

# When the Turtle Collapses, the World Ends

by Bernard Nietschmann

After delivering a lecture on the solar system, philosopher-psychologist William James was approached by an elderly lady who claimed she had a theory superior to the one described by him.

"We don't live on a ball rotating around the sun," she said. "We live on a crust of earth on the back of a giant turtle."

Not wishing to demolish this absurd argument with the massive scientific evidence at his command, James decided to dissuade his opponent gently.

"If your theory is correct, madam, what does this turtle stand on?"

"You're a very clever man, Mr. James, and that's a good question, but I can answer that. The first turtle stands on the back of a second, far larger, turtle."

"But what does this second turtle stand on?" James asked patiently.

The old lady crowed triumphantly, "It's no use, Mr. James—it's turtles all the way down."

In the half-light of dawn, a sailing canoe approaches a shoal where nets have been set the day before. A Miskito turtleman stands in the bow and points to a distant splash that breaks the gray sheen of the Caribbean waters. Even from a hundred yards, he can tell that a green turtle has been caught in one of the nets. His two companions quickly bring the craft alongside the turtle, and as they pull it from the sea, its glistening shell reflects the first rays of the rising sun. As two men work to remove the heavy reptile from the net, the third keeps the canoe headed into the swells and beside the anchored net. After its fins have been pierced and lashed with bark fiber cord, the 250-pound turtle is placed on its back in the bottom of the canoe. The turtlemen are happy. Perhaps their luck will be good today and their other nets will also yield many turtles.

These green turtles, caught by Miskito Indian turtlemen off the eastern coast of Nicaragua, are destined for distant markets. Their butchered bodies will pass through many hands, local and foreign, eventually ending up in tins, bottles, and freezers far away. Their meat, leather, shell, oil, and calipee,

a gelatinous substance that is the base for turtle soup, will be used to produce goods consumed in more affluent parts of the world.

The coastal Miskito Indians are very dependent on green turtles. Their culture has long been adapted to utilizing the once vast populations that inhabited the largest sea turtle feeding grounds in the Western Hemisphere. As the most important link between livelihood, social interaction, and environment, green turtles were the pivotal resource around which traditional Miskito Indian society revolved. These large reptiles also provided the major source of protein for Miskito subsistence. Now this priceless and limited resource has become a prized commodity that is being exploited almost entirely for economic reasons.

In the past, turtles fulfilled the nutritional needs as well as the social responsibilities of Miskito society. Today, however, the Miskito depend mainly on the sale of turtles to provide them with the money they need to purchase household goods and other necessities. But turtles are a declining resource; overdependence on them is leading the Miskito into an ecological blind

alley. The cultural control mechanisms that once adapted the Miskito to their environment and faunal resources are now circumvented or inoperative, and they are caught up in a system of continued intensification of turtle fishing, which threatens to provide neither cash nor subsistence.

I have been studying this situation for several years, unraveling its historical context and piecing together its past and future effect on Miskito society, economy, and diet, and on the turtle population.

The coastal Miskito Indians are among the world's most adept small-craft seamen and turtlemen. Their traditional subsistence system provided dependable yields from the judicious scheduling of resource procurement activities. Agriculture, hunting, fishing, and gathering were organized in accordance with

*Miskito Indians haul a green turtle from the Caribbean. Overexploitation has caused the decline of these turtles and the human culture they supported.*









seasonal fluctuations in weather and resource availability and provided adequate amounts of food and materials without overexploiting any one species or site. Women cultivated the crops while men hunted and fished. Turtle fishing was the backbone of subsistence, providing meat throughout the year.

Miskito society and economy were interdependent. There was no economic activity without a social context and every social act had a reciprocal economic aspect. To the Miskito, meat, especially turtle meat, was the most esteemed and valuable resource, for it was not only a mainstay of subsistence, it was the item most commonly distributed to relatives and friends. Meat shared in this way satisfied mutual obligations and responsibilities and smoothed out daily and seasonal differences in the acquisition of animal protein. In this way, those too young, old, sick, or otherwise unable to secure meat received their share, and a certain balance in the village was achieved: minimal food requirements were met, meat surplus was disposed of to others, and social responsibilities were satisfied.

Today, the older Miskito recall that when meat was scarce in the village, a few turtlemen would put out to sea in their dugout canoes for a day's harpooning on the turtle feeding grounds. In the afternoon, the men would return, sailing before the northeast trade wind, bringing meat for all. Gathered on the beach, the villagers helped drag the canoes into thatched storage sheds. After the turtles were butchered and the meat distributed, everyone returned home to the cooking fires.

Historical circumstances and a series of boom-bust economic cycles disrupted the Miskito's society

*Surfacing for air, this hawksbill turtle became entangled in a net near the surface. The shell of this rare species will be sold to the jewelry trade.*











and environment. In the seventeenth and eighteenth centuries, intermittent trade with English and French buccaneers—based on the exchange of forest and marine resources for metal tools and utensils, rum, and firearms—prompted the Miskito to extend hunting, fishing, and gathering beyond subsistence needs to exploitative enterprises.

During the nineteenth and early twentieth centuries, foreign-owned companies operating in eastern Nicaragua exported rubber, lumber, and gold, and initiated commercial banana production. As alien economic and ecological influences were intensified, contract wage labor replaced seasonal, short-term economic relationships; company commissaries replaced limited trade goods; and large-scale exploitation of natural resources replaced sporadic, selective extraction. During economic boom periods the relationship between resources, subsistence, and environment was drastically altered for the Miskito. Resources became a commodity with a price tag, market exploitation a livelihood, and foreign wages and goods a necessity.

For more than 200 years, relations between the coastal Miskito and the English were based on sea turtles. It was from the Miskito that the English learned the art of turtling, which they then organized into intensive commercial exploitation of Caribbean turtle grounds and nesting beaches. Sea turtles were among the first resources involved in trade relations and foreign commerce in the Caribbean. Zoologist Archie Carr, an authority on sea turtles, has remarked that "more than any other dietary factor, the green turtle supported the opening up of the Caribbean." The once abundant turtle populations provided sustenance to

ships' crews and to the new settlers and plantation laborers.

The Cayman Islands, settled by the English, became in the seventeenth and eighteenth centuries the center of commercial turtle fishing in the Caribbean. By the early nineteenth century, pressure on the Cayman turtle grounds and nesting beaches to supply meat to Caribbean and European markets became so great that the turtle population was decimated. The Cayman Islanders were forced to shift to other turtle areas off Cuba, the Gulf of Honduras, and the coast of eastern Nicaragua. They made annual expeditions, lasting four to seven weeks, to the Miskito turtle grounds to net green turtles, occasionally purchasing live ones, dried calipee, and the shells of hawksbill turtles (*Eretmochelys imbricata*) from the Miskito Indians. Reported catches of green turtles by the Cayman turtlers generally ranged between 2,000 and 3,000 a year up to the early 1960s, when the Nicaraguan government failed to renew the islanders' fishing privileges.

Intensive resource extraction by foreign companies led to seriously depleted and altered environments. By the 1940s, many of the economic booms had turned to busts. As the resources ran out and operating costs mounted, companies shut down production and moved to other areas in Central America. Thus, the economic mainstays that had helped provide the Miskito with jobs, currency, markets, and foreign goods were gone. The company supply ships and commissaries disappeared, money became scarce, and store-bought items expensive.

In the backwater of the passing golden boom period, the Miskito were left with an ethic of poverty, but they still had the subsistence skills that had maintained their culture for hundreds of years. Their land and water environment was still capable of providing reliable resources for local consumption. As it had been in the past, turtle fishing became a way of life, a provider of life itself. But traditional subsistence culture could no longer integrate Miskito society and environment in a state of equilibrium. Resources were now viewed as hav-

ing a value and labor a price tag. All that was needed was a market.

Recently, two foreign turtle companies began operations along the east coast of Nicaragua. One was built in Puerto Cabezas in late 1968, and another was completed in Bluefields in 1969. Both companies were capable of processing and shipping large amounts of green turtle meat and by-products to markets in North America and Europe. Turtles were acquired by purchase from the Miskito. Each week company boats visited coastal Miskito communities and offshore island turtle camps to buy green turtles. The "company" was back, money was again available, and the Miskito were expert in securing the desired commodity. Another economic boom period was at hand. But the significant difference between this boom and previous ones was that the Miskito were now selling a subsistence resource.

As a result, the last large surviving green turtle population in the Caribbean was opened to intensive, almost year-round exploitation. Paradoxically, it would be the Miskito Indians, who once caught only what they needed for food, who would conduct the assault on the remaining turtle population.

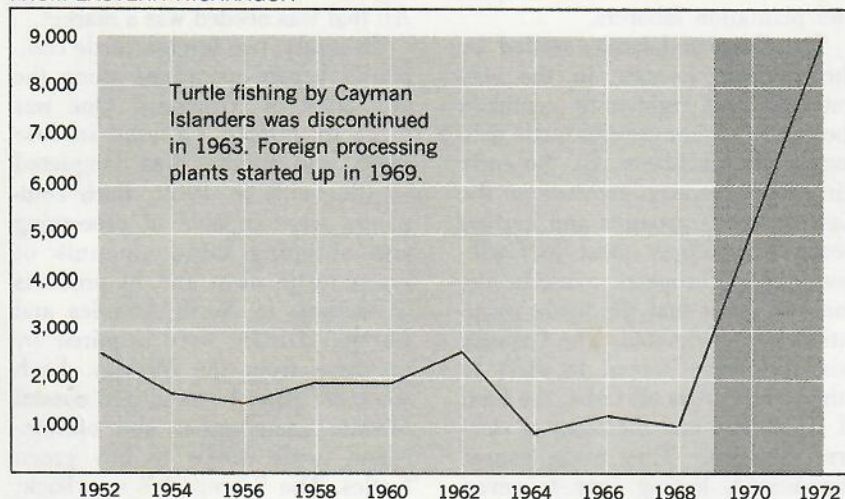
Another contradictory element in the Miskito-turtle story is that only some 200 miles to the south at Tortuguero, Costa Rica, Archie Carr had devoted fifteen years to the study of sea turtles and to the conservation and protection of the Caribbean's last major sea turtle nesting beach. Carr estimates that more than half the green turtles that nest at Tortuguero are from Nicaraguan waters. The sad and exasperating paradox is that a conservation program insured the survival of an endangered species for commercial exploitation in nearby waters.

Green turtles, *Chelonia mydas*, are large, air-breathing, herbivorous marine reptiles. They congregate in large populations and graze on underwater beds of vegetation in relatively clear, shallow, tropical waters. A mature turtle can weigh 250 pounds or more and when caught, can live indefinitely in a saltwater enclosure or for a couple of weeks if

*Villagers vie to purchase turtle meat, but there will not be enough for all; foreign processing plants buy between 70 and 90 percent of the catch.*



NUMBER OF GREEN TURTLES EXPORTED ANNUALLY FROM EASTERN NICARAGUA



kept in shade on land. Green turtles have at least six behavioral characteristics that are important in their exploitation: they occur in large numbers in localized areas; they are air breathing, so they have to surface; they are mass social nesters; they have an acute location-finding ability; when mature, they migrate seasonally on an overlapping two- or three-year cycle for mating and nesting; and they exhibit predictable local distributional patterns.

The extensive shallow shelf off eastern Nicaragua is dotted with numerous small coral islands, thousands of reefs, and vast underwater pastures of marine vegetation called "turtle banks." During the day, a large group of turtles may be found feeding at one of the many turtle banks, while adjacent marine pastures may have only a few turtles. They graze on the vegetation, rising periodically to the surface for air and to float for awhile before diving again. In the late afternoon, groups of turtles will leave the feeding areas and swim to shoals, some up to four or five miles away, to spend the night. By five the next morning, they gather to depart again for the banks. The turtles' precise, commuterlike behavior between sleeping and feeding areas is well known to the Miskito and helps insure good turtling.

Each coastal turtling village exploits an immense sea area, containing many turtle banks and shoals. For example, the Miskito of Tasba-

pauni utilize a marine area of approximately 600 square miles, with twenty major turtle banks and almost forty important shoals.

Having rather predictable patterns of movement and habitat preference, green turtles are commonly caught by the Miskito in three ways: on the turtle banks with harpoons; along the shoal-to-feeding area route with harpoons; and on the shoals using nets, which entangle the turtles when they surface for air.

The Miskito's traditional means of taking turtles was by harpoon—an eight- to ten-foot shaft fitted with a detachable short point tied to a strong line. The simple technology pitted two turtlemen in a small, sea-going canoe against the elusive turtles. Successful turtling with harpoons requires an extensive knowledge of turtle behavior and habits and tremendous skill and experience in handling a small canoe in what can be very rough seas. Turtlemen work in partnerships: a "strikerman" in the bow; the "captain" in the stern. Together, they make a single unit engaged in the delicate and almost silent pursuit of a wary prey, their movements coordinated by experience and rewarded by proficiency. Turtlemen have mental maps of all the banks and shoals in their area, each one named and located through a complex system of celestial navigation, distance reckoning, wind and current direction, and the individual surface-swell motion over each site.

Traditionally, not all Miskito were sufficiently expert in seamanship and turtle lore to become respected "strikermen," capable of securing turtles even during hazardous sea conditions. Theirs was a very specialized calling. Harpooning restrained possible overexploitation since turtles were taken one at a time by two men directly involved in the chase, and there were only a limited number of really proficient "strikermen" in each village.

Those who still use harpoons must leave early to take advantage of the land breeze and to have enough time to reach the distant offshore turtle grounds by first light. Turtlemen who are going for the day, or for several days, will meet on the beach by 2:00 A.M. They drag the canoes on bamboo rollers from beachfront sheds to the water's edge. There, in the swash of spent breakers, food, water, paddles, lines, harpoons, and sails are loaded and secured. Using a long pole, the standing bowman propels the canoe through the foaming surf while the captain in the stern keeps the craft running straight with a six-foot mahogany paddle. Once past the inside break, the men count the dark rolling seas building outside until there is a momentary pause in the sets; then with paddles digging deep, they drive the narrow, twenty-foot canoe over the cresting swells, rising precipitously on each wave face and then plunging down the far side as the sea and sky see-saw into view. Once past the breakers, they rig the sail and, running with the land breeze, point the canoe toward a star in the eastern sky.

A course is set by star fix and by backsight on a prominent coconut palm on the mainland horizon. Course alterations are made to correct for the direction and intensity of winds and currents. After two or three hours of sailing the men reach a distant spot located between a turtle sleeping shoal and feeding bank. There they intercept and follow the turtles as they leave for specific banks.

On the banks the turtlemen paddle quietly, listening for the sound of a "blowing" turtle. When a turtle surfaces for air it emits a hissing sound audible for fifty yards



or more on a calm day. Since a turtle will stay near the surface for only a minute or two before diving to feed, the men must approach quickly and silently, maneuvering the canoe directly in front of or behind the turtle. These are its blind spots. Once harpooned, a turtle explodes into a frenzy of action, pulling the canoe along at high speeds in its hopeless, underwater dash for escape until it tires and can be pulled alongside the canoe.

But turtle harpooning is a dying art. The dominant method of turtling today is the use of nets. Since their introduction, the widespread use of turtle nets has drastically altered turtling strategy and productivity. Originally brought to the Miskito by the Cayman Islanders, nets are now extensively distributed on credit by the turtle companies. This simple technological change, along with a market demand for turtles, has resulted in intensified pressure on green turtle populations.

Buoyed by wooden floats and anchored to the bottom by a single line, the fifty-foot-long by fourteen-foot-wide nets hang from the surface like underwater flags, shifting

direction with the current. Nets are set in place during midday when the turtlemen can see the dark shoal areas. Two Miskito will set five to thirty nets from one canoe, often completely saturating a small shoal. In the late afternoon, green turtles return to their shoals to spend the night. There they will sleep beside or beneath a coral outcrop, periodically surfacing for air where a canopy of nets awaits them.

Catching turtles with nets requires little skill; anyone with a canoe can now be a turtleman. The Miskito set thousands of nets daily, providing continuous coverage in densely populated nocturnal habitats. Younger Miskito can become turtlemen almost overnight simply by following more experienced men to the shoal areas, thus circumventing the need for years of accumulated skill and knowledge that once were the domain of the "striker-men." All one has to do is learn where to set the nets, retire for the night, remove the entangled turtles the next morning, and reset the nets. The outcome is predictable: more turtlemen, using more effective methods, catch more turtles.

With an assured market for turtles, the Miskito devote more time to catching turtles, traveling farther and staying at sea longer. Increased dependence on turtles as a source of income and greater time inputs have meant disruption of subsistence agriculture and hunting and fishing. The Miskito no longer produce foodstuffs for themselves; they buy imported foods with money gained from the sale of turtles. Caught between contradictory priorities—their traditional subsistence system and the market economy—the Miskito are opting for cash.

The Miskito are now enveloped in a positive feedback system where change spawns change. Coastal villages rely on turtles for a livelihood. Decline of subsistence provisioning has led to the need to secure food from local shopkeepers on credit to feed the families in the villages and the men during their turtling expeditions. Initial high catches of turtles encouraged more Miskito to participate, and by 1972 the per person and per day catch began to decline noticeably.

In late 1972, several months after I had returned to Michigan, I received a letter from an old turtleman, who wrote: "Turtle is getting scarce, Mr. Barney. You said it would happen in five or ten years but it is happening now."

Burdened by an overdependence on an endangered species and with accumulating debts for food and nets, the Miskito are finding it increasingly difficult to break even, much less secure a profit. With few other economic alternatives, the inevitable step is to use more nets and stay out at sea longer.

The turtle companies encourage the Miskito to expand turtling activities by providing them with building materials so that they can construct houses on offshore cays, thereby eliminating the need to return to the mainland during rough weather. On their weekly runs up and down the coast, company boats bring food, turtle gear, and cash for turtles to fishing camps from the Miskito Cays to the Set Net Cays. Frequent visits keep the Miskito from becoming discouraged and returning to their villages with the turtles. On Saturdays, villagers look to sea, watching for returning canoes. A few men will bring turtle for their families; the majority will bring only money. Many return with neither.

Most Miskito prefer to be home on Sunday to visit with friends and for religious reasons. (There are Moravian, Anglican, and Catholic mission churches in many of the villages.) But more and more, turtlemen are staying out for two to four weeks. The church may promise salvation, but only the turtle companies can provide money.

Returning to their villages, turtlemen are confronted with a complex dilemma: how to satisfy both social and economic demands with a limited resource. Traditional Miskito social rules stipulate that turtle meat should be shared among kin, but the new economic system requires that turtles be sold for personal economic gain. Kin expect gifts of meat, and friends expect to be sold meat. Turtlemen are besieged with requests forcing them to decide between who will or will not receive meat. This is contrary to the





traditional Miskito ethic, which is based on generosity and mutual concern for the well-being of others. The older Miskito ask why the turtlemen should have to allocate a food that was once abundant and available to all. Turtlemen sell and give to other turtlemen, thereby insuring reciprocal treatment for themselves, but there simply are not enough turtles to accommodate other economic and social requirements. In order to have enough turtles to sell, fewer are butchered in the villages. This means that less meat is being consumed than before the turtle companies began operations. The Miskito presently sell 70 to 90 percent of the turtles they catch; in the near future they will sell even more and eat less.

Distribution of Turtle Meat  
by Gift and Purchase

Percent of villagers*	Pounds received per person
18	10-14+
28	6-9
32	2-5
22	0-1.9

During the one-month period from April 15 to May 15, 1971, 125 green turtles were caught by the turtlemen of Tasbapauni, Nicaragua. Of these, 91 were sold to turtle companies; the remaining 34 were butchered and the meat sold or given to villagers. In all, 3,900 pounds of turtle meat were distributed, but 54 percent of the villagers received 5 pounds or less, an insufficient amount for adult dietary protein requirements.

\* Population of 998 converted to 711 adult male equivalents.

Social tension and friction are growing in the villages. Kinship relationships are being strained by what some villagers interpret as preferential and stingy meat distribution. Rather than endure the trauma caused by having to ration a limited item to fellow villagers, many turtlemen prefer to sell all their turtles to the company and return with money, which does not have to be shared. However, if a Miskito sells out to the company, he will probably be unable to acquire meat for himself in the village, re-

gardless of kinship or purchasing power. I overheard an elderly turtleman muttering to himself as he butchered a turtle: "I no going to sell, neither give dem meat. Let dem eat de money."

The situation is bad and getting worse. Individuals too old or sick to provide for themselves often receive little meat or money from relatives. Families without turtlemen are families without money or access to meat. The trend is toward the individualization of nuclear families, operating for their own economic ends. Miskito villages are becoming neighborhoods rather than communities.

The Miskito diet has suffered in quality and quantity. Less protein and fewer diverse vegetables and fruits are consumed. Present dietary staples—rice, white flour, beans, sugar, and coffee—come from the store. In one Miskito village, 65 percent of all food eaten in a year was purchased.

Besides the nutritional significance of what is becoming a largely carbohydrate diet, dependence on purchased foods has also had major economic reverberations. Generated by national and international scarcities, inflationary fallout has hit the Miskito. Most of their purchased foods are imported, much coming from the United States. In the last five years prices for staples have increased 100 to 150 percent. This has had an overwhelming impact on the Miskito, who spend 50 to 75 percent of their income for food. Consequently, their entry into the market by selling a subsistence resource, diverting labor from agriculture, and intensifying exploitation of a vanishing species has resulted in their living off poorer-quality, higher-priced foods.

The Miskito now depend on outside systems to supply them with money and materials that are subject to world market fluctuations. They have lost their autonomy and their adaptive relationship with their environment. Life is no longer socially rewarding nor is their diet satisfying. The coastal Miskito have become a specialized and highly vulnerable sector of the global market economy.

Loss of the turtle market would be a serious economic blow to the Miskito, who have almost no other means of securing cash for what have now become necessities. Nevertheless, continued exploitation will surely reduce the turtle population to a critical level.

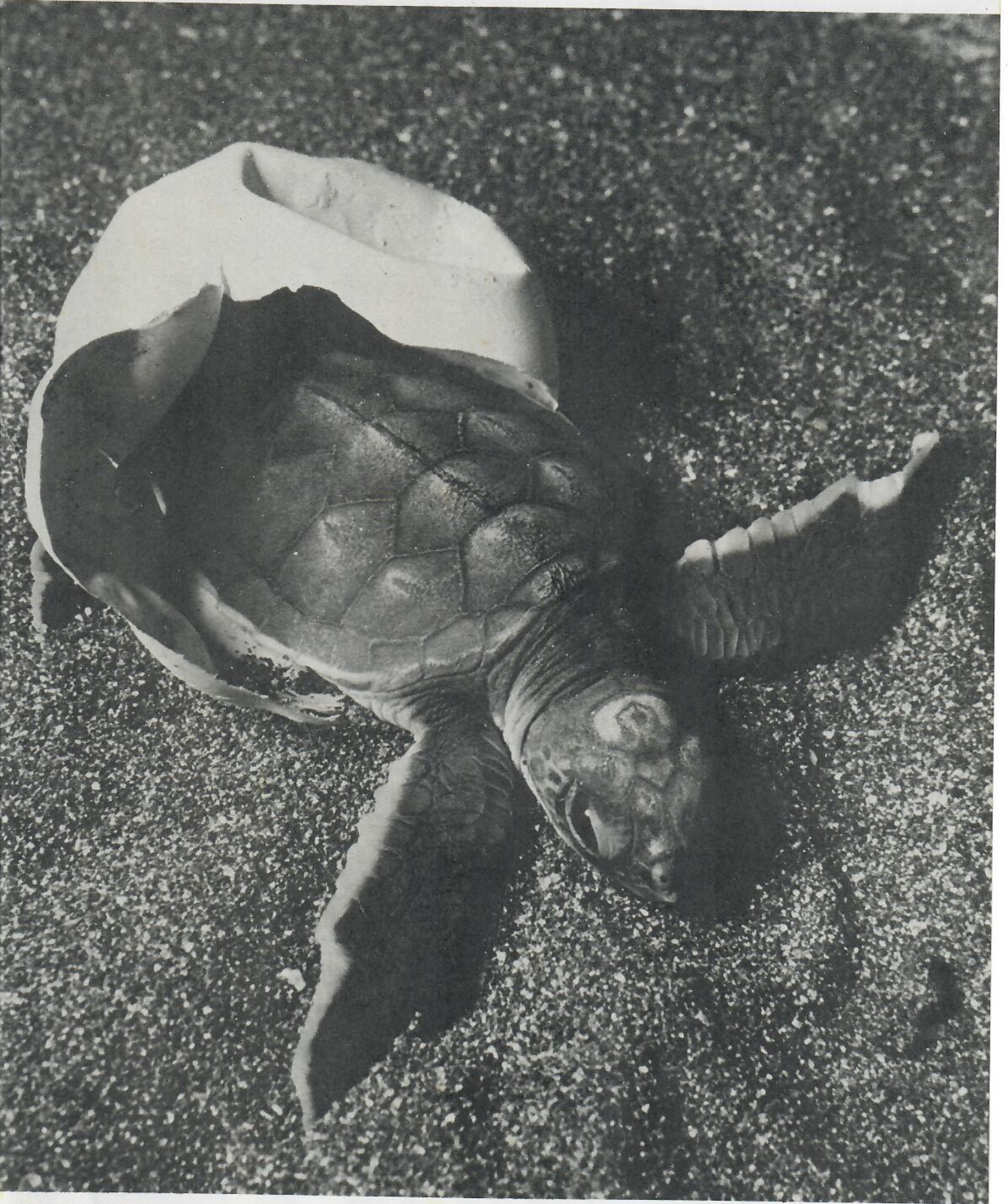
National and international legislation is urgently needed. At the very least, commercial turtle fishing must be curtailed for several years until the *Chelonia* population can rebound and exploitation quotas can be set. While turtle fishing for subsistence should be permitted, exportation of sea-turtle products used in the gourmet, cosmetic, or jewelry trade should be banned.

Restrictive environmental legislation, however, is not a popular subject in Nicaragua, a country that has recently been torn by earthquakes, volcanic eruption, and hurricanes. A program for sea turtle conservation submitted to the Nicaraguan government for consideration ended up in a pile of rubble during the earthquake that devastated Managua in December, 1972, adding a sad footnote to the Miskito-sea turtle situation. With other problems to face, the government has not yet reviewed what is happening on the distant east coast, separated from the capital by more than 200 miles of rain forest—and years of neglect.

As it is now, the turtles are going down and along with them, the Miskito—seemingly, a small problem in terms of the scale of ongoing ecological and cultural change in the world. But each localized situation involves species and societies with long histories and, perhaps, short futures. They are weathervanes in the conflicting winds of economic and environmental priorities. As Bob Dylan sang: "You don't need a weatherman to tell which way the wind blows." □

*Because of predation by birds and fish, only three or four out of 1,000 green turtle hatchlings survive to adulthood.*







# Authors



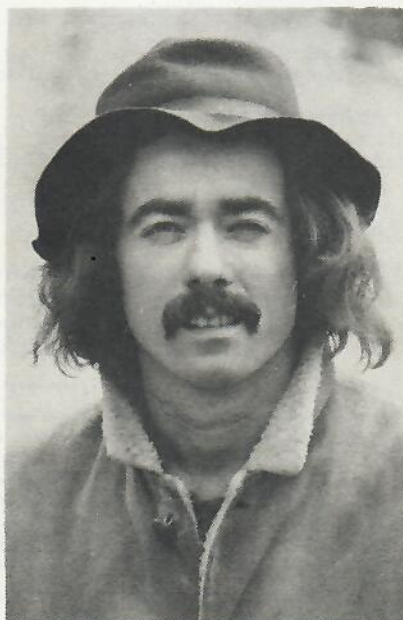
Bernard Nietschmann made his first trip to Central America in 1965 to study the social, economic, and ecological consequences of the overexploitation of the green sea turtle. The project, centered in Mexico, eventually led him to research the Miskito Indian-green turtle subsistence system in eastern Nicaragua. He is now engaged in a National Geographic Society tag-

ging program designed to determine the migration patterns of the hawksbill turtle. A recently completed venture has been the co-production with his wife Judi of a documentary film on the Mexican revolution and the social and economic changes it created. Nietschmann is an associate professor of geography at the University of Michigan.

An interest in the early history of Southeast Asia and China has taken Judith M. Treistman to Thailand, where she did archeological work, and Taiwan, where she researched aboriginal history. She is currently studying archeological materials and artifacts from many sources in an attempt to analyze the role of



It was by accident that Thomas M. Kiefer began studying the Tau Sug in the southern Philippines. He had planned to do anthropological field work in Indonesia while working toward his doctorate, but the political situation there prevented him from beginning his research. As an alternative, he chose the Philippines, where he learned of the independent and violent attitudes of the Tau Sug. For two years he lived with them, filmed them, and recorded their music. In 1972 he published a monograph, *The Tau-sug: Law and Violence in a Philippine Moslem Society*. Presently teaching anthropology at Brown University, Kiefer plans to study comparative legal reasoning at Harvard University Law School.



When plans were announced in the mid-1960s for construction of the "new city" of Columbia, Maryland, Aelred D. Geis recognized an ideal opportunity to study the effects of urbanization on bird populations. An urban bird specialist with the Patuxent Wildlife Research Center in nearby Laurel, Maryland, he began recording the changes in numbers and diversity of the resident bird species and identified the factors responsible for significant shifts as the planned community developed. Building on the base line of data generated in 1966, Geis is continuing his work on the population dynamics of birds in urban environments.



# NATURAL HISTORY

Incorporating *Nature Magazine*  
Vol. LXXXIII, No. 6  
June-July 1974

The American Museum of Natural History  
Gardner D. Stout, President  
Thomas D. Nicholson, Director

## 2 Authors

## 4 Letters

## 10 Bios: The Ungreening of South Vietnam

Arthur W. Galston

*The consequences of massive, unprecedented chemical warfare against the environment.*

## 16 This View of Life: Darwin's Dilemma

Stephen Jay Gould

*Evolution does not mean progress.*

## 24 Caves of the Infinite Buddhas

Judith M. Treistman

*Emperors and peasants have journeyed to these ancient monuments in remote northern China.*

## 34 When the Turtle Collapses, the World Ends

Bernard Nietschmann

*A hapless tribe of Indians and the green turtle are sinking together.*

## 44 Guns of the Tau Sug

Thomas M. Kiefer

*The roots of the Muslim uprising go deep in the Philippines.*

## 52 Celestial Events

Thomas D. Nicholson

## 54 The New Town Bird Quadrille

Aelred D. Geis

*An architect, unwittingly, can be a bird's best friend.*

## 62 Sky Reporter: Are We Alone in the Cosmos?

Robert Jastrow

## 66 The Rise and Fall of Heroin Addiction

Robert L. DuPont

*Why did the worldwide drug epidemic peak in the late 1960s?*

## 72 Home Is Where the Hearth Is

A review by Edward Abbey

*"A book of homes, habitations for human beings in all their infinite variety."*

## 76 Announcements

## 78 A Matter of Taste: The Turn of the Ewe

Raymond Sokolov

## 83 Additional Reading

**Cover:** *A chipping sparrow carries lining material to its nest in an apple tree. In the new town of Columbia, Maryland, this species has increased because of the availability of suitable trees for nest sites, grass seeds to feed on, and ornamental shrubs for shelter. Photograph by Thase Daniel, Bruce Coleman, Inc. Story on page 54.*

Alan Ternes, Editor  
Thomas Page, Designer

### Board of Editors:

Sally Lindsay, Frederick Hartmann,  
Christopher Hallowell, Toni Gerber  
Carol Breslin, Book Reviews Editor  
Florence G. Edelstein, Copy Chief  
Karen Bierstedt, Copy Editor  
Angela Soccodato, Art Asst.  
Diane Pierson, Editorial Asst.  
Lillian Gindea

Rosamond W. Dana, Publications Editor

### Editorial Advisers:

Dean Amadon, Dorothy E. Bliss,  
Mark Chartrand, Niles Eldredge,  
Vincent Manson, Margaret Mead,  
Thomas D. Nicholson, Gerard Piel,  
Richard G. Van Gelder

David D. Ryus, Publisher

L. Thomas Kelly, Business Manager  
Ernestine Weindorf, Administrative Asst.

Ann Brown, Circulation Manager

Joyce E. Klutch, Asst.

Joan Mahoney

Harriet Walsh

Harvey Oshinsky, Advertising Sales Manager

Gordon Finley

Harry R. Jeter

Vic Asselin

Eileen O'Keefe, Production

Cynthia Dawson, Asst.

Publication Office: The American Museum of Natural History, Central Park West at 79th Street, New York, N.Y. 10024. Published monthly, October through May; bimonthly June to September. Subscriptions: \$8.00 a year. In Canada and all other countries: \$10.00 a year. Single copies \$1.00. Second-class postage paid at New York, N.Y., and at additional offices. Copyright © 1974 by The American Museum of Natural History. No part of this periodical may be reproduced without the written consent of Natural History. Manuscripts and illustrations submitted to the editorial office will be handled with all possible care, but we cannot assume responsibility for their safety. The opinions expressed by authors are their own and do not necessarily reflect the policy of The American Museum. Natural History incorporating *Nature Magazine* is indexed in Reader's Guide to Periodical Literature.

Change of address notices, undeliverable copies, orders for subscriptions, and other mail items are to be sent to Natural History Magazine, Membership Services, Box 6000, Des Moines, Iowa 50306.