

FLORIDA STATE UNIVERSITY

Research

IN • R E V I E W



ARCHIE CARR

TURTLE MAN

A NEW BIOGRAPHY
OF THE MAN WHO
SAVED SEA
TURTLES WITH
SCIENCE &
THE PEN

PLUS: UNDERWATER COP-WORK • THOSE NASTY NUT ALLERGIES • AND MORE

BY FRANK STEPHENSON

TURTLE MAN



AN FSU HISTORIAN TELLS HOW THIS CAME TO BE, AND WHAT

**SAVING SEA
TURTLES FROM
EXTINCTION IS
NOW A GLOBAL
CAMPAIGN,
ROOTED IN
FLORIDA AND
THE LEGACY OF
ARCHIE CARR.**

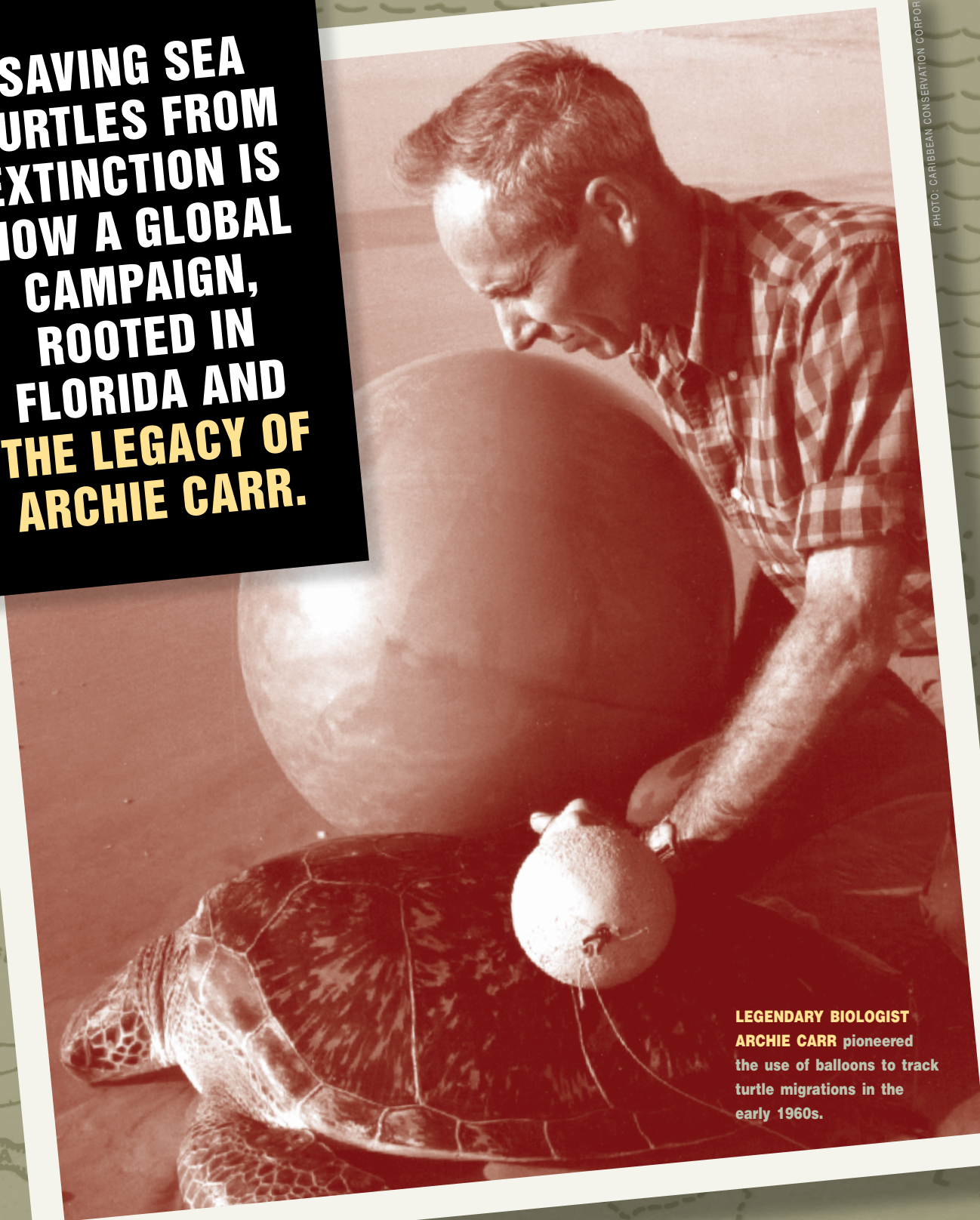


PHOTO: CARIBBEAN CONSERVATION CORPORATION

**LEGENDARY BIOLOGIST
ARCHIE CARR** pioneered
the use of balloons to track
turtle migrations in the
early 1960s.

IT MEANS FOR SAVING WHAT'S LEFT OF THE ANIMAL PLANET.



“Dey nevah finish, Don Archie. De tel-tel (turtle) nevah finish.”

With a bellyful of fresh-fried turtle meat and homemade turtle soup, Archie Carr got a lecture from his cook, a slight mulatto woman standing in her kitchen on the ebony beaches of Turtle Bogue.

It was Carr’s first visit to this dark, remote strip of Costa Rican beach. Tales of Turtle Bogue’s famous connection with sea turtles had finally drawn the distinguished, 43-year-old biologist from his academic home in Florida. It was the summer of 1952.

How long will the turtles last? Carr wanted to know. Since his arrival, he had witnessed the daily slaughter on the beaches of females lumbering ashore to lay their eggs; the frantic hunt by natives and feral dogs for the few eggs the turtles managed to bury before being captured or killed. To a seasoned scientist and woodsman with sensibilities honed since childhood about the fragility of nature, Carr chilled at what he foresaw for the docile sea creatures—a familiar equation of doom.

Sibella was glad to feed a hungry Carr who had shown up unannounced in her doorway. But she’d have none of her friendly guest’s strange talk of the end of turtles. Turtles had been coming to her black beaches forever, and they always would. For her faith in the turtle’s future, Sibella evoked the great, trackless expanse of the sea.

Nearly 30 summers later, Carr learned that the largest horde of nesting turtles seen in two decades had landed at Turtle Bogue (“Tortuguero” in Spanish). He recalled Sibella’s simple admonition—*de turtles nevah finish*—and was happy beyond words.

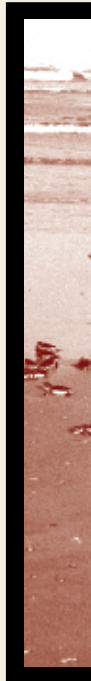
Two months before he died in May 1987, at his home on Payne’s Prairie near Micanopy, Florida, a 78-year-old Carr sat and listened as one of the world’s most famous naturalists—Harvard’s E.O. Wilson—paid public tribute to his friend and colleague.

Carr and Wilson had, in fact, been friends

for many years, kindred spirits conjoined by uncanny similarities. Although 20 years his junior, Wilson shared at a gut level Carr’s extraordinary passion for nature, his insight into the warp and weft of biological processes and his gift for writing about these things in terms that anyone who enjoyed a good story could appreciate. Not insignificantly, the men also

happened to be natives of Mobile, Alabama, and steeped in the same cultural broth.

Wilson called Carr an “archangel of the international conservation movement.” He lauded Carr’s battle to save the world’s sea turtles from extinction. He credited him and his wife Marjorie for their “heroic” efforts to “achieve sanity and balance” in their





◀ **HATCHLING TURTLES** scuttle to the sea under the gaze of Archie Carr, ca. 1961.

stomach cancer) Carr received one of the most distinguished honors that can befall any biologist—being named Eminent Ecologist by the Ecological Society of America—in a ceremony delivered at his bedside. The award essentially affirmed Carr’s stature as one of the greatest biologists of the 20th century. He was cited for his “landmark studies on sea turtle reproductive biology

Carr’s legacy as an “old-school” naturalist, prolific nature writer, pioneering conservationist, charismatic teacher and mentor was well established by the early 1970s. Yet remarkably, only now—on the 30th anniversary of his death—comes a proper biography of the world-revered figure known simply as “the man who saved sea turtles.”

Happily doing the honors is Frederick Rowe Davis—“Fritz” to those who know him—an assistant professor of history at FSU. This summer, Oxford University Press released *The Man Who Saved Sea Turtles: Archie Carr and the Origins of Conservation Biology* as Davis’ first book. It culminates Davis’ decade-long fascination with Carr and his life’s work that began during his undergraduate training in the history of science at Harvard.

“I’ve always been a naturalist myself, very interested in the natural world,” Davis said, explaining his interest in researching Carr’s life. “When I started reading Carr’s books I found that he had exactly the kind of perspective on natural history I’ve had

and migrations,” his “tireless dedication to conservation,” and his “uncanny ability to communicate the excitement and the music of ecology” to the public.

All told, in addition to more than 120 scientific papers and magazine articles, at his death Carr had written nearly a dozen popular books on subjects ranging from snakes to zoological adventures in Africa—and most of these published in the last 25 years of his life.

home state of Florida, which he called a “microcosm of the disappearing tropical environment.” Wilson concluded with a salute to Carr’s adept way with words, which he said made “many of our best natural history writers seem like callow journalists.”

A few days before his death (from

PHOTO: CARIBBEAN CONSERVATION CORPORATION

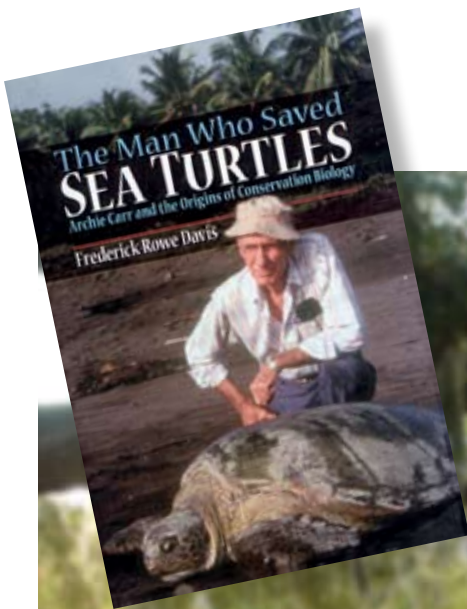


PHOTO: RAY STANFORD



FREDERICK “FRITZ” ROWE DAVIS



ARCHIE CARR — TURTLE MAN



OUTDOORS BORN: *clockwise from upper left: Carr with shotgun and pointer, ca. 1928; sailing for fun, ca. 1960; campfire scene in Mexico, ca. 1940; with a shot-gunned quetzal in Honduras, ca. 1947*

most of my life. I've always been interested in figures who managed to transcend science and reach out to the broader public. Archie Carr, along with Rachel Carson, managed to do that in significant ways."

After joining FSU's history faculty in 2002, Davis renewed a long-held interest in Carr and traveled to Gainesville where Carr had spent his entire, 56-year career, beginning as a student in 1932. To his delight, he learned that the University of Florida's main library held a complete archive of Carr's papers—63 boxes of them, in fact, stretching 40 linear feet. Davis soon dug in.

"As I began to read his correspondence, I found the story getting richer and richer," he recalled. And the best part of the story?

"No one had written it."

EARLY YEARS

As his appreciation of Archie Carr's exemplary life took shape, Davis soon realized that nothing had influenced the man more powerfully than the way he'd grown up—as

the eldest son of a man who may very well have loved to hunt and fish more than he loved his calling as a Presbyterian minister.

Born on June 16, 1909, in Mobile, Archibald Fairly Carr, Jr. soon took to the woods and streams with his dad and learned to fish from a rowboat. When he turned 8, the family moved to Fort Worth, Texas, and later to Savannah, Georgia, where young Archie, by now a crack shot with both rifle and shotgun, helped his dad put duck, turkey, quail and deer on the table.

On a fishing trip when he was 16, Archie contracted osteomyelitis in his right arm, and the disease, coupled with the limited medical options of the day, left the arm permanently bent at the elbow—a disfigurement that would become a well known Archie Carr trademark. To Archie's surprise and delight, the crooked arm improved his wing shot.

In Savannah High School, Archie displayed talents in writing composition and in acting—starring in lead roles in several plays. During summers, he worked the port

city's busy docks as a stevedore, back-breaking work that the young Carr made more palatable by picking up the singsong language used by the many black men he worked with. Born with an ear for language, Carr soon became proficient in the Gullah and Geechee dialects that to some extent still color the region to this day.

Carr's first shot at higher ed was Davidson College in North Carolina, but operations on his arm forced him to drop out for two years. He later enrolled at Weaver College where he wound up with a Cuban roommate—a fateful meeting. Like a sponge, Carr soaked up his roomie's native tongue and soon was on the way to becoming fluent in Spanish, a skill that would pay enormous dividends throughout his career.

Carr's dad soon chose a hunting and fishing paradise for his retirement: Umatilla, Florida—a tiny community in the middle of a vast, lake-filled wilderness on the edge of what would become the Ocala National Forest. Young Archie spent a quarter at nearby

Rollins College before enrolling in the spring of 1932 as a senior, majoring in English, at the University of Florida. After a biology field trip to collect critters living in water hyacinth floating in giant mats on nearby lakes, Carr was hooked. He soon switched his major to zoology, taking polished language skills he'd soon put to good use.

BARBOUR'S BOY

It soon became clear to everyone who knew him just what kind of zoologist the young Carr was aiming to be—a “herp” man, or herpetologist.

Snakes, frogs, toads, lizards, turtles and salamanders—essentially the huge families of reptiles and amphibians—frame the intellectual worlds of “herp” specialists. Carr had been fascinated with the cold-blooded beasts, big and small, since childhood.

Carr took swift advantage of what the university's brand new biology program offered, which was in the throes of development. After finishing his bachelor's degree Carr immediately entered grad school, earning a master's degree in 1934.

That year, Carr published his first paper, a guide to identifying the breeding calls of Florida frogs. The result of many painstaking, late-night collecting trips into swamps and wetlands throughout Central Florida, the paper, appearing in a new journal named *The Florida Naturalist*, won Carr his first collegial praise, and helped open the door to a correspondence network that linked herpetologists around the country.

One of the first established scientists to exchange letters with Carr was Thomas Barbour, a wealthy naturalist and herpetologist who served as director of Harvard's Museum of Comparative Zoology. Barbour had experience with the wildlife of Florida, having spent a year in the state as a child recovering from typhoid fever.

Barbour found Carr's key to frog calls fascinating, and so began a relationship that soon grew into a close-knit friendship that dramatically shaped Carr's intellectual and professional life. Davis devotes an

entire chapter of his biography, “Dear Dr. Barbour,” to detailing the profound impact that Barbour had on Carr's career.

“Barbour played so many roles in Carr's life—he was a mentor, a parent figure, colleague, collaborator, benefactor, role model, and perhaps most of all, a dear friend,” Davis said. “No one had a greater influence on the trajectory of Carr's scientific career than Thomas Barbour.”

But for all the many benefits of bonding at such an early stage with one of the country's most respected naturalists, Carr would soon meet the one person who would shape the arc of his life more than anyone else. In 1936, just a year before earning the first Ph.D. in biology ever granted by the University of Florida, Carr chanced to meet a wildlife technician who had come to campus seeking advice on how to treat a covey of sick quail. The young technician was Marjorie Harris, fresh from her undergraduate training in marine biology at Florida State College for Women in Tallahassee (see page 31).

Here's how Davis described the encounter in his book: *“By all accounts, it was love at first sight. Over the next few months, Archie courted Marjorie with the assistance of his brother's car. The two young naturalists married in January 1937.”*

SEA TURTLE SCIENCE

No sooner did he receive his doctorate degree in 1937 than Carr, showing promise as a builder of UF's young biology program, got offered a teaching job. He became an instructor in biology, without a clue he'd just begun a 50-year stint as a teacher and researcher at the university.

Carr's relationship with Harvard's Barbour strengthened, and developed into solid, professional collaboration and friendship. Every summer from 1937 until 1943, Carr and his wife Marjorie would pack up and head to Cambridge where Barbour set Carr up as a fellow of the museum. The Carrs would return the favor by having Barbour visit them in Gainesville during the winter.



AFTER A BIOLOGY FIELD TRIP

TO COLLECT CRITTERS LIVING IN WATER HYACINTH FLOATING IN GIANT MATS ON NEARBY LAKES, CARR WAS HOOKED...HE SOON SWITCHED HIS MAJOR TO ZOOLOGY....



ARCHIE CARR — TURTLE MAN

By 1939, Carr's stature as a herp collector and taxonomist (a scientific classifier of wildlife) was impressive for such a young scientist. He had found and classified numerous species and subspecies of animals completely new to science, including a blind cave salamander collected from a deep well in Albany, Georgia. He'd also become deeply interested in freshwater turtles, publishing several papers clarifying the taxonomy of various kinds of *Pseudemys* turtles, better known as "cooters."

In the fall of 1939 Carr got his first collecting trip abroad, a two-month expedition for him and his students to Orizaba, Mexico, and environs. Barbour mailed Carr a list of animals he'd love to have for his museum, and helped underwrite Carr's travel expenses. For the first time as a scientist working in the field, Carr got a chance to combine his command of Spanish with his friendly nature to win the confidence of local residents in pursuit of his research ends. He and his party survived a terrific hurricane to catch dozens of reptiles and more than 100 mammals—all of which soon arrived in good shape at Barbour's museum.

Carr's interest in the biology of freshwater turtles and his deep admiration for his Harvard colleague coincided in 1941. On a turtle-collecting trip to Merritt's Millpond, in Marianna, Florida, near the headwaters of the Chipola River, Carr and a grad student caught an odd-looking specimen that clearly belonged to the widely known map turtle genus (*Graptemys*). Carr soon established that the turtle was a species completely unknown in the literature. He dubbed it *Graptemys barbouri* as a tribute to his friend.

The following summer, with the world at war, Carr and Marjorie, pregnant with her first child (of five), found themselves once again in Cambridge. Carr spent much of his time absorbed by the taxonomic riddles of sea turtles, even though his own experience with the creatures was extremely limited. Nonetheless, that summer he wrote his first

paper on sea turtles, a taxonomic key aimed at solving what he saw as a problem in loggerhead turtles, which had long been separated into three species under the genus *Caretta*.

Carr argued that there were enough differences between the species to warrant a whole new genus. His key split off two of the *Caretta* species, commonly known as the ridley turtles, into a new genus, *Lepidochelys*. Carr's rationale withstood the heat of peer review and a new genus of sea turtles slipped into the literature, thus becoming another taxonomic tool useful in gauging the threats to diverse sea turtle populations worldwide.

Carr's curiosity about marine turtles was finally aroused, but it would be a frustrating five years before he would get to see his first nesting sea turtle, and a full decade before he'd be able to focus all his energies on solving the mysteries behind the most important yet least-studied marine reptile on earth. His mentor, colleague and best scientific friend Thomas Barbour died in 1946 without ever seeing his protégé rise to prominence in sea turtle science.

HONDURAN HEAVEN

As immersed as Carr was in his research and new family, by the spring of 1943 he found himself pulled in a completely new direction. The war weighed heavily on his mind, and he felt honor bound to serve his country.

"He was desperate to serve," Davis said. "I think that was all about being bound up in southern honor. But the disability—his arm—limited his options. He really wanted to serve as an officer, and finally got an appointment in Washington, D.C."

But his friend Barbour advised Carr he'd be making a big mistake if he took the

job, that his family would find Washington a "hellhole." The clincher, though, was UF President John J. Tigert, who told Carr in no uncertain terms that if he left campus for the military he might not find his position waiting for him when he returned.

Davis suspects some sort of horse-trading with Tigert ensued, and Carr spent two years teaching campus air cadets introductory physics, a course he righteously loathed. But as soon as the war ended in 1945, Carr—who wasn't yet tenured in his department—got a 5-year leave of absence from his UF post to become a visiting professor in an agricultural school in Tegucigalpa, Honduras.

Davis' account of Carr's time in Honduras describes it as a magical period for Carr and his entire family. They were set up in a large, airy house and provided domestic help, including a cook and a *niñera*—a babysitter—for 3-year-old Mimi. The couple also had access to a stable of horses, and after class and on weekends they often enjoyed extended forays into nearby cloud forests on horseback.

For the first time in their married lives, Honduras gave the Carrs an opportunity to recharge, in tandem, their mutual passions for nature and for each other, Davis said. During their four-and-a-half years there, Marjorie bore two more children, Tom and Steven. She also found time to study local



PHOTO: CARIBBEAN CONSERVATION CORPORATION



30

the beach we turned several lights on
her and she seemed completely confused
as to orientation and started back
up the beach! When lights extinguished
she turned back toward sea. at 10:56
back in water.

Nest 5' at top of log pile
500 mm deep

Turtle carapace 645 mm L; 580 mm W; width
7 and 9. 4 eggs 130 in number

Other specimen filling nest as above measured
L 630 mm 3rd costal; L 270 W 115
4 postcostals

Other laying and filling as above turtles 6, 6
comp. L 690 W 610 3rd costal L 305 W 126
Began laying at 12:15 at high tide finished
at 1:03. 4 egg 2 times; 3 eggs 5 times
1 egg 4 times 2 eggs the rest. Total eggs 108
Nest 550 mm deep; 11" x 11" at bottom
with L-shaped steep side toward sea as above
Interned later. egg number 5-10 all
except last 4 or five which longer.

Other nest only 39 eggs. ♀ seen with meas.
Nest L-shaped as above; 530 mm deep
11" long 8" wide at bottom.

31

Random sample 17 eggs from these 3 nests
meas. in mm: 35 34.9 34.0 33.9
34.5 34.8 32.2 33.5 34.3 32.6
34.6 32.6 34.9 35.0 34.2 32.1 34.2
Egg not adhered to much extent.

Beach of powdery sand. A cane-like
grass abundant and a few flowering
vine like morning glory in habit
legume *Sopino* *ruco* *ruco* & tree common.
also in certain areas: *botanillo* [angelia]
Tiquilote, *gubino* *engusano*,
many amella, *botanillo negro*,
Dipnony *puris* more or less reg. evident

NOTEBOOK: TOM CARR



PHOTO: MIMI CARR

fauna, and compiled an extensive survey of Honduran birds (she even skinned and ate a macaw).

Archie, meanwhile, voraciously explored the region's wildly diverse habitats, his naturalist instincts in full gear. If it crawled, swam or flew, Carr sampled it by any means at his disposal, including a shotgun—which bird scientists since the days of Audubon had depended on for collecting field samples. His youth as a wing-shooter was paying dividends for science.

But it was a trip in October 1947 to the Honduran Pacific coast that launched what would become Carr's most enduring legacy as a zoologist. On a tiny island named Isla de Ratones ("Isle of Rats"), Carr encountered camps of Salvadoran turtle egg hunters. He quickly became fascinated with the swarthy men who lived in huts with sand floors nearly paved in half-buried eggs, a technique that kept them from spoiling. Carr befriended the hunters and was invited to join them for lunch. He learned how to pinch a hole in the tops of the leathery ovals, and suck down

from far left: **BALLOONS** had limited, but important capabilities for tracking the mysterious offshore movements of turtles in an era where remote telemetry of marine animals with radio transmitters was unheard of (ca. 1959); Carr kept meticulous field notes that grounded all his popular writing; Marjorie Carr on a collecting trip in the Honduran mountains with local students, ca. 1947.



ARCHIE CARR — TURTLE MAN

the contents with salt and lemon.

On the evening of Oct. 10, Carr sat on a hunter's beach, hunched beside a nesting sea turtle as she laboriously dug a hole and deposited her eggs. On its slow trek back to the sea, the turtle abruptly stopped and reversed course when Carr suddenly turned his lantern on the animal. When he shut his light off, the turtle regained her orientation and headed back toward the surf. Carr's notes on the event are thought to be the first recorded evidence by a scientist of turtles' sensitivity to light. Carr also noted the curious condition of the animal's eyes during the egg-laying process—the mama turtle looked for all the world as if it were crying. Such observations laid the groundwork for many years of rich research yet to come.

Carr's experience in Honduras changed him forever. As a naturalist, he not only got the rare opportunity to steep himself in a profoundly species-rich, unspoiled environment, he also got a new appreciation of how animal ecology is inextricably bound to human ecology. In the Honduran jungles, Carr broke with scientific tradition and paid

keen attention to locals when they spoke of their experiences with wildlife. Instead of dismissing the stories as silly folktales, Carr listened and took careful notes. As a result, he gained enormous insight that proved its value time and again both to Carr's science and his writing.

Carr also noted how hard life often was for common people trying to survive in such a poor country. After Honduras, Carr would infuse all of his popular writings on nature with themes underscoring the often overlooked, yet all-too natural element of people. And he returned to Florida with a new research resolve—to unravel the life histories of marine turtles before it was too late.

WINDS OF CHANGE

It's one of the most famous—and commonly cited—accounts in turtle lore: On his sail through the Caribbean in 1503, Christopher Columbus was so amazed by the vast number of turtles he found on the shores of three islands off the southern coast of Cuba

that he christened them “Los Tortugas” (Spanish for “the turtles”). In 1586, the islands got a new name—the Caymans—from English explorer Sir Francis Drake.

Long before Archie Carr first pondered the plight of sea turtles, the hordes that had mesmerized Columbus and fed his sailors four centuries earlier had disappeared from the Cayman Islands. But in their wake, the vanished turtles left a turtle-hunting culture among the Caymanian people that is still without peer in the Caribbean.

During his Honduran days, Carr had heard local descriptions of the turtle-hunting prowess of Cayman islanders. He sensed that these fishermen, whose ancestry predated Columbus, might have more knowledge about the life history of sea turtles than all the best minds in herpetology combined. Carr's first popular book, in fact—*The Handbook of Turtles*, a guide to identifying turtles of the U.S., Canada and Baja, Mexico—appeared in 1952 with excellent descriptions of sea turtles, but with almost no information about the animals' migratory patterns, ecology or range of habitat.

Later that same year, armed with the first research grant of his career—a whopping \$500 from the American Philosophical Society—Carr returned to the Caribbean with the Cayman turtle hunters in mind. Renewed in 1953, the grant allowed Carr to visit no less than 10 Caribbean countries, from Jamaica to Trinidad.



PHOTO: CARIBBEAN CONSERVATION CORPORATION

◀ **A “TURNED” TURTLE, flipped onto its back to immobilize it, gets dragged up the beach by Archie Carr and crew for weighing and measurement. The practice of “turning,” later deemed stressful for the animals, was discontinued by turtle researchers in the early 1980s.**



Riddle Of The Ridleys

PHOTO: ISTOCKPHOTO

In less than two years, Carr collected data from scores of local fishermen, turtle hunters and fishery management people across a 2,000-mile swath of prime turtle territory. He trekked across hundreds of miles of beaches, sat in more huts of the turtle men, and developed a taste for exotic cuisine ranging from calipash (a green turtle delicacy) to manatee. He learned how to identify turtles by the sandy tracks they made during nesting time. He developed a crude, but effective, method of tagging turtles to learn where they go and when—heretofore something only turtle hunters knew. But above all, Carr got a bit in his teeth to write about what he saw, heard and felt—and not just for science.

In 1956, Carr published what would be his most famous book, *The Windward Road: Adventures of a Naturalist on Remote Caribbean Roads*. He dedicated the book to the memory of Thomas Barbour. With the lay reader foremost in mind, Carr turned to his gifts as a writer and storyteller and produced the most compelling account of sea turtle ecology the world had ever seen.

Essentially, Carr built a colorful narrative around what his research had turned up about the nesting and migratory habits of some of the most common marine turtles in the Caribbean. He focused two chapters on Turtle Bogue, or Tortuguero in Spanish, which he'd established as the most important

nesting ground in the eastern Caribbean for the green turtle, *Chelonia mydas*. Throughout the book, Carr contrasted his ecological descriptions of turtles and other wildlife with the people whose lives and culture depended on the very animals he wrote about.

Carr ended *The Windward Road* with a cautionary tale about the future of the green turtle, historically the most abundant species in the region. It had been the great numbers of greens that had caught Columbus' attention in 1503, and it was this vast population's decimated progeny that Cayman hunters had

doggedly pursued for generations.

On the black beaches of Tortugero, 600 miles south of the Caymans, Carr realized what he was seeing—a head-on collision between a rising, international market for sea turtle meat and a population of wild animals too thin to keep pace with the demand. He lamented a hideously wasteful system that paid locals as little as 50 cents for each turtle they trapped on the beach during nesting season, where untold numbers died miserably in the sun and rotted even before they could lay their eggs much less be shipped to market.

In his classic book, *The Windward Road*, Archie Carr devoted an entire chapter to “the riddle of the ridley.” To his profound consternation, Carr acknowledged that as far as he knew, no one had ever found a nesting Kemp’s ridley turtle or even a Kemp’s ridley egg. How could this be?

It was a “tough and nagging mystery” that baffled Carr for nearly 20 years. But in 1961, a biology professor at the University of Texas, Corpus Christi, called Carr and told him about a film he’d stumbled upon in Mexico. He insisted that Carr see it.

The amateur film, shot in 1947 by a wealthy Mexican engineer, stunned Carr. It showed an estimated 40,000 ridley sea turtles arriving *en masse* on the beaches of Rancho Nuevo, Mexico, south of Brownsville, Texas. It was a nesting armada that science never knew existed. Here was where it all happened for the mysterious Kemp’s ridley!

An elated Carr soon launched a field trip to Rancho Nuevo. But he would discover only scant traces of the nesting ridley hordes that had once so commonly invaded the shores there. The great, annual arrival (“*arribada*”) of the egg-laying ridleys was a thing of the past. Carr had solved the ridley riddle only to find disturbing new proof that entire species of turtles were disappearing from the planet.

◀ Visit www.rinr.fsu.edu/fall2007/features/coverstory.html to see a short segment of this rare film.





Envisioning a eulogy for the green turtle, Carr contrasted the beleaguered animal’s lot with that of the American bison, shot to near extinction by 1885:

“The bison was in the public eye from the start. It cluttered land now Illinois real estate. It gave comfort to difficult red Indians and blocked the scant traffic on proud new railroads. The bison passed in a blaze, watched by everybody—not without lamentation here and there, but with little interference. It had to go, in the mind of the day, because it hindered progress. The green turtle, on the other hand, hindered nothing. The turtle fleets passed secretly and without commotion. They were just too good to last.”

OPERATION SAVE SEA TURTLES

It’s the hobgoblin of science: Its inventors take it for granted. Without it, humanity would still be stuck in the Dark Ages. But despite science being an integral part of our daily lives, most of us are clueless about how any stripe of it came to be.

This is precisely why the work of historians such as Fritz Davis is so important both to science and to the humanities. Without researching the roots of a particular branch of science, the intellectual links that entwine the two cultures would be lost. Gone would be our perspective on how one branch of scientific curiosity begat another—and perhaps even more

importantly, why it did. Without answers to such questions, understanding any avenue of science at any depth is impossible.

Davis subtitled his biography of Archie Carr “*Origins of Conservation Biology*,” and for good reason. Before Carr’s day, the term “conservation biology” didn’t exist, even though a conservation movement had been gaining strength around the globe for decades. The movement had a central idea—to protect wildlife and natural areas from extinction—and not just for the sake of economics. Thanks to the writings of Henry Thoreau, John Muir, Louis Agassiz and many others, by the close of the 19th century policymakers in the U.S. and abroad were beginning to seriously contemplate the long-term consequences of unbridled exploitation of the world’s natural resources.

The last century wasn’t a decade old before President Theodore Roosevelt—a born naturalist—became the icon of the country’s young conservationist movement. Against the tide of industry, Roosevelt cre-

ated the U.S. Forestry Service and launched a broad campaign to create national parks and preserves. By the time Archie Carr first set foot on a turtle beach in the Caribbean, popular support for setting aside publicly owned, natural areas for the sole benefit of wildlife—as opposed to commerce—was higher than at any time in history.

It was against this national tableau that Carr’s book, *The Windward Road*, appeared in 1956. Although no one could predict it at the time, the book became a major factor in formalizing, in the mid-1980s, a new branch of science called *conservation biology* (also called conservation ecology). Within the first year of its publication, Carr’s book lit the fuse to a grassroots conservation movement unlike anything the world had ever seen. Nobody was more stunned to hear about it than the author.

“Soon after the book appeared, one day out of the blue Archie got this letter from a guy named Joshua Powers, who was a successful publishing agent in New York City,” Davis said. “Powers told Carr he’d sent copies of his book to 20 of his friends in publishing and government circles in the Caribbean and that he was creating a group called ‘The Brotherhood of the Green Turtle.’”

Carr soon learned that Powers, who had represented newspapers throughout the world, had strong political and economic connections scattered from Mexico to South America. Powers had been so taken by Carr’s description of the plight of sea turtles (which he later described as “engrossing, humorous and deadly serious”) that he had immediately enlisted the aid of his powerful friends to create and fund a conservation effort.

Before he wrote the first word of *Windward*, Carr had mused about the need to



CARR'S IMPACT
as a scientist was magnified by his gift with the written word which touched lay readers around the world.

SeaTurtle Saga

Archie Carr's crusade to save sea turtles from extinction, begun in the 1950s, stands as one of the most successful conservation movements in history. The biggest comeback has been seen in populations of the green sea turtle (pictured below). Still, biologists say certain species—notably the leatherback and the loggerhead—are in serious decline worldwide and may never recover. International treaties ban trade in products derived from all turtle species, but laws governing turtle consumption and trade within countries are set by those individual countries. The Endangered Species Act bans all trade and consumption of sea turtle meat or products in the U.S., but many Caribbean nations still legally allow their citizens to buy and sell turtle products, including items made from real tortoiseshell (*upper right*), derived almost exclusively from the hawksbill turtle.





ARCHIE CARR — TURTLE MAN

organize a plan to protect sea turtles in the Caribbean. His research had convinced him beyond any reasonable doubt that turtle populations from Trinidad to Costa Rica were rapidly declining. He'd concluded his book by writing: "...real protection for a few (nesting) beaches not only would help save for the future a species now threatened with extinction, but might even bring back the fleets Columbus found."

But Carr knew where his strengths lay. He was a scientist, not a politician. He knew what would be required to protect "a few beaches." If any conservation scheme in the Caribbean had any hope of succeeding, the governments of at least half a dozen key countries would have to agree to take unprecedented steps to protect nesting areas, and that would take political clout and lots of it. Even then, without local support of fishermen and turtle-egg hunters, even that wouldn't be enough, Carr knew.

Then, too, Carr wasn't happy about the state of his research. With the help of a new grant (his first) from the National Science Foundation, he'd just begun the most ambitious turtle tagging operation ever mounted. He didn't yet have enough data that he felt he needed on turtles' migratory patterns to, in his words, "build up the case" for creating an "uproar over the need for an international conservation program."

THE RISE OF TURTLE CONSCIOUSNESS

In 1979, *The Windward Road* was reissued by the Florida State University Press, 23 years after it first appeared. In the forward, Joshua Powers reflected on the book's legacy and what had stirred him to action some 20-odd years before:

"(Dr. Carr's) record of the things he saw, learned, felt and thought during his wandering (in the Caribbean) makes the reader's skin

tingle and his blood surge. It is not often that a book entertains, instructs, and drives people to action. This one did, however, and does, and it leaves one with spiritual urge and grace."

Powers recounted how the efforts of a small group of business leaders (including Tallahassee's own John H. "Ben" Phipps) meeting in Manhattan in 1959 eventually inspired the government of Costa Rica to establish The Tortuguero National Park in 1975, the world's first safe haven for nesting turtles. Powers, as did others, saw the establishment of the park as the crowning achievement in the history of his "Brotherhood" which since 1959 had been formalized as the non-profit Caribbean Conservation Corporation.

As for himself, Carr had worked tirelessly toward the park's creation, serving as the CCC's chief scientist and director of field operations based in Tortuguero and lobbying government officials every chance he got. For 30 years, he watched as a fledgling tagging operation at Tortuguero—begun with NSF funding that would continue uninterrupted until he died—blossom into the largest turtle research project in the world.

Within three years after Carr had installed graduate student Larry Ogren on Tortuguero beach in June 1957 as the chief of tagging operations, returns from more than 1,200 tagged turtles removed any doubt that Tortuguero was the most important turtle breeding ground in the entire Western Hemisphere. As research momentum grew, more pieces of the tantalizing puzzle of turtle biology quickly fell into place.

Carr and Ogren soon became the first researchers to determine the prime nesting

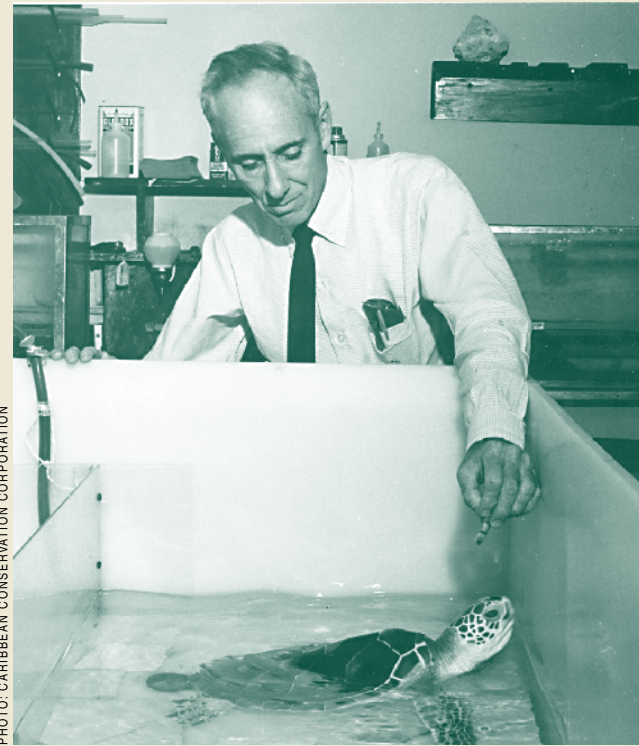


PHOTO: CARIBBEAN CONSERVATION CORPORATION

seasons for green turtles (August); leatherbacks (April and May) and hawksbills (between the greens and the leatherbacks). The pair also succeeded in figuring out turtles' curious dependence on light for orienting themselves during nesting. Carr termed the process "modified phototaxis," describing it as a complex mechanism whereby turtles use both light and space to guide them on land. Carr also put forth a strong argument for why mother turtles "cry" when they lay eggs: Tears help shed layers of sand that build up on their eyes during the process.

Another one of Carr's students working at Tortuguero, Harold Hirth, devised ingenious glass-sided artificial turtle nests that revealed intriguing details about how hatchlings develop and escape the nest (hatchlings turn into a "superorganism" and synchronize their efforts in digging their way out).

Backed by the CCC, in 1961 Carr launched the most ambitious turtle-restocking project ever conceived: Operation Green Turtle. Led by Hirth and Archie's oldest son, Archie F. "Chuck" Carr III, the project was aimed at safely hatching as many turtles as possible and releasing them into the wild all over the Caribbean.

For nearly a decade, Carr's hatchery at Tortuguero produced tens of thousands of

Carr, The Scientist

Just as there are species of bugs, there are species of biologists. Archie F. Carr, Jr. clearly belonged to a species that dates to the dawn of the science—the naturalist.

It's no stretch to say that Carr came from the same intellectual stock as some of the most famous naturalists in the history of biology. He cut his early academic teeth on taxonomy, the scientific classification of living things invented by the great 18th-century Swedish biologist Carl Linnaeus. Carr's passion for nature, his raw lust for being in the wild, harked to the halcyon days of John James Audubon and William Bartram.

Carr called himself a "whole-animal" biologist—a scientist mainly interested in studying animals living in their natural habitats. From the time he'd been old enough to hold a fishing pole, wade a creek with his dad, or tote a shotgun behind a bird hound, Carr had sensed an innate affinity with—and curiosity about—wild things.

But just as he was getting on track with his academic career in zoology at the University of Florida in the late 1930s, the entire world of biological science faced monumental change. Research into the life sciences was about to shift into a whole new dimension that threatened to turn "whole-animal" naturalists such as Carr into museum pieces.

By the mid-50s, the entire field of biology was transformed by discoveries made not in the field but in comfy labs equipped with powerful microscopes. Serious biological research had become

all about dissecting individual cells, genes, and even molecules, as opposed to slimy or hairy beasts snatched fresh from the field. Molecular biology, aimed at understanding life's chemical and physical underpinnings, fueled a wide variety of disciplines—most focusing on how genes worked.

Traditional methods of differentiating species of plants and animals—the taxonomical talents that had jump-started Carr's career—were eclipsed by clever new tools and know-how of geneticists and molecular biologists. Well before he died in 1987, Carr lived to see developments in his own department that he could never have imagined when he began his career.

At every turn, he saw his own specialties—in taxonomy, field ecology and natural history—marginalized by molecular biology, flush with the lion's share of federal research funding in the life sciences. Toward the end of his spectacular career, Carr was throwing up his hands. "You can't get a job in zoology being the kind of biologist I was anymore," he told an interviewer.

In his biography of Carr, historian Fritz Davis puts Carr's career into perspective.

"The pervasive view is that natural history became anachronistic during Carr's time, but I don't see it that way," he said. "Carr certainly represented a transition between 19th-century and 20th-century biology, but I believe that natural history as practiced by Carr continued to inform all the biological disciplines—particularly ecology and evolution—and still does today." —**F.S.**

baby turtles and transported them by amphibious aircraft to beaches in the Caymans, Belize, Columbia, Grenada, St. Lucia, Antigua, Barbados, St. Kitts and Puerto Rico. Through grants he'd received through the U.S. Office of Naval Research, Carr had made strong friends in the military. Until the Vietnam War reordered the Navy's priorities, Carr parlayed his Navy connections into free use of the service's fleet of Grumman Albatrosses.

Unfortunately, Carr was never able to ascertain the scientific value of Operation Green Turtle. Technology of the day didn't allow juvenile turtles to be tagged, so there was no way to determine where the hatchlings went or when, where—or if—they returned to nesting beaches when they matured. Carr's team still didn't know exactly how long it took turtles to reach sexual maturity—the

TALLAHASSEE CONNECTION:

John H. "Ben" Phipps (1905-1982), second from right, and his wife Elinor, chat with Florida Gov. Millard Caldwell and his wife Rebecca in Miami Beach in 1946. Phipps was a native New Yorker who moved to Tallahassee in the 1940s where he ran a media conglomerate that included WCTV-TV, a CBS-affiliate. Following the acclaim of Archie Carr's book *The Windward Road*, published in 1955, Phipps, an arch-conservationist, helped organize an international group of business leaders interested in promoting preservation of sea turtles.

Phipps served as the first president of the Caribbean Conservation Corporation, a nonprofit Florida corporation, and is credited with funding the group's work through its early years.





guess was four to six years. They would soon be stunned to learn that the process could take up to 40 years! Even if all went right, Carr realized it would take the better part of a lifetime to see any lab-raised hatchlings return as egg-laying adults.

Still, Carr regarded Operation Green Turtle as a resounding success in one critically important sense—its value in spreading the gospel of sea turtle conservation. For years, the sight of Navy seaplanes loaded with baby turtles cheered legions of beach-dwellers throughout the Caribbean basin. It was a public relations coup that fueled a rapidly

growing international movement that soon had Archie Carr at its epicenter.

FROM CONSERVATION TO PRESERVATION

From his first inkling that sea turtles might be on the road to extinction, at least in the Caribbean, Archie Carr never imagined a time when he would advocate a complete ban on the trade in turtle products. In his first exchange of letters with Joshua Powers in 1958, Carr told Powers that he'd

already “done more to...help insure turtle soup for the future than I could have done in years.”

Carr clearly subscribed to Teddy Roosevelt’s idea of conservation—publicly owned natural resources (such as forests) could be managed for rational use and thus be perpetually self-sustaining. As he made abundantly clear in *The Windward Road* (to the consternation of more than a few readers) Carr had a tooth for turtle meat and especially green turtle soup, which he described as “the finest gastronomic contribution of the English people.”

Carr, The Man

When he wasn't buried to his hips in some wetland muck or holed up fighting a deadline on a grant proposal or book, Archie Carr could be, in his own way, the life of the party. While not given to being a glad-hander or partier, Carr genuinely enjoyed people, as long as they came in small bunches.

Historian Fritz Davis paints a portrait of Carr as a congenitally shy man who nonetheless possessed genuine charisma and a flair for the dramatic. A small, slender man by today's standards, Carr easily commanded attention from students, faculty colleagues or—when he absolutely *had* to—government bureaucrats and even heads of state. Paradoxically, Carr avoided the limelight whenever he could, and absolutely abhorred confrontation with anyone on any subject.

Apparently, Carr never fully let go of his taste for the stage—he'd played leading roles in several high-school plays. Once, at a Christmas party in Honduras, Carr showed up dressed as Mr. Hyde, replete with a live vulture on his shoulders. On a field trip collecting tropical fish in Costa Rica, Carr snatched up and promptly ate a specimen completely new to science—just to see the horror in the face of the man standing beside him who'd discovered it.

If Carr had a keen funny-bone, it was matched by a remarkable

ear for language—a talent that served him well throughout his career. Through a chance match-up with a Cuban roommate in college, Carr quickly learned Spanish. Years later while teaching in Costa Rica, Carr wowed a radio audience by delivering a live lecture on evolution—in flawless Spanish.

Davis said his study turned up convincing evidence that in his personal life Carr basically toed the line on values that he'd picked up as the son of a Presbyterian minister. Carr had an incredibly

PHOTOS: MIMI CARR





PHOTO: CARIBBEAN CONSERVATION CORPORATION

◀ **A SLAUGHTERED** sea turtle lies on a beach, a victim of poachers. Carr, left, witnessed such carnage often in his crusade to protect marine turtles from extreme exploitation.

But by the mid-1960s, Carr's attitude had changed. In 1963, Carr was invited to serve as chair of the newly formed Marine Turtle Group, created by the International Union for Conservation of Nature, a high-caliber coalition of wildlife scientists and naturalists based in Switzerland. The appointment gave Carr a platform for researching the range and scope of turtle commerce well beyond the Caribbean perimeter.

He soon saw the writing on the wall: Sea turtles faced certain annihilation worldwide in the face of rising demand for their meat, calipee (yellowish cartilage prized for soups), shells, hides and even oil. Improvements in refrigeration aboard ships played a big role in escalating the turtle trade, even allowing Carr to eat fresh fried turtle sandwiches from a sidewalk cafe in Gainesville.

Carr's son Chuck reported seeing hundreds of olive ridley turtles slaughtered for leather on the Pacific beaches of Mexico. Demand for genuine tortoiseshell for making a variety of consumer goods from eyeglasses to combs was on the rise after replicas made from plastic began being passed over for the real thing—material that comes almost solely from hawksbills.

In a letter to the IUCN director, Carr called for an international clampdown on the turtle trade, and with characteristic Carr color:

"The egg markets of the Sarawak Islands and those of Eastern Malaysia ought to be stopped. So should the calipee trade; the expanding commerce in turtle skins; the Japanese exports of stuffed green turtles to be used by morbid Californians as household furnishings; and the worldwide traffic in young hawksbills, polished and mounted for hanging on the wall."

By 1967, with new data showing that green turtles can take up to 50 years to reach breeding age, it was clear to Carr and his team that measures protecting nesting beaches weren't enough. Adolescent and adult turtles found offshore needed protecting as well, and that meant international treaties. If these ever came about—no small feat—Carr knew what impact these new laws would have on people, and this

◀ **FAMILY AND FUN:** When he wasn't in the wild, Carr enjoyed time with his large family and wife Marjorie, who shared his keen sense of humor. At a party in Honduras, he came dressed as Dr. Hyde, accompanied by a live vulture.

strong work ethic, yet was a dedicated, engaged father (of five) and devoted husband.

But Carr was hardly the typical preacher's kid. Although he wasn't known to drink to excess, he loved a good beer. On his treks through the wild beaches of the Caribbean, he also acquired a taste for *guaro* (sugarcane rum) and sometimes carried a canteen of it on his hip.

Then there was the swearing. How he acquired his salty tongue is a mystery, but Carr could shock people with his profanity-laced outbursts on just about anything. At a large meeting of conservationists in Miami, Carr stunned some conventioners who mistook him for a "muttering, cursing old hag."

When his most famous book, *The Windward Road*, appeared in 1956, Carr's accounts of his zeal in eating exotic native foods startled more than a few readers. How could such a great naturalist reconcile dining on monkeys, even manatees, much less the very animal he wrote the book about?

In his preface to the book's reissue by the FSU Press in 1979, Carr solemnly addressed what he called "transitory pangs of conscience" over his gustatory habits as a young man:

"I will say without hesitation that clear green turtle soup is the finest gastronomic contribution of the English people. Giving it up was my greatest sacrifice to the religion of turtle preservation." —F.S.



ARCHIE CARR — TURTLE MAN

▶ With students and colleagues in Costa Rica, Archie Carr (center) discusses strategy for Operation Green Turtle, a restoration project launched by the Caribbean Conservation Corporation in 1961.



PHOTO: CARIBBEAN CONSERVATION CORPORATION

▶ **WHEN MARJORIE CARR SPOKE**, people listened. After becoming famous as the leader of a grassroots effort that led to President Richard Nixon ordering a halt to work on the Cross-Florida Barge Canal project in 1971, Marjorie continued as a tireless advocate for stronger environmental laws until her death in 1997. Here, she gives then Sen. Bob Graham at earful from her wheelchair in her Gainesville home in August 1997, just two months before her death at age 82. ▶

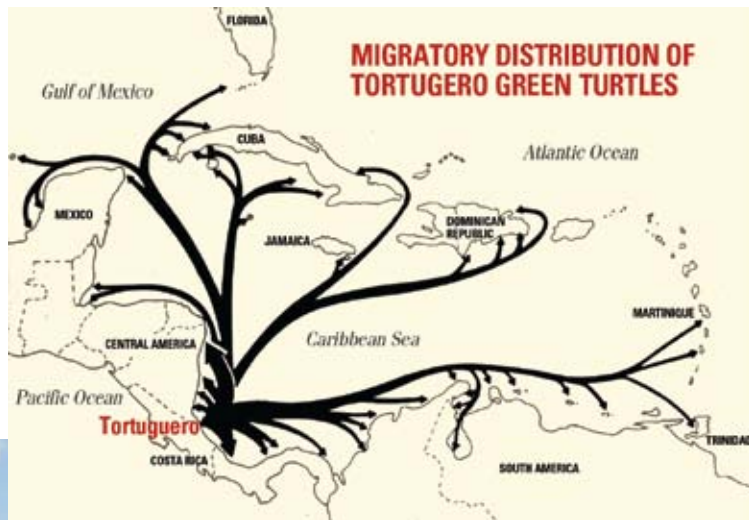
bothered him. He expressed his feelings in what would be his last, and some say best, book on the natural history of sea turtles, *So Excellent a Fishe* (Natural History Press, 1967):

“To stop turtle-hunting in the Miskito Cays of Nicaragua would change the lives of people in New York, Key West, and London, and in the Caribbean it would bring real suffering to some.”

Despite his misgivings, in the final analysis Carr saw no hope for survival of marine turtles than an all-out, global effort to save wild populations by any means necessary. He even saw the folly of turtle farming, a concept he’d initially supported. All farming would do, he realized, would be to fire up popular demand for turtle products and eventually push farms past their capacity. This would open the door for increased poaching of wild populations, he argued.

By 1968, the lines were being drawn around what the world was going to have to do to save marine turtles from extinction. A watershed victory in the cause for preservation came in 1973, when Congress passed the Endangered Species Act. Carr and his extraordinarily dedicated cadre of students were entering the most rewarding period of their careers.

PHOTO: THE GAINESVILLE SUN



▶ **THE GREEN HIGHWAY:** Perhaps Archie Carr’s greatest fundamental contribution to sea turtle science was documenting in the 1950s that the black beaches of Tortuguero, Costa Rica are the world’s largest nesting grounds for the green sea turtle, *Chelonia mydas*. Carr’s tagging program tracked the turtles’ intricate migratory routes throughout the Caribbean, thereby laying the groundwork for a rational, comprehensive approach to saving the species from extinction.

TURTLE MYSTERIES SOLVED

Davis’ book chronicles in detail the rise of Carr’s stature as the world’s leading crusader for sea turtle conservation. To be sure, it was a trajectory greatly fueled by Carr’s rare writing ability, a talent that stirred people to action. But ultimately, Carr’s success was grounded in the remarkable headway he and his students were making in the uncharted sea of turtle biology.

Painstaking efforts to develop and test increasingly more reliable methods of tagging turtles and tracking them on their long swims eventually paid off. By the time Costa Rica got around to setting up the world’s first, government-protected sanctuary for turtle nesting at Tortuguero in 1975, Carr’s team had established
Continued on page 42



Click into the Turtle World

Here are links to selected resources for more information about sea turtle conservation:

THE CARIBBEAN CONSERVATION CORPORATION

www.cccturtle.org/

THE ARCHIE CARR CENTER FOR SEA TURTLE RESEARCH

<http://accstr.ufl.edu/>

NOAA OFFICE OF PROTECTED RESOURCES

www.nmfs.noaa.gov/pr/species/turtles/

FLORIDA WILDLIFE COMMISSION SEA TURTLE PROGRAM

www.myfwc.com/seaturtle/

THE MARINE TURTLE NEWSLETTER

www.seaturtle.org/mtn/

THE INTERNATIONAL SEA TURTLE SOCIETY

<http://iconferences.seaturtle.org/>

CONSERVATION INTERNATIONAL

<http://web.conservation.org/xp/CIWEB/programs/turtleflagship/>

WILDLIFE CONSERVATION SOCIETY NICARAGUA SEA TURTLE PROGRAM

www.wcs.org/international/marine/marinelacaribbean/nicaraguaseaturtle

TURTLE MAN

Continued from page 30

the primary migratory routes and breeding habits of the five most important species of sea turtles in the Southern Hemisphere, including the once-mysterious Kemp's ridley (*Lepidochelys kempii*) (see page 23).

Carr's pull with the military gave him almost carte blanche to fly students and equipment to some of the most exotic locations in the world, and to good effect. In 1960, Carr made his first visit to Ascension Island, a speck of land that crops up 1,400 miles off the coast of Brazil in the South Atlantic. Green turtles had been using the island to breed throughout history, but no one knew where the turtles came from or how they managed to find a sliver of earth in the middle of nowhere that even veteran pilots sometimes missed. Carr's team eventually determined where the turtles come from (Brazil) and how they manage such an improbable journey (by smell).

One of the toughest challenges for turtle biologists everywhere, though, was

figuring out exactly what happens to baby turtles when they first scramble from their nests and enter the sea. Biologists had long observed that after hitting the surf, baby loggerheads, for example, essentially vanished for at least a year. When they reappeared, they'd be the size of dinner plates. Where had they been?

Carr spent his last productive years searching for answers. He resorted to a source of choice—local knowledge—to guide his search. Swordfishermen operating in the deepest parts of the Caribbean told Carr about seeing tiny turtles caught up in huge mats of sargassum weed floating far offshore. Intrigued, Carr—at age 76—plunged head-first into a field of science he knew nothing about—physical oceanography. His last scientific paper, published in 1986, put to rest much of the mystery of turtles' "lost year" and presented some of the first, disturbing evidence of how polluted seas were impacting oceanic wildlife.

LEGACY YEARS

From his front porch at Wewa, the name he and his wife Marjorie gave their home a dozen miles outside Gainesville, Carr liked to

gaze out across his yard—and see Africa.

Wewa sat near Payne's Prairie—a vast geologic anomaly caused by an ancient collapse of underlying limestone. The result was a 50-square-mile plain as flat as any beast-strewn savanna he'd seen on his numerous trips to Africa. While tubing down the nearby Ichetucknee River one day, Carr had found two large, prehistoric molars belonging to two different species of mammoths. He mused about how these great beasts, together with saber-toothed tigers, jaguars, camels and giant tortoises, had once shared similar grounds in Africa during the Ice Age, long before the earth's ecology got so complicated.

Notably, Carr had spent his entire career as an ecologist, even though as a distinct field of biology, the term "ecology" was little heard before 1970. Carr was in his mid-70s when his own ecological specialty—conservation biology—got formally recognized as a field unto itself. In doing so, the field became a keystone in Carr's legacy to science, spawning a whole new range of research in fields from wildlife management to population genetics.

Fittingly, it fell to one of Carr's graduate students—David Ehrenfeld—to be tapped



as the founding editor of *The Journal of Conservation Biology*, the voice of the Society for Conservation Biology, founded in 1985. Now a professor of biology at Rutgers University, Ehrenfeld followed the lead of his favorite college professor and launched a second career as a writer. He exemplifies the high caliber of doctoral students that remains one of Carr's finest legacies.

Conspicuously, the Caribbean Conservation Corporation remains at the forefront of Carr's legacy as the preeminent champion of sea turtle conservation. Still based in Gainesville, the non-profit CCC maintains strong projects in research and conservation around the world, including Tortuguero, where it runs the John H. Phipps Biological Field Station within the Archie Carr Wildlife Refuge, established in 1994. The station still runs the largest turtle-tagging program in the world and trains students from throughout Latin America in marine conservation.

In 2008, the International Sea Turtle Society will host its 28th annual meeting, this one in Baja, Mexico. Carr's work is generally regarded as the driving force behind the event, which typically attracts more than 1,500 sea turtle biologists, marine conservationists and ecologists from around the world. Larry Ogren, Carr's chief of tagging operations on Tortuguero in 1956, attended the group's first meeting, held in Jacksonville.

"What spawned it all was Archie Carr," Ogren told *Research in Review*. "All the awareness (of sea turtles' plight) we see in the world today, Archie was definitely responsible for that."

Now retired from the National Marine Fisheries Service, Ogren was a key member of the federal agency's lab based in Panama City, Florida, which developed the world's first practical turtle excluding device, or TED, for the shrimping industry. For decades, biologists have blamed the industry for killing more turtles—by trapping them in trawls where they drown—than any other human activity. In 1987, equipping shrimp nets with TEDS became mandatory in all U.S. waters. Though enforcement is spotty, the use of

TEDS is generally credited with saving tens of thousands of turtles every year.



FINEST HOUR

In summing up Carr's legacy, Davis singles out his "intellectual children and grandchildren"—his original students and now their kids—who have amassed more than 50 years of data on marine turtles, reportedly the longest running stretch of scientific research ever conducted on an animal. A number of Carr's former students fill prominent roles in turtle conservation efforts around the world.

Perhaps most notable of these is Karen Bjorndal, who worked with Carr almost daily for the last 20 years of his life. Bjorndal is director of UF's Archie Carr Center for Sea Turtle Research, set up as a tribute to Carr the year before he died. The center directs research on the entire range of turtle biology using an array of high-tech tools ranging from satellite telemetry to genetic probes.

Just recently, Bjorndal's group succeeded in using DNA tags to confirm one of Carr's key theories on where loggerhead turtles spend their first year at sea—far out into the Atlantic in gigantic eddies stretching all the way to the Mediterranean Sea. The study found that roughly half of the turtles feeding in the western Mediterranean come from

nesting beaches in Florida, Georgia and South Carolina.

Though he knew little about genetic tagging, such news no doubt would have put a smile on Carr's face just as had Sibella's words—"de turtle nevah finish"—so long ago.

"I believe that if he were around today, Archie Carr would say his greatest legacy is what's become of the turtles," Davis said.

Despite terrific threats from pollution, loss of nesting habitat, commercial fishing gear, poaching and disease, most sea turtle species are hanging in there, Davis reports, and some are doing remarkably well. Davis cites recent estimates that peg a worldwide population of green turtles above 88,000. Sea turtle nests at Tortuguero have jumped from a low of 15,000 in 1971 to nearly 80,000 in 2005.

But other species, notably the loggerheads and the leatherbacks, are still suffering and face serious challenges to survival. Populations of both are dropping sharply in many parts of the world, including the Southeastern U.S. Estimates by international wildlife watchdog groups claim that a combination of enormous, open-ocean drift nets, and a type of commercial fishing known as "long-lining"—essentially using miles of baited hooks—kill up to a quarter million loggerheads and up to 60,000 leatherbacks each year.

Still, Archie Carr's singular quest—to save turtles from the fate of so many of the creatures exploited by humans—is seen by Davis and many others as one of the noblest and most successful campaigns in the history of modern science. Thousands of well-trained soldiers are now in turtle-saving campaigns in nearly 60 countries around the world, thanks to an Alabama-born naturalist who knew how to write. Carr's talent with words can't be underestimated, in Davis' view.

"Archie was a brilliant, gifted writer, and that clearly sets him apart from so many other fine scientists of his day," Davis said. "He was a first-rate biologist, a born naturalist. But I think it's absolutely true that his gift with the written work helped to establish his legacy as the man who saved sea turtles." **RinR**