとって重大な歴史的な出来事が1973年5月19日に起きた。

その日、Grand Cayman島のMariculture社のTurtlelandで飼育中交尾していた雌の青海亀が60日後に孵化する卵を産む為にMaricultureの人工海岸に遡り上って来た。この事は、*Chelonia Mydas*が捕らわれの状態でも完全な繁殖をするという一歩であった。

関心のある科学者や自然保護者の皆さん、Mariculture社の観測者によるレポートの抜粋を見て下さい。

「3年前(1969年)雌雄の青海亀がSurinamの産卵海岸で捕えられた。GuyanaとCosta RicaのものはMariculture社のGreat

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Rockの本部の人工飼育池で飼われていた。それは亀の卵の完全人工孵化生産が出来るまで、そして経済的に独立するまでの長い戦いの一歩である。重要な問題は研究や実験を行ない、飼料・環境・水性・交尾率・飼育密度を調べることである。しかし全くの暗中模索で経過は遅々として捗どらない。だが研究と投資と待期の3年間の報いが交尾活動の起り始めた1973年の4月にやって来た。交尾活動は今年の早期にSurinamの産卵海岸で捕えられた二頭の雄の亀により刺激されたように思われる。これらの二頭の雄との際会の前に三年間に一二度だけ交尾活動が観察されている。新しいSurinamの二頭の雄が1973年4月12日に池に入れられ、そして30分たたたない内にこれらの亀の二頭が交尾した。

交尾活動はこの後頻度を増し、新しいSurinamの雄だけではなく、2~3年飼われていた雄も加わっている。雌はSurinam・GuyanaとCosta Ricaからのもので交尾活動が観察された。交尾活動はこの日より6月4日まで、ごく自然に続けられ、雄と雌が戯れたり、そういう試みをしたりのが随時観察された。

最盛期には交尾活動が一度に回組ものベアーで行なわれるのが観られた。交尾活動は青海亀にと、て長い行為である。一つのベアーが12日間も完全に交尾しているのが観察された。亀は人為的な環境の中でも普通の求愛と産卵行為を示す。最初の産卵の試みは交尾活動が見られて35日で現われた。何頭かの亀が

夜の間人工海岸に這い上って来、体の大きめの穴を掘り、たが、産卵を行なわず水の中へ戻り、て行った。38日目に始めて産卵の穴を掘り、68個の卵を産んだ。この穴に産卵された卵が今孵化し、61匹の健康な仔亀が産まれた。この孵化は捕えられた状態では最初の出来事である。

産卵は少しづつではあるが続けられ、9個の穴が最初の産卵より8週目に出された。16頭の直した亀が現在までに産卵し、9頭は Surinam - Guyana から来たもので、7頭は Costa Rica のものである。

これらの亀の産卵行為は人為的な環境にも関わらず、天然で見られるものと同じように思われる。

再産卵の間隔は割合一定していて10日間である。10々の亀は5回産卵する。とくに多産な個体ではこの報告書のできるまで898個の卵を産んでいる。Surinam と Guyana の一回の産卵の平均は139.67個で、卵の平均の大きさは45.00mmである。Costa Rica の亀の平均は一回の産卵につき83.78個で、卵の平均の大きさは43.85mmである。

Mariculture の人工設備の中でこれらの「飼われている」亀の産卵行動が、Cayman 島の天然のものと同様の産卵期間中に起っているとすることは重要なことである。Surinam や Guyana や Costa Rica の海岸から持って来た我々の亀は季節的に産卵期の違う Cayman の状態にうまく順応させている。

現在までに合計8000個以上の卵が集められ、1973年の産卵シーズン中には10,000個以上になるだろう。そして管理された状態で90%以上が孵化するであろう。人工的に亀の卵を孵化させることは亀の「養殖」の分野に於いて実に重要な問題である。大勢の卵の生産は現在、我々の養殖技術を精練させることと、飼育量を増加させることにかかっている。養殖ということを通じて、生産の循環を成功させるという将来の展望は極めて重要性を帯びている。より早い成長、より健康的な亀の発生は淘汰は現在可能性がある。亀の養殖は天然の産卵にたよることなく、完全養殖を行なうということによって将来を考えている。完全な自給による養殖の運営は、亀の肉や卵の生産物を世界の市場に供給でき、商業的目的の為に減少している天然の亀を獲ることを押えることができる。我々は天然の減少している亀が、Maricultureにより畜養されている亀で再補充できると将来を考えている。-----」

上記の報告は、このパンフレットに於て前に引用された文をかんがみて、非常に重要な事柄を引き出している。Dr. Jacques Yves-Costeau, Pro. Harold F Hirth, Dr. Archie Carr の考えは、実現化への発端となっている。

Some other example of Mariculture Research and Conservation activity

企業として養殖を行ない、充分な飼育料を購う施設を作るの

に天然の卵を採卵してきて以来、Maricultureはこの採卵行動も又、種の保護に貢献し、健康的孵化を最大限に活かしていることを確信し、その指針と手引を今まで遂行して来た。

もちろん、全ての卵の採卵は、産卵海岸の管轄権のおき当局の認可を以て行なわれて来た。Maricultureにより孵化させる為の大部分の卵は、自然の成行きとして孵化する可能性のない荒れ果てた環境から選ばれる。これは産卵海岸が、多量に遊炭の成分を含んだ砂でできている為である。それは殆んど卵を奇形にする。他の場合にも、卵は腐敗しやちい海岸に産み出されることがある。それは殆んど卵が、時期早々に海水に流れて腐り、孵化に失敗する。

このような環境から採卵された卵により、Maricultureは完全に健康な仔亀の割合を高くすることが出来る。以前の研究で証明されているが、砂の中に含まれる火山灰や火山塵の割合が高いと大部分の卵を奇形にする。このような海岸から1973年の4月に採卵された5297個の卵の内分けが図2のグラフで示している。

採られた卵は、Maricultureの人員により開発された特別の型の発老スチロールの孵化箱に入れられ、人工的に孵化させる。孵化した後、仔亀を内湾の水の中まで海岸を遠わせ、生存の可能性を高くする為、仔亀たちを網に入れ沖へ運ぶ。何故かと言うと、この若い仔亀たちは、浅瀬で腹を空かせて待っている内

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食性のスズキ類やハタ類にねらわれるからである。このように
放された3426頭という数は、自然の突発的な行爲を逃れ難化し、
海へ行くものと比べれば、ずっと多い。

new insight into nesting and egg laying habit

Mariculture の *Chelonia Mydas* の研究が、科学的知識に貢献し
ているもう一つの例として、図3と図4で産卵に関していくつ
かの発見を示している。

青海亀が産まれて、おそろく3年かそれ以上たつて、産卵の
時期が近づくと、彼女達は自分達の産まれた海岸へ戻つて来る
という本能的なものが、研究者達にとつて最も大きな興味のある
分野である。

Mariculture の研究により、雄亀は実際に自分の産卵した海岸
に戻つて来る傾向があるが、その本能は思つていた程的確では
ない。しばしば、産卵する亀は数百ヤードから数マイルまで誤
ちを犯す。しかし、それには雄亀が産卵に戻つて来る前に、彼
々が放浪する数千マイルという距離と数年間の期間を考えれば
印象的な航海の至宝である。

図3のグラフでは、数夜の産卵観察で印を付けた亀の20%以
上の雄亀が1つ以上の海岸に上陸していることを示している。
しかし、ロマンチックな伝説は決して壊されてはいない。と言
うのは、75%以上の亀が一つの海岸に上つている。そして、反

対する決定的な情報の欠陥により我々は、大部分の産卵が自分達の産まれた海岸に上陸し、産卵しているという確信をし、かり掘くことができる。

egg laying "by the clock" and (maybe) by the moon

1973年2月5日から2月28日の期間に、Ascension島での注意深い観察により、青海亀の産卵には非常にはっきりとした時間のパターンがあることが解った。

図4では、一ず、と知られていた事ではあるが全て夜間に一産卵は21時15分から05時15分までの間散らばっているが、22時00分から24時00分までカーブに明確な山があることを示している。産卵パターンと夜の時間について、正確に指摘する手助けをする上記の研究で、長い期間の循環に関して産卵パターンの興味ある傾向が表われている。

Maricultureの研究は、前文が示している非常にはっきりとした傾向を重視しており、その傾向というのはAscension島において、半月周期である10日から15日の期間で再産卵をするということである。(図5)

しかし、他の産卵場所でのMaricultureの観察を見た場合、グラフはそれ程単純な形にはならない。例えば、Surinamの青海亀の産卵パターンは一定した潮の周期に一致している。そして月と潮の干満には強い相関関係が見られるが、研究者にとって解決

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できない問題がまだある。

上記で引用された資料は、会社内で研究されたもののほんの一部である。そして、どの程度密接な関連があるかというはっきりとした指摘は、Maricultureの商業的な関心と、これらの魅力ある動物についての知識の集積を待つより他にない。実際Maricultureの努力は、科学者や自然保護者たちをよくバックアップしている。そして、データの蓄積を行なう努力の継続は、Maricultureが成長し続ける限り報われるものである。この点に於ても、Maricultureの成功は「青海亀の新しい希望」ということを根拠に置いている。

the important of developing food from the sea

このパンフレットで、ここまでは、真摯な研究者や誠実な自然保護者が、Maricultureの成功を重要なと考えるいろいろな事、を討論して来た。簡略して述べると、

1. 商業的な養殖だけで *Chelonia Mydas* の長い期間の保護を保證できるという指導的立場にある権威者の意見。
2. 亀の研究と保護に対して、会社の300万ドル以上の資本と永年に渡る作業への投資。
3. 自主的な研究者の仕事のMaricultureへの貢献。
4. 優秀な養殖された亀の内とそれによる生産物の有効性が、天然の亀の流通における「黒い市場」への経済的刺戟を排除

している事実。

5. 青海亀について科学的知識における Mariculture の重要な貢献。

6. そして、恐らく最も重要な、獲らわれの身でさえも交尾—産卵—孵化というサイクルを最初に起こさせた Mariculture の業績。

ということである。

もう一つより重要な点を置かれるべき問題がある。世界の人口が、世界の食糧の供給の増加の割合より驚く程早い割合で増えている。科学者は世界の食糧の供給が2000年までに3倍になると言っている。

それにも関わらず、養蚕や牧畜に適した土地には限度があり、そしてその土地がどの位の生産力増加ができるかにも限度がある。一方では、5フィートの深さで1エーカーの面積の海水があれば、20万ポンドの青海亀が生産できると見積もられている。同じ水の量で「海洋牧場」を真剣に考慮しても、4000ポンドのなまずか、600ポンドのサバヒーの2つの違った種類だけしか生産できない。そして対照を明らかにする為には、1エーカーの土地ではたった800ポンドの牛肉しか生産できない。これらの事実がはっきりすれば、思慮深い人々—科学者・当局の人々—そして多くの老若男女—は約4分の3が海水で覆われているこの地球での人類の未来を考え、海か

らの食糧の車を考えるのは至極当然のことである。

魚の内は非常に高蛋白質であり、青海亀の企業例養殖技術の Mariculture の進歩は多くの重要性を秘め、はっきりと、Mariculture を支持する考えの可能性の現実化は、青海亀の保護や復帰ばかりではなく、人類自身の糧食物の為に充分な約束をする。

SUMMARY

国際協定や国家の法律が、Mariculture によって為された企業
的な青海亀の研究や養殖の信頼の出来るものを、奨励すること
にでもなれば、その期待は多くにでも進展するであろう。

一つには養殖された動物の内やその生産物の方が天然のもの
より、と優れており、一つには Mariculture のような販売方法
は、魚の内やその生産物の充分な供給を世界の市場に踏える。
このように無益な天然の魚の不合法な捕獲をするのを一様な水
準で価格や供給で押えている。

商業的でない Mariculture の研究や保護は、商業的に成功した
多くの資金を利用できるので継続出来るばかりではなく、実際
に拡張出来る。そして最終的に Mariculture が自分のところで再
生産できるようになると、その時は天然の棲息地で放された仔
魚の割合も、彼ら自身で種を維持することが出来る群れになる。
そんな将来が近いうちにやってくる。このように、多く人懸か
るのは奇妙に美しい動物が世界の海に復帰するのが早められてい
る。実際問題、Mariculture は既にとうな、て来ている。それは。

亀の研究と保護活動により、特に畜養している亀の完全な再生産に成功することにより、そして商業的な「養殖」技術により、「青海亀の新たな期待」として脚光を浴びている一現実化されている。

今日、一生を捧げている科学者やまじめな自然保護者が、新しい期待のこの光が普遍的になってきているのを知ることが出来る。それは天然の亀の乱獲されたその商品と、商業的に養殖された亀の商品を識別する規則をつくるのに、おらゆる努力をすることにかかっている。そしてこの規則で、Maricultureのような責任のある信頼により、注意深く選抜採卵を行ない卵を供給する。

こうしてMaricultureでは、従業者や科学者や保護者が一つの目的に向って突き進んでいる。只一つの目的「青海亀の新たな期待」の為に。



May 11, 1981

Richard Fitter
Fauna & Flora Preservation Society
c/o Zoological Society of London
Regent Park
London NW1 4RY
GREAT BRITAIN

Dear Mr. Fitter:

Wayne King has asked me to comment to you on several articles that appeared in the British Herpetological Society Bulletin, No. 2, 1980, concerning Cayman Turtle Farm. In addition to the articles he sent me (by Brongersma; Hughes; Johnson; Pickett and Townson; and the Marine Turtle Newsletter), I have also had brought to my attention articles by Townson and Pickett and Townson that appear to be from another issue of the same periodical. The one characteristic that all these articles share in common is a serious misunderstanding of the Convention on International Trade in Endangered Species of Wild Fauna and Flora ("CITES") and the history of the actions taken by the United States under its Endangered Species Act to control trade in green sea turtles.

First, several of these articles imply that CITES has a much longer reach than it in fact does. The only trade regulated by CITES is international trade; that is, commercial activities within a country are completely outside the ambit of CITES. Thus, if a country wanted to encourage the establishment of turtle farms so as to provide a source of protein or other products for its own people, CITES would not stand in the way of that. Pickett and Townson's statement that "recent developments . . . may have far reaching consequences . . . for the principles of the breeding of any wild animal for any purpose in captivity" (emphasis added) is therefore a gross exaggeration for two reasons. First, if

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MAY 13 1981

the purpose is to supply products to domestic markets (e.g., the Malaysian enterprise cited in the editorial from the Marine Turtle Newsletter) nothing in CITES will hinder that. Second, nothing in CITES limits captive breeding or even international commercialization for any animal species other than those whose conservation status has been recognized as most imminently endangered and placed on the CITES Appendix I.

Second, there is also implicit in several of these articles the erroneous view that if an animal specimen has been "bred in captivity" (however that is defined) CITES permits it to be freely traded in international commerce without restriction. In fact, CITES requires that before international trade in any captive bred specimens of Appendix I species may be permitted, it must first be determined that such trade will not be detrimental to the survival of the species. That is, answering the question whether or not a particular specimen was in fact bred in captivity is really just the start of the inquiry, not the end. The remainder of the inquiry required by CITES focuses on the effect of that trade on the species as a whole, including the question whether such trade will stimulate a demand for the species which has an adverse effect upon its survival. Though Mr. Townson finds unconvincing the argument that trade in farmed turtle products is likely to stimulate demand, the United States concluded, after a comprehensive investigation in which Cayman Turtle Farm participated, that such detrimental stimulation was likely. Cayman Turtle Farm then challenged that conclusion in a United States court and the court held that the evidence accumulated was more than ample to support the U.S. view. Though Cayman Turtle Farm appealed the court decision to a higher court, their appeal was limited to other issues and abandoned this fundamental claim.

A third recurring erroneous view, stated most bluntly in Mr. Johnson's article, is that the definition of "bred in captivity" adopted by the parties to CITES was the product of some vendetta or conspiracy aimed at Cayman Turtle Farm. In particular, the requirement in that definition that a breeding operation show itself capable of reliably producing at least two generations in captivity is attacked. In fact, as the numerous affidavits referred to by Mr. Johnson demonstrate, the bred in captivity provision of CITES was never intended to be a loophole authorizing continued removal of Appendix I animals from the wild. Yet, unless a breeding program is shown to be capable of producing more than a single generation in captivity, that program will necessarily be dependent upon

Richard Fitter
May 11, 1981
Page Three

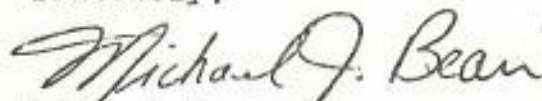
further removals from the wild in perpetuity. This fact was sufficiently obvious to the CITES parties when the definition was agreed upon that not a one of them cast a vote against it. Even Great Britain, which was always solicitous of the Farm's interest, had a major hand in crafting the definition.

The concern the CITES parties had about not sanctioning international commercial trade in Appendix I species where such trade is in fact dependent upon wild populations is well illustrated by the example of Cayman Turtle Farm itself. Essentially all of the products marketed by the Farm today come from one of two sources: turtles either hatched from eggs taken from natural nesting beaches or born to wild-caught turtles that have mated in captivity. Though the Farm has succeeded in having wild-caught adult turtles mate and produce offspring in captivity, it has had very little success in getting captive-raised turtles (i.e., those hatched on the Farm from eggs laid in the wild) to produce viable offspring. The first egg-laying by captive raised turtles occurred in 1975. Only 199 hatchlings resulted. In 1976 and 1977, only 51 and 24 such hatchlings were produced. By 1978, substantially more hatchlings were being produced by captive raised turtles, but few of those hatchlings survived. In fact, more than 85 percent of the Farm's total hatchling production in 1978 were dead by the middle of the next year. As a result, only about 150 of the hatchlings born to captive raised turtles in 1978 proved viable. In 1979, survival of hatchlings improved but hatchling production by captive raised turtles fell by half. The result was that fewer than 350 of the hatchlings born to captive raised turtles in 1979 were still alive by the middle of the next year. Comparable statistics for the 1980 hatch are not yet available.

The above figures take on significance when compared to the Farm's annual slaughter requirements of over 13,000 turtles. Even assuming that all the hatchlings alive one year after their hatching continue to survive until slaughter age of three or four, it is clear that the Farm still depends, and will continue to depend for the foreseeable future, on the production by wild caught adult turtles for more than 97 percent of its slaughter needs.

I hope these comments will be of use to you. If I can be of any further assistance, please feel free to ask for it.

Sincerely,



Michael J. Bean
Chairman, Wildlife Program

MJB/ry
cc Wayne King



ENVIRONMENTAL DEFENSE FUND

June 25, 1981

Dr. Archie Carr,
Department of Zoology
University of Florida
Gainesville, Florida 32601

Dear Dr. Carr:

Enclosed is a copy of a recent letter from J.R. Wood of Cayman Turtle Farm concerning releases of turtles from the Farm. You may find the information presented therein of interest.

W. Johnson, formerly chief executive of Cayman Turtle Farm, and now a consultant to the Farm, was in Washington last week visiting various federal officials in hopes of persuading them to reopen the U.S. market to the Farm's products. Reportedly, he met with considerable sympathy from Ray Arnett, who is Secretary Watt's Assistant Secretary for Fish, Wildlife and Parks.

Sincerely,

Michael J. Bean
Chairman
Wildlife Program

cc: ✓ F. Wayne King

Enclosure

MJB/ry

JUN 29 1981



Cayman Turtle

FYI,
Miles

14 April, 1981

Mr. Larry B. Barrett,
Center for Environmental Education,
1925 K Street, N.W.,
WASHINGTON,
D.C. 20006.
U.S.A.

Dear Larry,

Thank you for your letter of 25 March 1981. Cayman Turtle Farm released 150 2-year old turtles in 1976 in Surinam. These animals were notched and tagged using tags provided by Prof. Carr. During the following year over 20% of these turtles were reported captured by tags returned to Prof. Carr. The majority of the turtles were taken off the coast of Guyana, however, several were reported as far north as Curaçao and as far south as Rancho del Norte, Brazil. Prof. Carr told me he was very impressed with the number of tag returns (the best ever recorded) and felt that such returns indicated a positive conservation contribution.

Since October 1980 we have released approximately 2,000 turtles into the waters surrounding Grand Cayman. Since that time several sightings of turtles have been reported and I have personally seen 3 of our turtles which have been captured 2-3 months after release. In each case the turtle appeared healthy and in good condition.

It is my feeling that captive reared turtles do adapt to the wild environment without great difficulty. They learn to recognize local food sources and avoid predators. Consequently I am convinced that the local population will benefit from the release program.

The questions raised by Prof. Carr are certainly valid. As mentioned above I think turtles are more adaptive than might be believed, however it is essential that the environment must be capable of supporting the turtles. Both in Surinam and in Cayman the age of turtles released has been 1-2 years old and the local environments are acceptable. The release of 3 month old hatchling is a different situation in that if the natural habitat is indeed pelagic then it might be very difficult for the 3 month old hatchling to get out to the open ocean. I would think that hatchlings should be released as soon as possible after hatching.

During the coming year we hope to release approximately 10,000 turtles, the majority of which will be 2 week to 3 month old animals. Perhaps we will

Page 2.

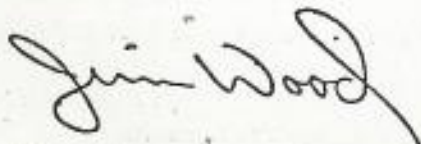
14 April 1981

Mr. Larry B. Barrett

get additional information following such releases. I would be very interested in pursuing the possibility of a joint research effort between CTFL and the Center with the objective of studying the fate of released farm reared turtles. One advantage of Cayman for such a study is that it is a relatively confined area. It should be possible to obtain the cooperation of the government and the local dive boat operators. If such a study could be well done it could provide very valuable information for the evaluation of such projects in other localities.

If I can provide any other information please let me know.

Sincerely yours,
CAYMAN TURTLE FARM LTD.



J.R. WOOD, Ph.D.
General Manager-Research

JRW:dc

CC: Dr. W.A. Johnson
Dr. Judith Mittag



M E M O R A N D U M

TO: Archie Carr, Jr.; F. Wayne King; Peter Pritchard;
George Balazs; David Ehrenfeld; Richard Felger;
Jack Frazier; Hilburn Hillestad.

FROM: Michael J. Bean

RE: CAYMAN TURTLE FARM

DATE: June 1, 1981

Because Cayman Turtle Farm is again receiving a fair amount of attention, I thought it would be useful to summarize their actual breeding results with "farm reared" turtles (*i.e.*, those hatched on the farm from eggs taken from the wild) and compare those results with the projections made to the IUCN Marine Turtle Group in 1975. As you will recall, the projections forecast that the farm-reared stock would quickly replace the captive-wild turtles as the principal source of the Farm's production. The hatchlings produced by farm-reared females in 1979 were forecast to provide more than 13,000 slaughterable turtles at slaughter age of three or four, enough to meet the Farm's entire slaughter needs. In fact, of the 606 hatchlings produced by farm-reared females in 1979, only 346 survived to June 1, 1980. Though that represents the best year to date, it constitutes less than three percent of the number forecast to IUCN.

Two observations need to be made about the attached table. First, the third and fourth columns compare the Farm's projection of the number of turtles surviving to age three or four (slaughter age) against actual survival to June 1 of the year following hatching. Thus, the fourth column may exceed the number that have actually survived, or will actually survive, to full slaughter age. The second observation is that the numbers in the fourth column were derived by multiplying the number of farm-reared hatchlings produced in a given year by the appropriate survival rates for that year. However, the survival rates represent gross survival rates of both farm-reared and captive-wild produced hatchlings. I have never seen data from the Farm breaking down these gross survival rates into farm-reared and captive-wild components. I therefore assumed equal survival rates for each. With the exception of this assumption, all the data in the attached table comes from the Farm itself.

Attachment

Environmental Defense Fund, 1525 18th Street NW, Washington, DC 20036 (202) 833-1484
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Cayman Turtle Farm Production
from "Farm-Reared Stock":
A Comparison of the Projections Made
to the IUCN Marine Turtle Group
in 1975 and the Actual Experience

	<u>No. of Hatchlings</u>		<u>Turtles Surviving to Slaughter</u>	
	<u>Projection</u>	<u>Actual</u>	<u>Projection</u>	<u>Actual Survival to June 1 of Year Following Hatch</u>
1975	300	199	144	N.A.
1976	600	51	360	N.A.
1977	1,650	24	1,072	4*
1978	5,760	1,115	4,608	149*
1979	17,280	606	13,824	346*
1980	28,800	N.A.	24,040	N.A.

* Calculated on the assumption that Farm-supplied gross survival rates are the same for farm-reared and captive-wild produced hatchlings.

N.A. = Not available.

IRVIN S. NAYLOR
R. D. 9
YORK, PENNSYLVANIA 17402

January 3, 1980

8

RECEIVED
JAN 10 1980
ADMINISTRATIVE OFFICE
OF THE PRESIDENT

Mr. Paul G. Pearson
Executive Vice President &
Chief Academic Officer
Rutgers University
Old Queens Building
New Brunswick, NJ 08903

Dear Mr. Pearson:

Thank you for your letter of December 17 in response to my letter of December 5 to Dr. Bloustein concerning the credibility of Dr. David Ehrenfeld.

I agree with everything you have said in your letter of December 17, including the fact that it was not in the highest tradition of good manners to refer to Dr. Ehrenfeld as a "bad apple"--and for that I apologize.

But, unfortunately, Dr. Ehrenfeld (and many of his colleagues) do not play the "published articles in scientific scholarly journals"--and--"debate at conferences" game according to the highest tradition of either good manners or fairness:

1) In the early 70's Ehrenfeld and a representative of Mariculture, Ltd. were invited to New York City to present papers on the conservation of green sea turtles. Mariculture's representative was our distinguished chairman, Antony G. A. Fisher, a very honest man who made the mistake of believing that Ehrenfeld would be equally honest when, at Ehrenfeld's request, they exchanged papers in advance of the presentation. Antony Fisher told Ehrenfeld of many of the misstatements and unsupportable conclusions drawn by Ehrenfeld, but Ehrenfeld did not temper either his presentation or his subsequent article in the January/February 1974 "American Scientist." Ehrenfeld knew that many of his statements and conclusions were incorrect and unsubstantiated; more importantly, I am convinced that he knew that his presentation would seriously harm the turtle farm from an endangered species legislative standpoint, but, recklessly, he carried on.

Mr. Paul G. Pearson
January 3, 1980
Page 2

2) "American Scientist," a "scholarly journal" (as referred to in your December 17 letter) refused to print even a summary of the paper which one of our consulting scientists, Sir Allen Parks, prepared in rebuttal to Ehrenfeld's article. How would you suggest that Mariculture, Ltd. should have coped with that problem?

3) Ehrenfeld, et al., continued to change the rules to the detriment of Mariculture, Ltd./Cayman Turtle Farm. When it became obvious that the farm would be self-supporting in eggs (a fact which Ehrenfeld still refuses to acknowledge), Ehrenfeld and his pals changed the interpretation of "bred in captivity" to mean a "closed cycle operation, self-sustaining and independent of wild stock"--an interpretation which they fully realized the turtle farm would be unable to meet.

"Debate at conferences" was what should have taken place in Washington at the State Department between November 26 and 30, 1979 at the "World Conference on Sea Turtle Conservation"--what did take place was a well orchestrated conspiracy by those opposed to turtle farming and ranching to discredit "Cayman Turtle Farm" and "railroad" the conference--you may be interested in reading the enclosed copy of my letter of December 5 to Russel E. Train.

Mr. Pearson, I no longer have any economic interest in the turtle farm and, in deed, am not a scientist-- I am an entrepreneur--the kind of businessman who creates capital with personally-founded, successful companies, one of which should have been Mariculture, Ltd. My only interest in the turtle farm now is the perpetuation of this purportedly endangered species and the public acknowledgement that there is a very strong possibility that it can be done through commercialization, as other threatened/endangered species may be saved if they are captively bred for commercial exploitation.

The problems, in my judgment, with the positions taken by Carr, King, Dodd, and, the worst of all, Ehrenfeld are:

1) They are "scientists" who cannot/will not acknowledge that lowly "businessmen" have been able

Mr. Paul G. Pearson
January 3, 1980
Page 3


to do that which they--with all their ivory tower omnipotence--cannot accomplish (i.e., guarantee the survival of the green sea turtle); that "businessmen" have no right to intrude into the scientists' (perceived-to-be) exclusive realm.

2) Personally, I think they are opposed to private commerce as an economic philosophy--although each of them is paid directly or indirectly through taxes or endowments or tuitions generated from those involved directly or indirectly in private commerce.

So, this is not just an argument as to whether or not the green sea turtle may be saved through its commercialization--this is an argument between "businessmen" wanting to guarantee perpetuation through exploitation and "scientists" who may be using the turtle to hopefully enhance their own scientific reputations.

You have a wonderful idea in that last sentence of your letter--Rutgers has a long and distinguished history of scholarly achievement. Why don't you ask David Ehrenfeld if he would be willing to debate me (and/or a representative of Cayman Turtle Farm) in front of the peers and an unbiased jury of scientists and businessmen as to whether or not Cayman Turtle Farm is a positive or negative influence on the conservation of the green sea turtle? Ehrenfeld almost turned himself inside out voting to "cut off discussion" on the Cayman Turtle Farm a few weeks ago in Washington at the World Conference on Sea Turtle Conservation, and I'll bet you ten bucks and give you odds of ten to one that he won't agree to the debate because, in my opinion, he knows (and has known for a long time) that his position is untenable and that, eventually, as the history of this unfortunate situation continues to unfold and is recorded in business annals (and I am seeing to it that it will be recorded), he will be justly discredited.

Yours very truly,


Irvin S. Naylor

jmm

cc Mrs. Mary Jane Singer
Dr. Edward J. Bloustein

PS You may be interested in the enclosed copy of the article from the November 23, 1979 "Caymanian Compass" concerning Senator Jepson's opinion of the turtle products embargo.



COOK COLLEGE • DEPARTMENT OF HORTICULTURE AND FORESTRY • 201-932-9711
P.O. BOX 231 • NEW BRUNSWICK • NEW JERSEY 08903

January 21, 1980

Dr. Paul Pearson
Executive Vice-President
Rutgers University
College Avenue Campus
New Brunswick, New Jersey

Dear Paul:

In his latest letter to you (Jan. 10), Mr. Irvin Naylor continues to accuse me of conspiring to persecute the turtle farm on Grand Cayman Island. If not completely insane he is certainly totally obsessed, and in a fashion that would be familiar to any psychiatrist blames his own spectacular financial failure in the turtle farming business on the people who warned him against it in the first place. His net of accusations now includes, in one way or another, The New York Academy of Sciences, American Scientist, The First World Conference on Sea Turtle Conservation, Dr. Archie Carr, Dr. Kenneth Dodd, and Dr. Wayne King -- in addition, of course, to me.

To identify my co-conspirators briefly: Dr. Archie Carr, as you know, is Graduate Research Professor at the University of Florida. Archie's honors include the Gold Medal of the World Wildlife Fund, the Eliot medal of the U.S. National Academy of Sciences, a medal from the Smithsonian Institution, and a knighthood from the Netherlands. Dr. Dodd is a well-known and respected herpetologist in the U.S. Office of Endangered Species. Dr. King is Director of the Florida State Museum, the former Director of Conservation of the New York Zoological Society, and the number two man in the Survival Service Commission of the International Union for the Conservation of Nature (Switzerland). As you can see, I am in good company.

During the last six years I have presented a grand total of three papers that have bothered Mr. Naylor. Each was delivered at a public meeting with ample opportunity for debate. At the recent meeting in Washington, which I helped to organize, we had delegates from 40 countries to worry about, in addition to Mr. Naylor's turtle farm (the meeting was held at the State Department, with additional sponsorship by Interior and Commerce, plus a number of private organizations). Nevertheless, we gave turtle farming more time than any other subject. The decision to cut off discussion of the turtle farm was made by an overwhelming vote of the delegates -- not by me. When I gave my own paper, Mr. Naylor asked questions. I answered them politely, and he

could have asked more if he had wanted to (and if he could have been heard over the laughter).

I am not anti-business -- but for sound scientific reasons which are shared by many other sea turtle experts, I am anti-turtle farming. I like sea turtles more than I like Mr. Naylor, and am concerned with their survival, which is now partly threatened by turtle farms. I don't feel responsible for Mr. Naylor's financial troubles with the farm; a number of us pointed out quite clearly that the biology of sea turtles makes turtle farming a risky and foolish waste of capital. If Mr. Naylor wishes to think that his business failed because of the paper I published in American Scientist, I suppose there is no way to get the idea out of his head.

But all this just for the record, and beside the point. Mr. Naylor seems to assume that American universities are run on Nazi or Soviet lines, and that his heavy-handed, libellous accusations will have some sort of effect on the Rutgers administration. If I may suggest it, the most appropriate answer to him would be no answer at all. You have already stated your position to him, and there is no point in encouraging further correspondence.

I enclose a copy of the American Scientist paper that got Mr. Naylor mad at me in the first place. If Mr. Naylor had bothered to understand what conservationists were telling him prior to 1974, perhaps he would have made life easier for himself (and for the First National City Bank of New York).

Sincerely,

David Ehrenfeld
Professor of Biology

cc: Marijane Singer
Archie Carr
Kenneth Dodd
Wayne King

encl.



Cayman Turtle

FYI,
Nutter

14 April, 1981

Mr. Larry B. Barrett,
Center for Environmental Education,
1925 K Street, N.W.,
WASHINGTON,
D.C. 20006.
U.S.A.

Dear Larry,

Thank you for your letter of 25 March 1981. Cayman Turtle Farm released 150 2-year old turtles in 1976 in Surinam. These animals were notched and tagged using tags provided by Prof. Carr. During the following year over 20% of these turtles were reported captured by tags returned to Prof. Carr. The majority of the turtles were taken off the coast of Guyana, however, several were reported as far north as Curacao and as far south as Rancho del Norte, Brazil. Prof. Carr told me he was very impressed with the number of tag returns (the best ever recorded) and felt that such returns indicated a positive conservation contribution.

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During the coming year we hope to release approximately 10,000 turtles, the majority of which will be 2 week to 3 month old animals. Perhaps we will

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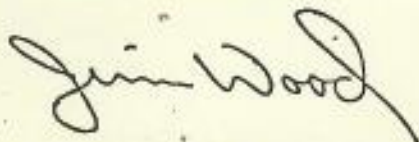
14 April 1981

Mr. Larry B. Barrett

get additional information following such releases. I would be very interested in pursuing the possibility of a joint research effort between CTFL and the Center with the objective of studying the fate of released farm reared turtles. One advantage of Cayman for such a study is that it is a relatively confined area. It should be possible to obtain the co-operation of the government and the local dive boat operators. If such a study could be well done it could provide very valuable information for the evaluation of such projects in other localities.

If I can provide any other information please let me know.

Sincerely yours,
CAYMAN TURTLE FARM LTD.



J.R. WOOD, Ph.D.
General Manager-Research

JRW:dc

CC: Dr. W.A. Johnson
Dr. Judith Mittag

NATAL PARKS, GAME AND FISH PRESERVATION BOARD

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RAAD VIR DIE BEWARING VAN NATALSE PARKE, WILD EN VIS

POSBUS 662, PIETERMARITZBURG 3200

INQUIRIES
NAVRAE

DR. G. R. HUGHES

OUR REFERENCE
ONS VERWYSING

E. 6/1 - Turtles

Please address all communications to the Director
Gebewe alle briefwisseling aan die Direkteur te rig

14 September 1981

George Balazs,
University of Hawaii at Manoa,
Hawaii Institute of Marine Biology,
P.O. Box 1346,
COCONUT ISLAND,
KANEHOE,
HAWAII,
96744

Dear George,

Thanks for your note of 16 July and the figures on Farm Reared Stocks from EDF. I didn't have these figures myself so I passed everything on to Jim Wood so that he could comment if he wished to.


I enclose his reply to me plus a reply to another enquirer plus yet a third copy of his figures right up to date.

Where you and I would disagree perhaps is on the significance of the figures. I suspect that you interpret these figures, as McBean clearly does, as doomsday guidelines. I don't. The real significance lies in the fact that it can be done. The acid test for the farm is whether they can improve the figures in years to come or perish.

In my philosophy I believe that they should be given every opportunity to succeed. Similarly it causes me no concern whatsoever that they have had a major success with wild bred adults. The removal of a few hundred adults green turtles from the wild (especially as eggs originally) worries me not the slightest provided it was done, as Mariculture and Cayman Turtle did it, with the blessing and cooperation of the country concerned. This is a rational use of a natural resource and quite acceptable to me.

However from the toe of Africa I continue to watch developments with interest and I really appreciate the flow of notes and articles that comes from you. As a Secretary you are a star even if we dont see eye to eye on everything. Many thanks. Looking forward to hearing from you again.

Yours sincerely,


for : DIRECTOR

UNIVERSITY OF HAWAII AT MANOA
Hawaii Institute of Marine Biology
P.O. Box 1346 - Coconut Island - Kaneohe, Hawaii 96744
Cable Address: UNIHAW

October 2, 1981

Dr. George R. Hughes
Natal Parks, Game and
Fish Preservation Board
P. O. Box 662
Pietermaritzburg 3200
South Africa

Dear George:

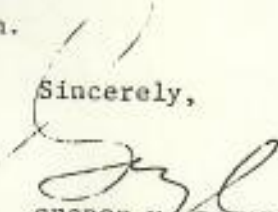
Many thanks for your letter of 14 September which included some kind words about my commitment to communicate current sea turtle information to you (and other Turtle Group members). It seems to me that this is one of the few concrete things we can do, as a group. I have tried to take the lead in this as Archie's assistant.

The only enclosure with your letter was a copied letter to John Rudge from Jim Wood dated 24 July 1981.

The reply from Jim Wood to your inquiry, plus a third inquiry you mentioned, was not enclosed. I will, of course, be interested to learn what was said about Mike Bean's summary.

Hope to hear from you soon.

Sincerely,



GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

NATAL PARKS, GAME AND FISH PRESERVATION BOARD

P.O. BOX 662, PIETERMARITZBURG 3200



T.A. "FAUNA"

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RAAD VIR DIE BEWARING VAN NATALSE PARKE, WILD EN VIS

POSBUS 662, PIETERMARITZBURG 3200

INQUIRIES
NAVRAE

DR. G. R. HUGHES

OUR REFERENCE
ONS VERWYSING

E. 6/1 Turtles

Please address all communications to the Director
Geliewe alle briefwisseling aan die Direkteur te rig

15 October 1981

George H. Balazs,
Assistant Marine Biologist,
University of Hawaii at Manoa,
Hawaii Institute of Marine Biology,
P.O. Box 1346,
Coconut Island,
Kaneohe,
HAWAII,
96744

Dear George,

Thanks for your letter. Sorry about leaving out some of the copies to my 14 September letter. They are now attached.

Yours sincerely,

DR. G. R. HUGHES

for : DIRECTOR

GRH/klh



FRS HATCHLING DATA

Season	FRS # Hatchlings Produced	FRS Hatchlings Surviving	Date
1975	199	136	1 Oct 1976
1976	51	30	1 June 1977
1977	24	6	1 June 1978
1978	1,115	190	1 June 1979
1979	601	218	1 June 1980
1980	372	97	1 June 1981



Cayman Turtle

(1)

26 August, 1981

The Director,
Natal Parks, Game and Fish Preservation Board,
RAAD VIR DIE BEWARING VAN NATALSE PARKE, WILD EN VIS,
P.O. Box/Posbus 662,
Pietermaritzburg,
South Africa.
3200.

FOR THE ATTENTION OF DR. G.R. HUGHES

Dear George,

It is good to hear from you again. We recently had a similar request from John Rudge in the U.K. and I am enclosing a copy of my response to him which gives our reply to the figures. I am also enclosing a brief table showing actual figures for FRS hatchlings produced and surviving for the past 6 years. You will note the figures are similar to those provided by EDF. The excess turtles are the production of the CWS animals. Although it is still a bit early to predict the outcome of the reproductive season it would appear that the results will be similar to last year with about 40000-50000 eggs being laid by 80-90 females producing 10000-12000 hatchlings.

I am enclosing a couple of sets of Cayman stamps for your sons.

Best regards,
CAYMAN TURTLE FARM LTD.

J.R. WOOD, PH.D.
General Manager-Research

JRW:dc

CC; Dr. Judith Mittag
Dr. W.A. Johnson

ENCLS.

NATAL PARKS, GAME AND FISH PRESERVATION BOARD

P.O. BOX 662, PIETERMARITZBURG 3200



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RAAD VIR DIE BEWARING VAN NATALSE PARKE, WILD EN VIS

POSBUS 662, PIETERMARITZBURG 3200

INQUIRIES
NAVRAE

DR. G. R. HUGHES

OUR REFERENCE
ONS VERWYSING

E. 6/1 - Turtles

Please address all communications to the Director
Geliewe alle briefwisseling aan die Direkteur te rig

14 September 1981

George Balazs,
University of Hawaii at Manoa,
Hawaii Institute of Marine Biology,
P.O. Box 1346,
COCONUT ISLAND,
KANEHOE,
HAWAII,
96744

Dear George,

Thanks for your note of 16 July and the figures on Farm Reared Stocks from EDF. I didn't have these figures myself so I passed everything on to Jim Wood so that he could comment if he wished to.


I enclose his reply to me plus a reply to another enquirer plus yet a third copy of his figures right up to date.

Where you and I would disagree perhaps is on the significance of the figures. I suspect that you interpret these figures, as McBean clearly does, as doomsday guidelines. I don't. The real significance lies in the fact that it can be done. The acid test for the farm is whether they can improve the figures in years to come or perish.

In my philosophy I believe that they should be given every opportunity to succeed. Similarly it causes me no concern whatsoever that they have had a major success with wild bred adults. The removal of a few hundred adults green turtles from the wild (especially as eggs originally) worries me not the slightest provided it was done, as Mariculture and Cayman Turtle did it, with the blessing and cooperation of the country concerned. This is a rational use of a natural resource and quite acceptable to me.

However from the toe of Africa I continue to watch developments with interest and I really appreciate the flow of notes and articles that comes from you. As a Secretary you are a star even if we don't see eye to eye on everything. Many thanks. Looking forward to hearing from you again.

Yours sincerely,


for : DIRECTOR

GRH/klh

UNIVERSITY OF HAWAII AT MANOA
Hawaii Institute of Marine Biology
P.O. Box 1346 - Coconut Island - Kaneohe, Hawaii 96744
Cable Address: UNIHAW

October 2, 1981

Dr. George R. Hughes
Natal Parks, Game and
Fish Preservation Board
P. O. Box 662
Pietermaritzburg 3200
South Africa

Dear George:

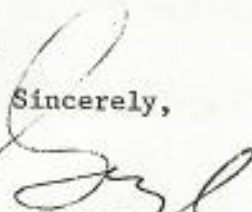
Many thanks for your letter of 14 September which included some kind words about my commitment to communicate current sea turtle information to you (and other Turtle Group members). It seems to me that this is one of the few concrete things we can do, as a group. I have tried to take the lead in this as Archie's assistant.

The only enclosure with your letter was a copied letter to John Rudge from Jim Wood dated 24 July 1981.

The reply from Jim Wood to your inquiry, plus a third inquiry you mentioned, was not enclosed. I will, of course, be interested to learn what was said about Mike Bean's summary.

Hope to hear from you soon.

Sincerely,



GEORGE H. BALAZS
Assistant Marine Biologist

GHB:ec

24 July 1981

Mr. John Rudge
The Nature Conservancy
19 Belgrave Square
London SW1
ENGLAND

Dear John,

In a recent letter from Dr. Johnson, he mentions that you had received a type-written page from the Flora and Fauna Society (UK) giving the projected numbers of FRS hatchlings surviving to slaughter in 1975-1980 and the actual numbers of hatchlings surviving at June 1 the following year. If the objective of the letter was to demonstrate that the original projections made for the 29 August 1975 meeting w'th IUCN was not accurate, I would agree. The projection of the performance of the animals was based, for the CWS, upon the previous 2 years' results and, for the FRS, upon literature estimates on age of sexual maturity. The first nesting of a FRS female occurred only 9 days prior to the meeting. At a second meeting held in Germany in November 1975, the original projection was modified to reflect the record low hatch experienced by the farm during the 1975 reproductive season.

Hindsight clearly shows that the projections for the FRS females were too high due to:

1. Under estimation of the age at which the FRS female becomes sexually mature, and
2. Not realizing that even once egg laying age is reached additional years are required before full reproductive potential is achieved in terms of number of eggs/nest, number of nests/season, and hatch rate.

The predicted production by the CWS females was actually too low due mainly to the fact that although 20 females were predicted to lay each year, the number of CWS females nesting has averaged over 40 per season.

The main problem we have had in past reproductive seasons is an extremely variable hatch rate. We are currently investigating the possibilities of artificial insemination which, if successful, should stabilize hatching success. The FRS animals should improve with increasing age. The main objective of the reproduction projections was to demonstrate to the IUCN group that there was a definite plan for achieving independence from wild eggs and that such a projection had a reasonable chance of success. The first projection stated the last egg collection would be made in 1978,

while the second indicated the last collection would be in 1979. The last collection was, however, made in 1978 thereby confirming the original projection. We are hoping to release 8,000 - 10,000 hatchling and yearling turtles into local waters this year (over 2,000 have already been released) which should convince even the most skeptical that we require no additional eggs from the wild

If I can provide you with any specific information which will be of assistance to you please let me know.

With best regards,
CAYMAN TURTLE FARM LTD.

Jim Wood, Ph.D.
General Manager, Research

FRS HATCHLING DATA

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