FLORIDA STATE UNIVERSITY
Research
IN REVIEW

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
GLASS ACT

Chemistry labs remain one of the most reliable places where science and art still manage to meet. This exquisite distillation apparatus—used in synthetic organic chemistry—was built by Tom Dusek, a scientific glassblower with Florida State's Department of Chemistry. Dusek apprenticed for more than a decade under his father Leo, a master glassblower, before working as the scientific glassblower for the Institute of Polymer Science at The University of Akron in Ohio. Though still in high demand, scientific glassblowing is a vanishing skill being priced out of the market by new techniques and off-the-shelf glassware.
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\textbf{Attention Teachers:} We encourage the use of this magazine as a teaching aid for middle and high school students. For more details, e-mail the editor at frankstp@mailer.fsu.edu or call 850-644-8634.
Fat in Fashion?

Genes. Lack of exercise. A virus. The varied explanations for Americans’ ballooning waistlines—and medical bills—have proliferated in recent years as the country has grown fatter, but none account for the whole picture.

So what’s really going on here?

At the root of it all, say economists, is the cheap calorie. In June, Time magazine reported that “Americans still spend less to feed themselves than any other people on the planet...Just 9.9 cents of each dollar we spend is for food, down from 23.4 cents in 1929. By comparison, 16 percent of household expenditures in Britain go to food; Brazilians spend 23 percent, Thais 29 percent.”

But again, the price explanation doesn’t fill in all the gaps. After food prices leveled off in the 1990s, Americans still packed on the pounds.

Now a new, unconventional economics model, drawing from not only economics but also sociological and biological research, is helping to complete the picture, at least for American women, who were the focus of the model published this summer in the journal Economic Inquiry.

Frank Heiland, FSU assistant professor of economics, and his colleague Mary Burke at the Federal Reserve Bank of Boston, theorize that cheap calories cause American women’s initial weight gain, but beyond that, two additional factors kick in that largely explain the rest of a trend that saw nearly one-third of American women clinically obese by 2000.

Heiland and Burke suggest that by the end of the last century putting on a few extra pounds simply had become more socially acceptable. Data collected by the Centers for Disease Control and Prevention in Atlanta showed that in 1994, the average woman weighed 147 pounds and wanted to weigh 132 pounds. By 2002, the average woman weighed 153 pounds and wanted to weigh 135 pounds. The economists also cite as support another study from 2000 that found 87 percent of Americans, including 48 percent of obese Americans, said their body weight qualified as “socially acceptable.”

Also shoring up the social component of Heiland and Burke’s formula are recent findings, published this summer in the New England Journal of Medicine, that obesity spreads through social networks almost like a socially transmitted disease.

Still, food price and social contagion together don’t explain the whole pattern of weight gain.

The third key factor the economists plugged into their model is metabolism. Though economists in the past decade have joined the many efforts to figure out the obesity epidemic, Heiland and Burke are the first to incorporate this biological variable, and as a result, Heiland says, their model so far best explains the pattern of weight gain among American women.

Some medical researchers have shown that fat burns far fewer calories per pound than muscle, which is bad news for people already on the plump side. When Heiland and Burke incorporated this information into their model, their predictions matched more closely than any previous economic model the reality that not only has the average American woman’s weight gone up in recent years but also that the heaviest women, the ones with the most pressing need to shed pounds, are the ones gaining the most.

The good news, Heiland said, is that women’s weights have actually stabilized in the past few years as food prices have ticked slightly upward.

“I wouldn’t be surprised if we’ve seen the worst of it,” he said.—C.S.

A New Star in Physics

When a certain kind of star explodes, it does so with such violent energy that it makes the blast of a nuclear bomb look like a dull, ephemeral speck. It’s such a spectacular event unimaginable to most people on Earth that it’s no wonder the explosion creates some of the most fleeting particles in the universe, particles that don’t exist on this planet—at least not naturally. They are created in a few labs around the world, including one in an FSU basement.

With the completion this spring of an ambitious, five-year project, Florida State physicists will be able to study what happens when these passing particles react with other tiny particles, such as protons, as they are theorized to do in star matter. These experiments are
designed to give scientists new insight into the life cycle of stars and of the universe.

The project called RESOLUT, short for Resonator Solenoid with Upscale Transmission, is the latest addition to the existing particle accelerator that nuclear physicists built here in the 1970s and added to in the ‘80s.

The RESOLUT system, said lead physicist Ingo Wiedenhöver, will be able to explore new directions in nuclear physics and astrophysics like no other instrument, he said. The team ran its first experiments in May and June, and are already obtaining surprising results.

Essentially, they charged the accelerator, which is partly housed in an enormous pill-shaped steel chamber, with enough energy to match the voltage of a typical thundercloud (9 million volts) and hurled particles of magnesium ions, to zoom from zero to one-tenth the speed of light in a fraction of a second.

Wiedenhöver shot the magnesium through heavy-hydrogen gas to convert the element to an unearthly form of aluminum that exists for mere seconds—normally only in exploding stars—before it totally decays. But before it had a chance to disappear, in another fraction of a second RESOLUT propelled the aluminum nuclei through a foil target and then sorted the zooming particles that spewed from the reaction. The end chamber of RESOLUT detected what particles sprang from the experiment.

“It all happens within a microsecond,” Wiedenhöver said. But the specific particles he was looking for are so rare—one in a million—he had to keep the experiment running for three weeks straight to collect enough data for meaningful results.

Only four other laboratories in the world can run similar experiments, and Wiedenhöver’s lab has the advantage of being able to focus on these measurements and do them more efficiently than anybody else. Wiedenhöver said that his team may have the results to prove it as early as this fall.—C.S.

It’s a rare thing when rehabilitation of prisoners can be called an art form. But a new program launching this fall by Florida’s Department of Corrections could be the closest thing to that.

Some Florida prisoners soon will have an opportunity to participate in a joint new program built around the proven therapeutic value of art, said David Gussak, associate professor of art education and clinical coordinator for Florida State’s program in art therapy, within the university’s Department of Art Education. He said the state program is an outgrowth of a partnership his department has enjoyed with the state prison agency for five years. This partnership has produced the first quantifiable proof that art therapy in prisons really works, Gussak said.

Gussak has devoted most of his career in art therapy to
helping prisoners deal with the self-destructive behaviors that have condemned them to a life behind bars. Using art classes as therapeutic aids in prisons is hardly a new idea, but the effectiveness of such programs has traditionally been questioned because of a lack of statistical proof. In 2002, Gussak began the first quantitative study ever done in prisons.

Working in collaboration with the Florida Department of Corrections, Gussak and his team of graduate interns led several studies in a variety of Florida’s correctional facilities. He and a staff of therapists worked with inmates using art therapy techniques. Testing determined the level of mental functioning before and after art therapy intervention. Gussak’s team found a quantifiable improvement in a number of behaviors. Depression decreased, and behavior, attitude, and socialization skills improved.

Encouraged by Gussak’s research, the Florida Department of Corrections has thus begun the first steps to a major expansion of its art programs in prisons statewide. The initiative has support from the highest levels of the department.

Laura Bedard, Department of Corrections deputy secretary, has long promoted art in Florida prisons. “This is a segment of the population that historically has failed in school. They haven’t been exposed to some of the cultural issues that art can expose them to—and art can be used as a venue to teach all kinds of things—communication skills, team building, decision making skills… things that inmates might not normally get.”

Last spring, Bedard’s department asked Gussak to be the guiding light for its new art program that will include writing and dance, as well as the visual arts. Gussak has been charged with developing a detailed proposal that will describe an art program for correctional facilities throughout Florida. He’s put together an interim committee that will assess needs and resources and formulate a direction. If all goes well, a permanent committee will be formed to oversee and facilitate the program.

—J.H.

State’s Economic Woes Nailed by 2005 Forecast

A dire prediction of a flat-lining economy for Florida, released two years ago this fall, has turned a team of university professors into some pretty sharpshooting soothsayers.

In their October 2005 release of Tough Choices: Shaping Florida’s Future, Florida State University political scientist Carol Weissert and University of Florida economist David Denslow predicted severe weather ahead on the state’s economic horizon.

The nonpartisan report, commissioned by FSU’s LeRoy Collins Institute, sounded the alarm that the state’s booming sales of high-priced housing, a primary force behind the extended economic expansion up to that time, would begin to dry up, creating a revenue drought and a shortfall in funds to cover government-funded services and programs. Further, constitutionally mandated spending on class sizes and pre-K would cloud fiscal forecasts in the ensuing years. The report’s bottom line: The time had come for Florida to face some hard realities and make some challenging choices.

But the report essentially fell on deaf ears as the state’s economy continued to roar, fueled by a seemingly bottomless gas tank of sales tax revenues largely derived by a booming housing market.

No one called it the Chicken Little report—at least not out loud—but with its timing, some politicos surely were tempted to. A few weeks after the release of Tough Choices, the state’s Revenue Estimating Conference identified a $1.7 billion surplus, a windfall from higher-than-expected sales tax collections.
But then came the proverbial dawn. When the state closed its fiscal 2007 books last June 30, figures showed the state $380.5 million in the red, with projections of a $1 billion revenue shortfall for fiscal 2008. Suddenly, the party was over, and alarm bells are still clanging, with a special budget-cutting legislative session set for this October.

The debacle was no surprise to the drafters of the 2005 report. “It looked like we were naysayers and off the mark,” Weissert said. “But (now) it looks like we were exactly right on.”

If anyone cared to pay attention, all the indicators were there, suggested Curt Kiser, former state senator and chair of the Collins Institute board.

“It really was the housing industry at an all-time high...and insurance payouts from two years of back-to-back payoffs [for hurricane damage]—that’s what was

Continued on page 6
**More Careers in Music**

A new door to some highly specialized careers in music swung open at Florida State this fall.

Last spring, the university’s board of trustees approved a new master of arts in music, complementing the College of Music’s diverse offerings in graduate training.

The new degree program will give students opportunities to specialize in commercial music, sacred music and—rarest of all—piano technology. The discipline addresses all aspects of restoring pianos to their original condition, a challenge that requires acute knowledge of the instruments’ history and the materials used to make them. FSU is now the only university in the country to offer graduate training in piano technology, said the director for the new program Anne Garee.

For decades, a shortage of more—and more academically attuned—piano specialists has been recognized as a worldwide phenomenon, Garee said. “We’ve designed this program to take the best primary training in piano technology now available anywhere and take it to the next professional level,” she said. —F.S.

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**Cluster Power**

This fall, Florida State’s capabilities in advanced computing got a boost with the installation of this integrated bank of Dell computers, housed at the university’s High Performance Computing Center at Innovation Park. The new system, valued at $2 million, ties together 128 Dell four-processor servers (a total of 512 processors), with a combined memory capacity of 78 terabytes (trillion bytes) of information. The machine’s peak computing speed tested at 2.3 teraflops (trillion floating point operations per second). Clustered computer systems such as this are gaining popularity at research universities where high-speed computing is essential for staying competitive in fields ranging from physics to pharmacology. What makes the systems so attractive are their lower operating costs and remarkable performance compared to all-in-one, so-called “big-iron” supercomputers, machines that debuted in the early 1980s. Florida State’s contract with Dell Systems calls for an annual upgrade of fully one-third of the cluster’s processors, guaranteeing scientists a research tool that stays current with technology. For more details on FSU high-performance computing, visit www.hpc.fsu.edu. —F.S.

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To read the original Tough Choices report or the October update, please visit the LeRoy Collins Institute Web site at www.fsu.edu/~collins.
**The Unwitting Wanderer**

The Making of John Ledyard: Empire and Ambition in the Life of an Early American Traveler by Edward Gray; Yale University Press, 2007, 240 pages, $35.00

In 1776, as Britain’s colonies in America set out on their struggle for independence, a young man from Connecticut named John Ledyard wasn’t there to help. Pressed into the British Navy as an alternative to jail and assigned to Captain James Cook’s final voyage to the South Pacific, he unwittingly avoided combat and began his career as one of America’s earliest travelers.

The so-called Age of Discovery was long over, the outlines of the world continents more or less charted. There was a need now not for discoverers but travelers—who easily at-tracts people to him. Despite dropping out of Dartmouth College, in debt and disgrace with sources and their mysterious ways. In his book, The Making of John Ledyard: Empire and Ambition in the Life of an Early American Traveler, associate professor of history Edward Gray writes about a feckless young man and his largely unsuccessful yet intriguing career, finding significance in the ways that Enlightenment ideals and the empire-building spirit animated it.

The evidence is that Ledyard was a genial, intelligent and resourceful person who easily attracted people to him. Despite dropping out of Dartmouth College, in debt and disgrace with

Eleazar Wheelock, its founder and president, Ledyard became close to Wheelock, one of the first of a number of influential men Ledyard would befriend.

Later Ledyard concocted a global trading scheme, teaming up with Robert Morris, an important American financier. Morris made a fortune while Ledyard’s part fizzled. In France he became a confidant of Thomas Jefferson, who encouraged him to travel across America by way of Russia. He obtained financial backing from the Marquis de Lafayette and the botanist Joseph Banks but was kicked out of Russia by Catherine the Great. Banks and a British group called the African Association backed Ledyard’s final attempt at distinction, a trip to explore Africa’s Niger River. He died at age 37 of a stomach illness while in Cairo preparing to embark.

Whether it was ineptitude or ill fate, Gray is less concerned with that question than with tracing the tropes of the revolutionary age that can be found in Ledyard’s adventures and his attitudes toward such subjects as ethnography, slavery, Old World failings and empire-building in an age of enlightenment.

– Nora Fitzgerald

**Paranoia in Power**


Occasionally in even a democratic society, a small group of people appoint themselves the voice of authority and the conscience of the nation, threatening the very liberties they claim to defend. It is what Books on Trial authors Shirley Wiegand, law professor at Marquette University, and Wayne Wiegand, FSU professor of library and information studies, call “an arrogance of power” that “results in self-censorship, the discouragement of dissenting voices, and ultimately the limitation of social reform.” But too often, the voice of power is the dissenting voice, while the popular voice—the majority voice—is the one being silenced.

In the summer of 1940, Oklahoma City police raided the small Progressive Book Store and five homes, seizing box loads of books and arresting several people, including 33-year-old state Communist Party Secretary Bob Wood and his wife Ina. Among books seized were John Steinbeck’s The Grapes of Wrath, Richard Wright’s Uncle Tom’s Children, Leo Tolstoy’s War and Peace, and The Collected Works of Jack London. “The only thing they could say about me was that I read and sold books, most of which are available in large public and college libraries throughout the country,” said Wood, who nevertheless was fined $5,000 and sentenced to 10 years in prison, as was his wife and several other co-defendants.

Police, attorneys, and judges trying the defendants understood little about the Communist agenda and didn’t care. What disturbed the county attorney most was the notion of equal rights for all citizens. While prosecutors claimed that Wood and his cohorts advocated violence, destruction of property and murder, they proved only that he consorted with African Americans and Jews and sold books.

Protests from “thousands (if not tens of thousands) of private citizens poured into the offices of the county attorney, the state attorney general, and the governor.” Newspapers across the country editorialized in favor of free speech, free assembly and fundamental civil rights. Finally, in 1943 the Criminal Court of Appeals reversed the district court’s opinion.

The Wiegands note the parallels between the “paranoid politics” of that day and the present “chain of civil liberties violations.” Even with the world at war, when the civil rights of a few citizens were threatened, people across the nation got it—their rights, too, stood in harms way.

– Gena Caponi-Tabery

**OUR REVIEWERS THIS ISSUE**

Nora Fitzgerald, freelance writer from St. Louis, Mo.; Gena Caponi-Tabery, author of Jump for Joy: The Velocity of Cultural Change in the 1930s
NUTS!

TO MOST OF US, THEY’RE DELICIOUS—TO OTHERS, THEY’RE DEADLY. FINALLY, FOOD SCIENTISTS ARE FIGHTING BACK.
Even the most creative chef would be hard pressed to find a more versatile, celebrated nut than the almond.

Greeks have showered them sugar-coated over newlyweds. Swedes hide them in rice pudding at Christmas. North African Jews serve cakes crunchy with whole almonds during Passover. They can be sliced into slivers, squeezed for oil and ground for marzipan—or savored simply, deliciously raw.

The buttery kernel has been cultivated for thousands of years and permeated so many cultural rites that it is difficult to avoid. But for the millions of people around the world who are allergic to the ubiquitous nut, their almond ritual is one of total abstinence.

Though peanuts are far more notorious for inducing severe allergic reactions, even death, almonds and other tree nuts can be just as threatening. And while more people are allergic to shellfish, tree nuts such as almonds, walnuts and cashews as well as peanuts rank among the worst offenders. One study, published in January 2001 in the *Journal of Allergy and Clinical Immunology*, found that out of 32 food allergy deaths in the country, more than 90 percent of the cases were triggered by peanuts and tree nuts.

That’s bleak news for the 3 million Americans who have to be on the alert for peanuts and...
As alluring as almonds are to consumers and chefs in all corners of the globe, most food scientists have shied away from bringing the nuts into their labs. By the time he earned his doctorate in 1982, Shridhar Sathe, FSU professor of food science, said only five scientists before him had published research on the tasty seed. Frankly, he said, there’s just not a lot of federal support in the field of food allergies—at least not in the United States. Europe, on the other hand, has been more generous to his counterparts across the Atlantic with their research funds, he said.

Aside from a lack of funding—or because of it, some would say—the National Institutes of Health in the 2006 report attributed slow progress in food allergy research to other hurdles. For one thing, there is only a “small cadre of academic investigators working in this arena,” the report found. Another challenge is the “relatively narrow interests of the biotechnology and pharmaceutical industries in food allergy research compared to other immune-mediated diseases.”

Part of the problem is that hardly anyone but food allergy sufferers themselves has viewed the health risk as serious until recently, even in Europe. Despite the severity of some food allergies, particularly peanut and tree nut allergies, “serious attempts to estimate the impact of allergic reactions to foods on public health did not begin until the 1980s,” wrote one European researcher, René Crevel, in 2005. “Until about 15 years ago (1990) food allergy was considered a minor aspect of food safety.”

Luckily for food-allergy suffer-
ers, there has been a dramatic shift in attitude and regulations if not in research dollars, say researchers such as Sathe.

The first sign of progress came in the form of federal regulation in 1990. Starting that year, food manufacturers were required to put food labels on their packaged products.

This was a significant step forward, but the food labeling rules and their enforcement came up short in some respects. The labels often contained ingredient names without stating that albumin, for example, comes from eggs, or that lecithin comes from soy or eggs.

And not all manufacturers were diligent about listing all ingredients in their products. In 1999, the U.S. Food and Drug Administration recalled 659 food products, more than a third of which contained allergens that were, for the most part, either omitted from the ingredient list or a result of cross-contamination. The FDA didn’t report how many of these errors sent allergy sufferers to the hospital, but the majority (56 percent) of the recalls in this category resulted from consumers reporting the product.

To correct at least one problem with the original labeling requirements, in Jan. 1, 2006, the FDA instituted a new rule that requires food labels to list in plain language any of the eight major allergens (soy, milk, eggs, shellfish, fish, wheat, peanuts and tree nuts) if they are an ingredient or source of an ingredient in a product. The initiative was a vast improvement that made grocery store shelves far friendlier.

However, they aren’t the only place where ingredients can be a mystery to consumers.

On a different front, to try to make restaurants free of food allergens, a smattering of states have proposed legislation that would, if passed, require restaurant employees to receive food allergy training.

—C.S.

tree nuts in restaurants and grocery stores. Most peanut and tree nut allergies aren’t outgrown, and currently, there is no cure for either, which makes avoidance the best defense, said Shridhar Sathe, professor of food science and one of few internationally recognized tree nut experts.

The strategy sounds simple enough, but it’s not always easy to pull off. A 2006 report on food allergies from the National Institutes of Health disclosed that one out of four people with a food allergy are accidentally exposed to an offending food. Often, this happens when someone eats a food product that has been declared free of certain allergens but that has been contaminated during processing.

For example, a so-called “nut-free” chocolate bar can become contaminated by almond residue that sticks stubbornly to processing equipment. Innocuous for most people, but for those who are extremely allergic, even small traces of an accidental nut protein can mean, literally, a heart-pounding, dizzying trip to the emergency room.

The good news is that many of these hospital visits can now be prevented thanks to the work of a handful of diligent scientists in a field that they say has persevered despite disinterest by the federal government and a drug industry that heavily influences the direction of health research.

Sathe is one of these scientists. To tame a potentially deadly food allergy into a manageable one, Sathe built his more than 30-year research career around identifying, purifying and testing the proteins to assure that nuts are made as benign as possible to everyone.

Perhaps the most dangerous threat to people who suffer from food allergies is one that often goes undetected and is difficult to control: contamination in food processing plants. In theory, said Steve Taylor, professor of food science and technology at the University of Nebraska-Lincoln, food manufacturers should be able to cleanse the equipment they use for processing different foods so there is no cross-contamination. But in testing food products in his lab, Sathe has found contamination does happen.

So how do manufacturers catch this kind of

CLASSED BY MASS—Sathe’s lab sorts and identifies tree nut proteins using a common scientific technique called gel electrophoresis. Stained blue in the gel below, proteins migrated through the porous gel at different rates, depending on their mass.
allergen pollution—especially for the foods that cause the most severe reactions? Finding a method has taken scientists years, with Sathe at the field’s forefront.

“He’s done a lot to help identify which proteins are the allergens,” Taylor said. “I consider (Sathe) one of the world experts on tree nut biology, biochemistry and allergies.”

Timing turned out to be one of Sathe’s biggest allies in achieving this stature. He had zeroed in on the almond, the delicately flavored nut, rich in vitamin E and touted for its cholesterol-reducing potential, long before most of the food industry, regulators or even most scientists took food allergies seriously (see page 10).

So the field was wide open. No one even knew which proteins in tree nuts were triggering allergic reactions, and Sathe had a springboard for a prolific research program.

“First you identify which protein is responsible (for the allergic reaction),” Sathe said.

To do this, Sathe and his lab team start with whole nuts. They keep their refrigerator packed with plastic storage bags full of tree nuts, from Hawaiian macadamias to Brazil nuts. With a mortar and pestle or blender, they grind the almond seeds into a soft powder, then remove the fat from the flour to extract and isolate the proteins. Next, they treat the almond proteins with a solution of human antibodies that are responsible for triggering an overblown immune response—a result of mistaken identity when a body accidentally labels a harmless protein as a threat and triggers an allergic reaction.

In Sathe’s experiments, one protein, called almond major protein, emerged as the dominant player in almond allergies. and, as it turns out, more than 10 years earlier Sathe had been the first to identify the protein and demonstrate that it comprises 65 percent of the nut’s total protein content.

Now Sathe and his collaborators had shown the protein triggers allergies in its raw form.

But what if the protein is baked, microwaved, fried or blanched, as the nut is often prepared?

Sathe and his collaborators, including Kenneth Roux, FSU professor of biological science, tried blasting almonds with various processing and cooking methods to see whether they could alter the proteins so the antibodies would no longer be able to recognize them.

“It’s important to know whether upon processing, this (protein) triggers allergies in its raw form. But what if the protein is baked, microwaved, fried or blanched, as the nut is often prepared?

Sathe and his collaborators, including Kenneth Roux, FSU professor of biological science, tried blasting almonds with various processing and cooking methods to see whether they could alter the proteins so the antibodies would no longer be able to recognize them.

“It’s important to know whether upon processing, this (protein) triggers allergies in its raw form.
Unfortunately for the millions who face a lifetime of wheezing, hives and the rare threat of death from peanut and tree nut allergies, there is no cure for either, and the search has been slow-going. But researchers are tackling the problem and reporting promising advancements. The different tactics include re-engineering nut proteins so they’re harmless, vaccination, and ratcheting up an allergic person’s—or animal’s—tolerance to his or her feared food.

• Shridhar Sathe, professor of food science at Florida State, was the first to identify the major allergy-causing proteins in almonds and cashews. Sathe developed a method of genetically neutralizing the troublesome proteins of cashews. Testing the altered nuts on humans, however, is probably a long way off.

• In 2004, a researcher at Stanford University published results from a successful vaccination experiment—on nine dogs. Before the vaccine was given, the dogs that were allergic to peanuts could only eat one peanut before they showed a reaction. On average, after the vaccination the dogs could tolerate 37 peanuts.

• In mice, Chinese herbal medicines have been found capable of blocking peanut-induced anaphylaxis, the most severe allergic reaction that can cause death. The effects lasted for several weeks after therapy, the National Institutes of Health reported in a 2006 summary of food allergy research.

• In humans, clinical studies have tested a way to block the antibody responsible for triggering an allergic reaction, but results have been mixed. Some patients went from eating a half of a peanut to nine peanuts before having an allergic reaction, but the treatment had no effect on others.

• Ultimately, one of the most effective prevention measures may be decidedly low-tech. Though many online resources recommend parents keep peanuts, tree nuts, eggs and fish out of their babies’ diets to prevent allergies, some studies show that early life exposure—specifically to peanuts—is linked with low rates of allergies. The 2006 NIH report concludes that “early-life, high-dose allergen exposure might prevent the development of (specific antibodies) to that allergen.” —C.S.

A MODEL MOLECULE

This 3-D computer model shows four views of the same protein molecule, called cashew nut major allergen, that Sathe and his collaborators were the first to identify. The model gives researchers valuable information about how the protein interacts with antibodies. The protein regions highlighted in different colors represent individual epitopes, which are the specific parts of the molecule that are recognized by the immune system.
A N F S U H I S T O R I A N T E L L S H O W T H I S C A M E T O B E , A N D W H A T
SAVING SEA TURTLES FROM EXTINCTION IS NOW A GLOBAL CAMPAIGN, ROOTED IN FLORIDA AND THE LEGACY OF ARCHIE CARR.

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.
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
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 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.

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...
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.”

E Ari e Y e a r s

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 roommate’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

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 quetzel in Honduras, ca. 1947
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.

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.
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 withheld 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
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 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.
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.

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.

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.
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.

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, *Chelonia mydas*. 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.

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 was witness to 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.
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 created 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
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 (picted 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.
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 50 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 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
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.”

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**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-hand 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
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
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 Fish* (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.

**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
If scholars can agree that Archie Carr is the man who saved sea turtles, they can find it equally plausible that Carr’s wife is the woman who saved the future of Florida’s environment. In his new biography of Archie, historian Fritz Davis emphasizes the remarkable, complementary role Marjorie Harris Carr played in her husband’s campaign to raise public...
consciousness over an environmental issue.

Marjorie never shared the scientific limelight of her famous naturalist husband, but when it came to Florida politics, for nearly three decades her name rang far more bells in Tallahassee and Washington than Archie’s ever did.

In the early 1960s, Marjorie became the icon of a grassroots backlash against one of the largest and most ill-conceived public works projects ever passed by Congress—the Cross-Florida Barge Canal. The backlash morphed into a popular, nonpartisan movement that signaled the arrival of Florida’s environmental consciousness, a phenomenon that grew to inspire a national awareness about the mindless destruction of natural resources that ruled the day.

What many of Marjorie’s most ardent admirers never knew is that her passion for saving Florida’s natural heritage was every bit a natural part of her, and not some sympathetic expression of public service borne of a 50-year marriage to one of the most famous naturalists of the last century.

Like both her parents, Marjorie Harris was a born naturalist. A native of Boston, as a 3-year-old she relocated with her family to Bonita Springs, Florida, near Naples on the Gulf Coast, in 1918. With her parents as guides, Marjorie grew up exploring the area’s wild wonders, and decided early on that she wanted to be a zoologist.

Her quest took her 300 miles north, to one of the Southeast’s premiere liberal arts colleges—Florida State College for Women, the predecessor of Florida State University. At FSCW, Marjorie was heavily influenced by two botany professors, Herbert Stoddard and Herman Kurz. She graduated in 1936 with a B.S. in zoology, and soon became the first woman ever hired as a wildlife technician by the U.S. government. Marjorie signed on for one of FDR’s New Deal projects based in Welaka, Florida, about 60 miles southeast of Gainesville.

When a covey of sick quail turned up at her field station, Marjorie boxed them up for a quick trip to Gainesville. She hoped to find some advice on how to treat the birds from specialists at the University of Florida’s Department of Zoology. What she found was a handsome, 27-year-old doctoral student named Archie Fairly Carr, Jr., six years Marjorie’s senior. After a whirlwind
courtship, the couple was married in January 1937.

Had it been another era, after her marriage Marjorie’s career might well have taken off on an academic odyssey every bit as rich and illustrious as her husband’s. She possessed all the tools required for success as a biologist—a keen, inquisitive intellect, superior observation skills and a genuine fascination for nature and wildlife. In 1942, while pregnant with her first (of five) children, Marjorie earned a master’s degree in zoology from her husband’s department. Interestingly, even though she had a fondness for birds, her master’s thesis, later published, was on the breeding habits of the largemouth black bass (Micropterus salmoides).

On the heels of the war, which had pinned her husband to campus doing his bit for the cause by teaching air cadets basic physics—a subject he despised—Marjorie got the thrill of her lifetime. She spent nearly four years in the mountains of Honduras with Archie, hired by a local agricultural school as a visiting scientist. Complimentary domestic help freed Marjorie to ride horseback through the cloudy highlands and study all the exotic flora and fauna on an equal scientific footing with the only man she ever loved. She subsequently produced a lengthy field survey of Honduran birds, the first of its kind.

Marjorie spent the Fifties essentially keeping her brood (a girl, Mimi, and four boys, Archie III, Steve, Tom and David) “out of dad’s hair,” as she put it, while he poured his considerable energies into what eventually became a global campaign to save sea turtles from oblivion. But by 1960, Marjorie was finding time to reconnect with nature and her innate interests in saving it.

As a kid growing up in southwest Florida, Marjorie witnessed the results of humans’ reckless disregard for wild things. In her later years, she wrote about the appalling condition of wildlife along the Imperial River near her home in Bonita Springs. Even in the 1920s, one could paddle the river’s length and never see a living animal of any kind. Tourists hired guides to take them on river “hunts” where they would stand in the prow of a boat and shoot anything that moved, from alligators to red birds. The spectacle had made a deep impression on young Marjorie.

In 1960, Marjorie co-founded the local Alachua Audubon Society with one of her husband’s colleagues and some conservation-minded friends. She quickly became a leader on a variety of local conservation efforts. When the University of Florida decided to drain Lake Alice, an 11-acre lake on campus, Marjorie and her group protested and got the idea killed. (For decades, the lake has been an iconic part of the university’s landscape.)

But in 1962, Marjorie helped arrange an event that irrevocably changed her life and the course of Florida’s economic and environmental future. Two representatives of federal and state agencies accepted the society’s invitation to come give a talk about the probable environmental impact of a cross-Florida barge canal, a mammoth proposal gaining steam in Congress. The project was aimed at bisecting the state with a waterway to speed barge traffic between the Gulf of Mexico and the Atlantic.

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...IN 1962, Marjorie helped arrange an event that irrevocably changed her life and the course of Florida’s economic and environmental future.
Crime scenes in places like Florida can get awfully wet. Getting to the bottom of things takes a rare kind of training.
Horrified, he did a quick survey, noting rib bones, vertebrae, decaying organs, and even more shocking evidence of foul play—five concrete blocks that anchored the skeletal remains to the sinkhole bottom.  

The ensuing investigation revealed that the killers, seven months earlier, had been offloading tons of marijuana at an inlet called Sandy Creek just north of Panama City when two unsuspecting couples stumbled on the operation. The smugglers shot the intruders and dumped the bodies five counties away.

“I realized I was staring into the face of a human skull with a rag stuffed down the mouth,” English said.

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It takes less than seven months for human flesh submerged in the frigid water of a north Florida sinkhole to rot and fall off the bones. That was one grisly lesson Lamar English learned 30 years ago that he would never forget.

On a muggy August afternoon in 1977, English, 16 at the time, was diving for arrowheads in a Panhandle sinkhole when he caught a glimpse of some odd shapes. The objects were almost within reach, but at 40 feet down, the light was too dim to reveal anything but fuzzy outlines. English swam closer for a better look.

“I realized I was staring into the face of a human skull with a rag stuffed down the mouth,” English said.

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The gruesome case, now infamously known across the region as the Sandy Creek murders, was hardly the first and far from the last crime to end in water, especially in Florida. In fact, many Florida crime specialists figure that just about every body of water in the state, from its clear springs to swampy wetlands, has swallowed some kind of criminal clue. With 1,200 miles of coastline, 11,000 miles of rivers and streams and many more square miles of lakes and springs, that’s a lot of secrets.

But with new techniques and technology, it turns out many of these secrets could be found instead of lost forever. To convert water from mute accomplice to witness, Gregg Stanton, former director of the Advanced Science
Diving program, and criminology professor Thomas Kelley in 2001 started a program called Underwater Crime Scene Investigation on the FSU Panama City Campus. It seemed an unlikely union, but the need couldn’t have been more pressing, says Dale Nute, a more than 20-year forensic science veteran of the Florida Department of Law Enforcement and one of the first recruited instructors for the program.

Law enforcement, said Nute, had long ago segregated scientific thinking in the lab from the investigator in the field, an egregious mistake that may have cost prosecutors an untold number of cases. The split has resulted in a misguided focus in the field on protocols rather than principles.

“Technicians employ protocols,” Nute said. “Scientists use the results of protocols to solve problems. Obviously, underwater scientist-investigators are better able to solve the problems if they can conduct the protocols themselves rather than relying on the results by technicians.”

And when it comes to scrutinizing underwater scenes, some investigators don’t even have proper protocols to follow.

The program’s immediate goal is fill in the gaps, Nute said. Long term, he added, the group wants to transform the field and develop techniques that are unique to the underwater scene, all the while training both academic students and working law enforcement divers to do underwater investigation right.

Surprisingly even today, when precision in investigations can make or break a legal case, some underwater recovery operations still practice “snatch-and-grab,” an outdated, haphazard approach to recovering corpses and evidence from lakes, rivers, gulfs and oceans.

“Snatch-and-grab” is faster, cheaper, easier—and just plain wrong, Nute said. The practice effectively destroys any clues
that might be gleaned from observing, photographing and mapping evidence underwater as any investigator would do on land.

At first glance, the Panama City program seems an odd match with academe. Indeed, some academics argue that underwater investigation classes belong in a police academy or private dive shop rather than a university. As a result, the program may very well be the only one of its kind at a four-year institution.

But to others, this type of training truly belongs at a university. Ken McDonald, a retired sergeant of the Leon County Sheriff’s Office and FSU graduate in criminology, has been on both the academic, theoretical side of criminology and the practical side of on-the-street—and underwater—police work.

As a former dive team leader, McDonald eagerly joined the program’s steering committee at its inception, frustrated by the paucity of information about underwater investigation. Even though recently retired, he continues an active relationship with the group.

“Until someone like FSU takes an interest, no one will collect data [on underwater investigation],” McDonald said. Nor, he added, will anyone help develop the technology that will improve the field.

Right now, the unknown factors far outnumber what’s known, McDonald said. For example, investigators don’t have a standard procedure for calculating how far a drowning victim’s body might have drifted or how fast decay eats away a murder victim’s corpse in brackish versus salt versus fresh water, information that would help investigators know what to look for and where.

“There is still a lot of guesswork involved…(and) a lot
of physics and science involved, but the average person doing (law enforcement) diving doesn’t have that kind of background,” McDonald said. “Putting divers in the water is the last thing you want.” He added that a solid, investigative strategy, which can take hours to days to devise, should be hammered out before anyone gets wet.

It also doesn’t help that divers at the scene of an investigation don’t yet have a way to test the water for pollutants and know whether it is safe. Most bad guys, McDonald added, throw things in the filthiest water they can find.

No agency collects national statistics on how many underwater calls dive teams make, he added. But what is certain is that calls are constant enough to maintain dive teams over the years. The U.S. Bureau of Justice Statistics found that in 2003 about half of the nation’s sheriff’s offices that serve at least 50,000 people reported underwater recovery as one of their special operation functions, a ratio that held steady in at least the previous four years.

But the list of what’s missing from the budding discipline is extensive. For example, there has been no centralized effort to develop technology specific to underwater investigation. Sometimes, law enforcement divers don’t even have proper, basic dive training, much less the skills necessary to do detective work in a challenging watery environment. In the past 12 years, various sources such as dive organizations have reported more than 400 deaths nationwide among underwater investigators, McDonald said. More than 90 percent of them were the result of inadequate training, he added.

“That’s unforgivable in my opinion,” he said.

Even worse, no standard protocols for underwater investigation yet exist. Though underwater recovery teams formed decades ago throughout the country, it wasn’t until the 1990s that members started questioning the “snatch-and-grab” approach, said Sgt. Blake Gilmore, a police diver in Massachusetts for more than 20 years. Even now, he said, many law enforcement dive teams, including his own, still don’t have documented protocols to follow when searching for drowning victims or discarded weapons or remnants from a plane crash. This is why Gilmore, although a long way from Panama City, Florida, is keeping close tabs on what FSU is doing.

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The program is the first to put a dent in many of these areas. Filling the void of standard protocols in their field, this summer the instructors published Underwater Crime Scene Investigation: A Guide for Law Enforcement (Best Publishing). It’s an encyclopedia of underwater investigation protocols and tips, developed from scratch, tested and tweaked over the past five years. Jim Joiner, the publisher, said the manual is the first of its kind.

In addition, the instructors often act as guinea pigs to test new dive technology. One of the latest gadgets they are among the first to have access to is a mask-and-sonar system that essentially gives divers sight in zero visibility.
For working dive teams who take the Panama City classes, hands-on exposure to cutting-edge technology that they otherwise wouldn’t have heard of is critical. After the first two-week course that Sgt. Rob Pinner of Putnam County, Florida, took at FSU-PC, he suggested his department order full face masks with an underwater communication system. Almost as soon as the new masks arrived in the mail, a small plane plummeted into the St. Johns River, and the Putnam divers snatched them to take to the scene. In the river’s muddy current, having directions piped into the masks from investigators on land or in a boat likely shaved hours or even days off the search.

As for technical training, what courses many sheriff’s, police and fire department dive teams do take are at private dive shops or police academies, and it often comes up short. These courses teach divers how to use their gear but not how to be flexible and creative in their thinking, said Michael Zinszer, the program’s diving safety officer and former Navy experimental diver.

“Some of [the programs] are outstanding,” Zinszer said, “but the majority of them still need a lot of work.”

For all of its novelty, FSU’s program isn’t without precedent. Six years before it was first proposed, judge-turned-diver-and-teacher Ron Becker started an emergency responder class at Texas State University in 1995 in “black water” diving, that is, diving in zero visibility. But he said resources are hard to come by, so that single class never developed into a full-blown underwater investigation program.

“[FSU’s] folks have taken it a long way past where we were,” said Becker, now teaching an underwater investigation class at Chaminade University in Hawaii.

FSU’s program was first conceived when criminologist Thomas Kelley and then-director of FSU’s Advanced Science Diving program Gregg Stanton put their heads together at a fish fry in 2001.

Why not unite in one program the methodical procedures of underwater science—such as mapping and artifact preservation—with crime scene investigation techniques?

“I'd always been aware we could do better in underwater investigation,” said Stanton, now a private, advanced-diving consultant. “No one (in law enforcement) was taking the underwater environment seriously.”

This lack of clout was true even in marine sciences, added Stanton, whose background is in biology, and it was true in criminology. He and Kelley wanted to reverse that dismissive attitude.

“We didn’t want to teach just the how-to of investigation. We wanted to teach a way of thinking,” said Kelley, now director of the program.

As it turns out, the union of underwater science techniques and crime scene investigation techniques is a winning formula.
criminology at FSU’s Panama City campus is a natural fit. The branch campus, which serves students who have completed two years of community college, already was home to a criminology program. The campus sits on the Gulf Coast where fake, but realistic crime scenes can easily be set up for aspiring investigators and divers already in law enforcement to get hands-on training. With the program’s three boats docked in St. Andrews Bay at Sun Harbor Marina, just a mile from campus, students can practice their skills in the Gulf as well as in nearby rivers and springs.

To keep their own skills fresh, instructors consult regularly with law enforcement on active cases. They’ve assisted with investigations on bridge collapses, murders, disappearances and drowning accidents. For just about every one, students get to participate and truly understand exactly what it is they’re preparing for.

None of this would be possible without hefty funding. Underwater investigation requires meticulous maintenance of dive equipment and boats, plus the funds to transport students and purchase new equipment. But FSU’s program has become so popular among law enforcement that it receives regular funding from the Florida Department of Law Enforcement, which has allocated up to $500,000 annually to send law enforcement dive team members from around the state through short courses designed for working emergency responders. To date, more than 200 law enforcement, and fire and rescue personnel have been certified through the program. And by many trainees’ accounts, it’s well worth it.

“There’s no substitute for the Panama City training,” said Pinner, the sergeant from Putnam County. “That is the best dive training I’ve ever had.”

On the academic side, padding undergraduate or graduate degrees with a certificate or minor in underwater investigation can mean a leg up for a student’s future in a variety of careers, says Kelley.

Hardly restricted to investigating crimes, the well-rounded program doesn’t focus solely on law enforcement and the technical aspects of diving. The academic students take five rigorous classes over three semesters in underwater investigation and forensic science—in addition to their major courses—sometimes dedicating entire Saturdays to shoehorn night diving into all too-short 16-hour days. The program also includes overviews in toxicology, biology and law. So not only do students learn to investigate scenes involving body or weapon recovery, but they also gain the skills to handle a much wider range of cases, from bridge collapses to boat-scuttling to chemical spills.

Graduates have gone on to work for the FBI, NASA, the Naval Criminal Investigative Service, private boat insurance companies investigating claims, as well as other national and local agencies and companies, Kelley said, though many do find their niche in law enforcement.

Melissa Adams, who majored in criminology at FSU-PC in 2004, landed her first job after graduation on the dive team of the Washington County Sheriff’s Office in Chipley, Florida. Within a year, the former daycare center owner with no previous experience in diving, much less in investigation, rose to the position of team leader, a rapid advancement she attributes to the hands-on and theoretical training she received from Kelley, Nute and the other instructors.

“Rather than just learning techniques and tools, [students] get the bigger picture and theory of a crime scene,” Adams said. “The support and knowledge I gained helped me become dive team leader.”

Student by student, the underwater investigation program aims to educate the best qualified law enforcement and forensic leaders who will make sure murky lakes, muddy rivers and ocean waters can no longer be a criminal’s best friend.
ONCE PERCEIVED AS WHOLESALE and American as apple pie, the peanut has gained a tainted reputation in the past 10 years. Highly publicized allergic reactions to the staple snack of ball-games and airlines have drawn negative attention to the otherwise harmless nut.

From a handful of peanut emergencies in the air to scattered reports of kisses transferring peanut proteins to someone who’s severely allergic, the popular snack has stirred concerned parents and businesses to action.

To avoid a ruckus, some airlines stopped serving peanuts altogether, as well as tree nuts of any kind, which can also cause anaphylaxis—the most severe allergic reaction that can cause blood pressure to plummet, the airway to constrict, vomiting, diarrhea, and even death. Or they’re establishing peanut-free zones when passengers let them know ahead of time that they have an allergy to the popular snack. One ballpark in Connecticut even went totally peanut free for at least one game. The Minnesota Twins designated a peanut-free Skybox for four games this season. Some schools have established peanut-free tables in the cafeteria.

Granted, only between 1 and 2 percent of the U.S. population is actually allergic to peanuts. Still, that’s up to 3 million Americans. And though most of them will experience hives and swollen lips at worst if they ingest peanuts, come into contact with them, or even inhale the proteins wafting in the air, some will experience a life-threatening allergic reaction that could have been prevented. A few, perhaps dozens, will die.

It’s difficult to pinpoint exactly how many people have died from peanut allergies specifically. Peanut and tree nut allergy sufferers are often lumped into the same category in reports, though peanuts are in fact not technically true nuts—it is part of the legume family along with beans and peas. But indeed, there is a great deal of overlap. If a person is allergic to peanuts, he often is allergic to one kind of tree nut or another, and doctors often recommend that patients who discover they’re allergic to peanuts stay away from tree nuts as well. Oddly, recent research has found that about one-fifth of children with peanut allergies will grow out of them, whereas tree nut allergies are far more likely to be lifelong.

At the same time, a survey of more than 4,800 households between 1997 and 2002 found that the number of children with peanut allergies doubled, from 0.4 percent to 0.8 percent. The reason for the increase remains a mystery, but theories abound. One of the most popular explains the rise in allergies by Americans’ obsession with cleanliness and hygiene. Because of it, some say, parents are effectively under-exposing their children to potential microscopic invaders that actually help build up immune systems.

For now, explanations are only speculative. In the meantime, word continues to spread that peanut allergies are nothing to sneeze at.

—C.S.
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 we 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. Population 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.”
In later years, Marjorie recounted that fateful meeting:

“The audience had come to the meeting with a completely neutral attitude toward the canal (and) went away that evening disturbed, uneasy, and determined to find out more about the probable effects of the barge canal on the Florida environment.”

Nonetheless, the project moved forward. By 1970, nearly a third of the canal’s proposed 110-mile length was finished, at a cost of some $70 million. From Inglis, Florida, on the Gulf Coast above Crystal River to Palatka, vast acreages of trees were destroyed, including thousands of cypress trees drowned by the new Rodman Dam that backed up 16 miles of the scenic Oklawaha River.

But also by 1970, Marjorie Carr was in high gear as well. She, along with Bill Partington of the Florida Audubon Society, had organized a diverse group of scientists, economists, lawyers and conservationists into the Florida Defenders of the Environment (FDE). After linking her group with the Environmental Defense Fund, Carr soon vaulted into the spotlight as the face of public opposition to the canal.

The FDE’s in-depth study—one of the first environmental impact studies ever done by a non-profit group—soon showed the canal to be a colossal hydrological, geological, ecological and economic blunder on a scale rivaling the state’s earlier campaign to drain the Everglades (a bone-headed project squelched by yet another environmentalist visionary, Miami’s Marjory Stoneman Douglas). In 1971, only nine years after two confident government officials had lit Marjorie Carr’s fuse at what amounted to an obligatory garden club luncheon in Gainesville, President Richard Nixon signed an executive stop-work order locking the canal project’s wheels. Politics prevented full deauthorization of the project by both Congress and the Florida Legislature until 1990. Ownership of all canal lands was turned over to the state of Florida, and a bill creating the Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area was signed into law by President George H. W. Bush.

Marjorie’s death (at 82) in October 1997 triggered responses from people all over the world and in status high and low. Among those closest to her, a common remembrance was her remarkable tenacity and courage in the face of immense political pressure. Florida Gov. Buddy MacKay lauded her as “a towering figure in the struggle to protect Florida’s wilderness and wetlands—energetic, effective and fearless.”

David Gluckman, an environmental attorney who worked for Marjorie from 1968 until her death, told Research in Review that a key to Carr’s effectiveness was her uncanny ability to work without anger. “No matter how important an issue was, Marjorie didn’t need to get angry to get her way,” he said. “She used science, she used persuasion, and she used a pleasant personality—she rarely had to get mad at anybody.”

David Godfrey echoed Gluckman’s observations. Now executive director of the Caribbean Conservation Corporation—the nonprofit group spawned in the late 1950s by Marjorie’s famous husband’s fight to save sea turtles—Godfrey worked with Marjorie for the last decade of her life and became her close friend and confidant.

“Even when she was really upset over something, she was never angry,” he recalled. “She maintained decorum with great humor—and even though I never knew her husband, I know without any doubt that one of the greatest attributes they shared was their unbelievable sense of humor. Both of them loved life so much that in almost any situation they could find the humor in it.”

Godfrey believes Marjorie’s greatest contribution transcends her reputation as the woman who killed the Cross-Florida Barge Canal. “People talk about her defeating the barge canal as her greatest legacy, but I think the really lasting thing she did in Florida was she taught people all over the state to get involved in conservation. She trained an army.”
About happiness, novelist Edith Wharton may have said it best: “If only we’d stop trying to be happy, we’d have a pretty good time.”

Humans have been clawing their way to varying states of happiness for eons, and it’s downright intriguing how they’ve gone about it. In a book published last year, historian Darrin McMahon shed remarkable light on how the concept of happiness has changed—sometimes dramatically—over the past 2,000 years.

An intellectual historian who specializes in 18th-century Europe and the French Revolution, McMahon found the Enlightenment period a crucial landmark in happiness’s evolution. Before that time, religious mores historically had mandated that people, as sinners in a sinful world, weren’t intended to be happy, he says.

“In the 18th century, that notion is challenged,” McMahon reports. “That was really the first time in human history when large numbers of people are presented with the notion that they ought to be happy—they have a right to be happy.”

The Enlightenment’s revised idea of happiness then inspired a flood of reversals, McMahon says. “Who says we shouldn’t enjoy our bodies? Who says we shouldn’t take pleasure in sex, in food, in the fruits of our labor, and the things of this earth?” he says were among the questions and personal convictions of the day.


Does McMahon’s work project a happy ending for happiness? Not quite.

“There’s a paradox,” he admits. “The more you tell people you’ve got to be happy, (the more) it creates a moral imperative.”

And so it turns out, he says, that the pursuit of happiness ends up having an unhappy byproduct: guilt or angst associated with not being consistently happy.

In short, “By dwelling too much on happiness, we make ourselves unhappy,” he says.

On that happy note, perhaps there’s no small comfort in coming to grips with that. —M.M.W.