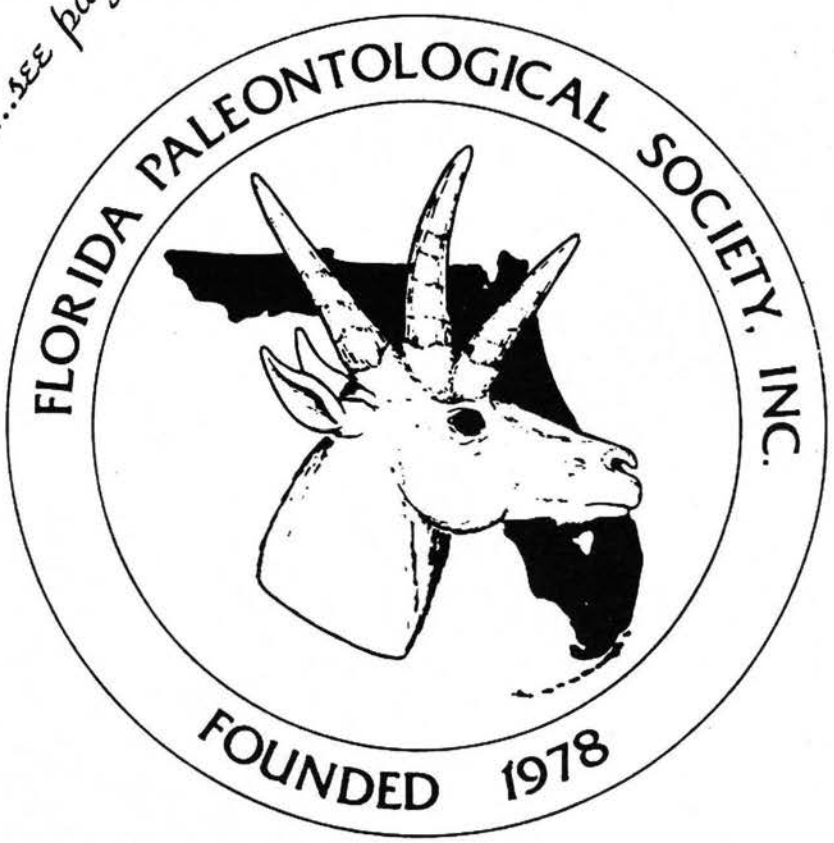
Florida Paleontological Society, Inc.

Newsletter

Dues are due...see page 27



Volume 11 Number 4 Fall Quarter 1994

FLORIDA PALEONTOLOGICAL SOCIETY, INC.

OFFICERS

President:	Susan Pendergraft, 17 Jeff Road Largo, Florida 32544 (813) 555-2661
President-Elect:	Gordon Hubbell, 150 Buttonwood Drive Key Biscayne, Florida 33149 (305) 361-5890
Past President:	Frank Rupert, Florida Geological Survey 903 West Tennessee St., Tallahassee, 32304 (904) 488-9380
Vice President:	Larry Ellis, 151 N. Orlando Ave., #151 Winter Park, Florida 32789 (407) 644-3201
Secretary:	Eric Taylor, P.O. Box 3506 Lake City, Florida 32056 (904) 752-6764
Treasurer:	Phil Whisler, Fla. Paleo. Soc., Florida Museum of Natural History, Gainesville, Florida 32611 (904) 372-3790

BOARD OF DIRECTORS

Tom Ahern, Tampa, 1995
Douglas Dew, Palatka, 1997
Steve Manchester, Gainesville, 1995
Barbara Fite, Lutz, 1997
Jim Toomey, Bradenton, 1997
Tony Estevez, Tampa, 1996
Don Crissinger, Nichols, 1995
Robyn Miller, Jacksonville, 1995
Bruce MacFadden, Gainesville, 1996
Terry Sellari, Tampa, 1996
Barbara Toomey, Sanibel, 1996

COMMITTEES AND APPOINTMENTS

Auction Committee:	S. Manchester, T. Ahern, T. Sellari
Book Committee:	R. Portell, B. MacFadden
Nominations:	Frank Rupert
Spring Meeting Committee:	Tony Estevez, Jim Toomey, Terry Sellari
Fall Meeting Committee:	Phil Whisler, Frank Rupert
Finance:	P. Whisler, R. Portell
Membership:	Eric Taylor, A. Brown, B. MacFadden
By-Laws:	A. Brown, Eric Taylor, Robyn Miller
Honorary Members and Awards:	A. Brown, J. Pendergraft
Historical:	Eric Taylor
Board of Editors:	R. Portell, F. Rupert, A. Brown, E. Taylor
Resident Agent:	Frank Rupert

HONORARY MEMBERS

Margaret C. Thomas Anita Brown Lelia and William Brayfield David Webb Gary Morgan

INFORMATION, MEMBERSHIP, AND PUBLICATION INFORMATION

Please Address: Secretary, Florida Paleontological Society, Inc.
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611

FLORIDA PALEONTOLOGICAL SOCIETY INC. NEWSLETTER

Volume 11, Number 4 **Fall Quarter 1994**

CONTENTS

Wishing You and Yours the Happiest Holiday Season Ever, and Our Best Wishes for a Properous 1995!

News Notes...

by Frank Rupert

Fall Meeting Highlights...

The FPS Fall Meeting was held on Saturday, October 29, 1994 on the University of Florida campus. The morning events included talks on the Thomas Farm Fossil Site and the annual Business meeting. Vice President Dr. Gordon Hubbell presided at the business meeting, during which the following new officers were elected: President Elect - Gordon Hubbell, Vice President - Larry Ellis, Secretary - Eric Taylor, and Treasurer - Phil Whisler. Three new Board Members were also elected: Dr. Douglas Dew of Palatka, Barbara Fite of Lutz, and Jim Toomey of Bradenton. New President Sue Pendergraft officially took the reins at the conclusion of the meeting. Congratulations to all our new officers and many thanks to Dr. Hubbell for chairing the meeting in the out-going President's absence.

Saturday afternoon featured fossil identification sessions at the museum, and some interesting finds came to light. That evening, attendees were treated to a Banquet dinner at the Reitz student union, followed by the annual fossil auction. This year's auction took in nearly $1300 which will go into the Annual Student Research Award fund.

Despite earlier concerns about the meeting conflicting with the Florida-Georgia football game, the meeting was a success and all went well.

Tim Cassady receives Converse Award...

At the Annual Meeting, Dr. David Webb announced that member Tim Cassady of Marianna is this year's recipient of the Howard Converse Award. The Converse Award recognizes an individual (or individuals) from the non-professional paleontological ranks who has made outstanding contributions to Florida paleontology, typically through donations of fossil specimens or volunteer service to the Florida Museum of Natural History. The award is named in honor of the late Howard Converse, a former museum staff member in vertebrate paleontology, who had a great statewide impact on paleontology. Award recipients are selected each year by the museum paleontology staff and are presented with a personalized wall plaque; their names are also inscribed on a large, permanent plaque which hangs in the museum.

As many of you know, Tim has worked the panhandle rivers for a number of years and has made many interesting vertebrate finds. He has routinely shared these finds with museum staff and has made numerous contributions to the Museum collections. Although Tim was not present at the meeting, the honorary plaque certifying this new honor will be delivered to him.

1995 FPS Meetings...

Mark your calendars: the Spring Meeting is scheduled for March 11-12, 1995 in the St. Petersburg area. The Fall Meeting is tentatively set for the last weekend in October, and will be in the Tallahassee - St. Marks National Wildlife Refuge area. Details on both will be forthcoming.

Book Bits

Florida Geological Survey Special Publication 37, ***The Neogene of Florida and Adjacent Regions: Proceedings of the Third Bald Head Island Conference on Coastal Plains Geology***, is now available. This 112 page, 8.5 X 11 inch paperback contains papers submitted at the latest Bald Head Island Conference, an occasional gathering of Gulf Coastal Plain stratigraphers. The following is a partial list of papers included in this work:

Pliocene stratigraphy of south Florida: Unresolved issues of facies correlation in time, by Thomas Missimer

Paleobiography of the late Cenozoic barnacle fauna of Florida, by Victor Zullo and Roger Portell

Mammalian biochronology and marine-nonmarine correlations in the Neogene of Florida, by Gary S. Morgan

Do Florida's Plio-Pleistocene shell beds have large-scale paleobiological significance?, by Warren Allmon

Patterns of gastropod extinction in the Pliocene Okeechobean Sea of southern Florida, by Edward Petuch (contains fossil mollusk illustrations)

Pliocene stratigraphy and biostratigraphy, Virginia to Florida, by Lauck W. Ward

To order this publication (limit one per order please), send $1.00 check or money order, payable to the **Florida Department of Environmental Protection**, to the following address:

Publications
Florida Geological Survey
903 West Tennessee St.
Tallahassee, FL 32304

Leisey Volume Available Soon...

FPS members will be able to order the two-part Leisey shell pit volume at a discount. Details will be forthcoming.

From the Secretary...

by Eric Taylor

Member Notes

The following persons and organizations have joined the Society since the last member update in the Spring Newsletter:

Grand Strand Fossil Society, Surfside Beach, SC

Wingard, Lynn, US Geological Survey, Reston, VA

Thulman, David, Tallahassee, FL

Darnell, Bette J., Green Cove Springs, FL

HRS Lee County P.H. Unit, ATTN: Ray Schneider Cape Coral, FL

Buggallo, Gus F. Boca Raton, FL

Bond, Jerry and Teresa, St. James City, FL

Broadstreet, Jim Oakland, CA

Turner, Mike Melbourne, FL

Jones, Richard Waterville, ME

Finch, Chris Plant City, FL

Holman, Elbridge O. Lakeland, FL

Swanson, David Grove City, FL

Blinebury, Sharon Tampa, FL

Cass, David L. Winter Park

Burnet, Janet & Steve Havana, FL

Loster, John Venice, FL

Weisen, Geraldine F. Gainesville, FL

Peard, Tom & Cindy Jacksonville, FL

Breard, S.Q. (Skip) Houston, TX

Congratulations to member and long-time FPS supporter **Dr. Bruce MacFadden** of the Florida Museum of Natural History. He is the recipient of the Vertebrate Paleo Society's Morris F. Skinner Award.

Dues are Due!

Please use the form at the end of this newsletter to renew or to join for the first time.

1120-4th Street South, St. Petersburg, FL 33701

Prehistoric, Ice Age Creatures Invade Tampa Bay!

An exhibition combining the excitement of life-like robotic creatures, an outstanding collection of Ice Age fossils and an opportunity for hands-on paleontology exploration comes to St. Petersburg in **After The Dinosaurs: Into The Ice Age**, opening Saturday, December 17 at Great Explorations, The Hands On Museum.

The presentation centers around nine groupings of a total of 21 amazing Ice Age mammals, including the famous Woolly Mammoth and Saber Tooth Cat, that look, move and sound like their real-life ancestors of millions of years ago. A computer-controlled air compressor gives each mammal its own unique sequence of movement and sound. The animals range in size up to 13 feet long and up to 10 feet high.

An impressive display of fossils on loan from the Florida Museum of Natural History, as well as from private collectors and other sources as far away as Kenya, make a striking complement to the beasts. The display is arranged so visitors may view the animated recreations of the creatures side by side with their actual fossil remains.

Also included in the exhibit is a Hands-On Fossil Pit designed as a Florida sinkhole. Visitors may sift through sand in the Fossil Pit to find actual fossils which they then identify by comparison with items on display.

Great Explorations, The Hands-On Museum is located at 1120 4th Street South in downtown St. Petersburg. Take I-275 to exit 9, then right on 4th Street 6 blocks; museum is on left. **Museum hours** are 10 AM to 5 PM, Monday through Saturday, Noon to 5 PM Sunday, and closed Christmas day. Special extended evening hours until 8 PM are in effect through December 31. **Admission fees** are: under 3, free; 18 - 65 $5.00; 66+ $4.50.

MINUTES
MEMBERSHIP MEETING
FLORIDA PALEONTOLOGICAL SOCIETY INC.
OCTOBER 29, 1994

The meeting was called to order at 11:28 AM following a series of talks on the paleontology and history of the Thomas Farm Fossil Site. In the absence of President Frank Rupert, the meeting was chaired by Vice-President Dr. Gordon Hubbell.

Treasurer Phil Whisler gave the financial report for the Society, a copy of which is attached. The report was accepted by the membership.

A report on the Election of new officers and on the activities of the Bylaws revision committee was given by Eric Taylor. The nominated slate of officers was unanimously elected. The new officers will be:

President: Susan Pendergraft
President-Elect: Dr. Gordon Hubbell
Vice-President: Larry Ellis
Secretary: Eric Taylor
Treasurer: Phil Whisler
Board of Directors:

Jim Toomey
Barbara Fite
Dr. Douglas Dew
Tom Ahern
Steve Manchester
Tony Estevez
Don Crissinger
Robyn Miller
Bruce MacFadden
Terry Sellari
Barbara Toomey

Dr. David Webb reported on the status of the scientific report on the paleontology and stratigraphy of the Leisey shell pit, a two volume work that is currently in press and should be available in early 1995.

Dr. Richard Hulbert reported on the status of the book on fossil vertebrates.

The Converse Award was given by Dr. Webb on behalf of the museum to Tim Cassady of Marianna in recognition of his contributions to the understanding of the paleontology of the panhandle region of Florida.

It was announced that Gary S. Morgan had won the Morris F. Skinner Award from the Vertebrate Paleontology Society.

Dr. MacFadden moved that the society contribute $500 towards the cost of upgrading the museum collection manager's office that is also used by the FPS. The motion was passed.

Following the presentation of the Society's mascot horns to new president Susan Pendergraft, the meeting was adjourned at 12:35PM.

Respectfully submitted,

Eric G. Taylor

MINUTES
BOARD OF DIRECTORS MEETING
FLORIDA PALEONTOLOGICAL SOCIETY INC.
OCTOBER 29, 1994

The Board of Directors of the Florida Paleontological Society, Inc. met in the cafeteria of the Reitz Union at the University of Florida following the annual meeting. The meeting was held during a working lunch and was chaired by new president Susan Pendergraft.

Following a discussion on our publications, it was decided to raise the wholesale price of the Brayfield's Shell book to $5.97 effective January 1, 1995. Other publications are or will need reprinting soon, including the Converse book (needed now) and the M.C. Thomas book (probably early 1995.)

The progress on the Florida Vertebrates book was discussed in some detail. It appears that the articles written by various individuals that will be included in the book will require copy write waivers from the authors before they can be published in the finished work. Phil Whisler suggested that the subject be investigated by the Richard Hulbert.

The bylaws revisions were discussed in considerable detail and some additional corrections and revisions were made. A copy of the revisions will be published and voted on by the membership by mail.

Roger Portell moved that the scholarship given each year by the FPS be renamed the Gary S. Morgan Scholarship Award and that a perennial plaque for the winners be mounted in the Florida Museum of Natural History. The motion was seconded and passed.

The Spring Meeting was discussed and Tony Estevez, Jim Toomey, and Terry Sellari were appointed to the committee to work on the meeting. The intended location and time will be the St. Petersburg area on March 11-12, 1995 in conjunction with a display of animated extinct mammals due to be in the museum in St. Petersburg at that time. It was moved and passed that the Sun Coast Archaeological and Paleontological Society be invited to the meeting.

Phil Whisler suggested that the Fall Meeting be planned for the Big Bend area of the state in conjunction with the fall migration of the monarch butterflies through that area. Phil and Frank Rupert were appointed to the Fall Meeting committee.

Treasurer Phil Whisler was directed to have an audit of the Society's finances done.

The meeting was adjourned at 2:00 PM.

Respectfully submitted,

Eric G. Taylor
Secretary

FLORIDA PALEONTOLOGICALSOCIETY, INC.

Revenue and Expense Report
November 1, 1993 - October 28, 1994

Revenue		
Membership Dues		$ 4,519.00
Sales		
Publications		
Beach and Bank Collecting		$ 4,913.78
Fossil Shells		2,522.64
Handbook of Paleo Preparation		614.35
Plaster Jacket		11.55
Papers in Florida Paleontology		63.00
Butvar		$ 300.00
Miscellaneous		
Meetings		$ 1,471.00
Auction		1,862.00
Other (refund from State)		1,296.00
	TOTAL REVENUE	$15,051.18
Expenses		
Publications		
Fossil Shells		$ 8,608.10
Newsletter		$ 1,689.25
Postage		$ 880.69
Miscellaneous		
Meetings		$ 1,753.46
Office Supplies		282.21
Printing		121.26
Other		92.52
	TOTAL EXPENSES	$13,927.49

STATEMENT OF ASSETS

Assets		
Cash		
Checking		$12,481.16
Savings		13,611.16
	TOTAL CASH AND CREDIT	$26,092.32
Inventory		
Beach and Bank Collecting (714 @ $1.50)		$ 1071.00
Fossil Shells (1190 @ $4.36)		$ 5,188.40
Handbook of Paleo. Preparation (out of print)		$ 0.00
Papers in Florida Paleontology (846 @ $1.50 & 66 @ $2.50)		$ 1,434.00
Plaster Jacket (2,075 @ $.50)		$ 1,037.50
Butvar (56 lbs. @ $4.52/lb)		$ 253.12
	TOTAL INVENTORY	$ 8,984.02
	TOTAL ASSETS	$35,076.34

The One That Got Away from Florida: A Tale About Fossil Values

by S. David Webb

Curator, Florida Museum of Natural History
Honorary Member, Florida Paleontological Society

Much has been written in recent years about the value of fossils. The word **VALUE** has at least two very distinct meanings, namely scientific versus monetary. The Florida Paleontological Society clearly states in its Articles of Incorporation (often reprinted inside the back cover of the FPS Newsletter) that its purpose is to "**advance the science of paleontology**". The following brief history exemplifies the tragedy that may occur when our society does not fulfill its commitments to preserve Florida's fossil heritage.

For about two decades Florida paleontologists have been aware that a small, undescribed glyptodont was turning up regularly in Irvingtonian (early to middle Pleistocene) faunas throughout the Florida peninsula. In 1984 the Leisey shell pit operations turned up a very large number of thick hexagonal scutes, but no other elements. One of our brightest young paleontologists, Kevin Downing, studied this new dasypodoid along with the other Leisey shelled edentates, and concluded that it should be named even if we knew it only from scutes. We knew that eventually more would turn up.

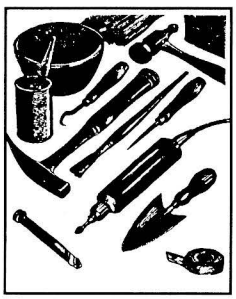
About three years ago in Sarasota County a local collector did turn up more. Indeed it was a nearly complete skeleton with most of its shell, but lacking its skull. This collector sold the specimen on the international market, via the Tucson Gem and Mineral Show in February, 1992. By that time Kevin Downing was a Ph.D candidate at the University of Arizona and was actually able to see the specimen. It was also cast by dealers with Valley Anatomical Preparations in Canoga Park, California, en route to its private owners in Mexico.

Loss of this critical specimen is deeply frustrating to scientists trying to shed light on this interesting new form of ancient Florida life. Is it an armadillo or a glyptodont? Perhaps it is something in between, descended from the earliest South American glyptodonts, like the Oligocene genus *Glyptatelus*? Dr. Downing has now proposed that this mystery beast is a new genus and species which he and his coauthor name *Pachyarmatherium leiseyi*. When you read the account you will sense the agonizing way in which some features of the "lost" specimen are mentioned. Since it was not available for detailed study, much less as the scientific type specimen, however, there is much that could not be verified.

At the Society of Vertebrate Paleontology Annual Meeting in late October I learned that the original specimen has now turned up in the Gunma Prefecture Museum in Japan. It is listed as "*Glyptodon*, locality Florida." Had we known sooner that it had arrived in a permanent museum collection, we might have designated it as the type specimen. It is now too late. One can still buy a cast for $5,000 ($2,000 unmounted) from California.

What can we learn from this tangled tale? Certainly, we recognize that there is fierce competition for valuable fossil resources. And we reiterate that the word **VALUE** has two very distinct meanings. Members of the FPS subscribe to an emphasis on scientific value, whereby we, our children and Florida visitors all learn about Florida paleontology. Increasingly, however, others have discovered the monetary value of the commercial route. Unique fossils bring a hefty price on the world market. Usually the major profit comes to a dealer (middle man) who moves fossils from Florida to Tucson or other marketplaces. Frank Rupert told me of a nice tusk of a woolly mammoth he saw in a Laguna Beach, California antiquity shop for a mere $16,000.

Many of my friends, upon hearing this tale, have advised me to forget about it, or "just pretend it eroded away". Being something of an optimist, however, I believe that we might learn something by pondering this sad incident. Our greatest hope continues to be through education. Every year I am more impressed with the breadth of paleontological knowledge that we encounter in our FPS members. And every year we add to the depth of paleontological collections, invertebrates, vertebrates, and plants that represent our fossil heritage in Florida. Perhaps the next one will come to someone's attention in time to acquire it for a museum, preferably one in Florida, before it leaves the country or is lost to science.



Prep Talk

by Russ McCarty

Greetings from the bone lab! As the year winds down, I usually experience a powerful (but controllable) urge to finish all the uncompleted projects I have begun during the year. Unfortunately, come January 3, I often walk into the lab and see these aborted, good intentions looking up at me with their sad little boney eye sockets, begging to be made whole again, or to be freed from the cold, hard constraints of the matrix which has imprisoned them so long. I did, however, finish one very important project this year, and that was the inventory and repair of a fairly complete mammoth skeleton. This is an important project for us, at the museum, because we intend to make it a showpiece of the paleo exhibit at the new museum which will open in 1997. The specimen is one of three partial skeletons found by Dr. Dave Webb and his crew back in the late 60s on the Aucilla River. Hey!--- some of you must remember those 'heavy', 'far-out', sixties with their 'mellow' music, bell bottoms, and 'bummer' experiences. Of course, some pedant has remarked, that "if you can remember the sixties, you really weren't there." Well, I remember.... While Dave was on the river digging up mammoths, Jack 'Dinosaur hunter' Horner , was digging foxholes at Khe Sanh where elements of the 1st Marine Division were under siege by the North Vietnamese army, and my unit, the 1st Air Cav, went in on foot (in spite of the division name) to lift the siege. Other sand bag 'humpers' were Steve Hutchens, who volunteers in this lab, F.P.S. secretary, Eric Taylor, and probably 300 others I don't know about. It makes you wonder if there is a connection between Nam service, digging holes, and paleontology?

Anyway, it seems that as recently as the sixties, it was not uncommon to find partial proboscidean skeletons in the rivers. Oh!... the stories, those older collectors can tell... Fossils, are of course, a finite resource, and it may be that all the easily accessible ones have already been found. The mammoth skeleton which Pat Hylton and I worked on for six months is missing the tail, an ulna, a fibula, most of three feet, and two tusks. That's the best we can do. In spite of the fact that most amateurs who visit our collection are overwhelmed by what appears to be a mountain of specimens, we are limited when it comes to complete skeletons of any fossil animal. A museum in Utah, which has a mold of a similarly sized mammoth will provide us with the missing parts (for a fee). The skeleton will be articulated by Robert 'Bob' Allen, a free lance "articulator of bones". Bob has articulated dinosaurs, sloths, rhinos, horses, and many other fossil specimens, and will do our mammoth on contract. Bob is no stranger to the Florida Museum of Natural History. Any visitor to the Fossil Study Center has seen Bob's handiwork in the three mounted specimens: the giant ground sloth, the rhinoceros, and the little three-toed horse, Parahippus.

In the last Prep Talk column, I talked about casting symmetrical objects in molds without pour spouts. I will discuss more complicated molds in an upcoming issue, after I have generated pictures for the article (I have a horse skull and jaw project which I will start soon). For now, I want to tell you about peels and silicone rubber casts. Silicone rubber has such detail capturing ability, that food abrasion marks can be lifted from teeth. Even objects as small as the exterior cell walls of some plants have been studied on silicone peels by scanning electron microscopy. And since silicone rubbers are liquids which harden into strong, elastic polymers, they can be introduced into hard to reach areas and pulled out after they cure. For these reasons, silicone rubbers have an important role to play in several types of paleontological investigation.

Trace fossils are true fossils, but instead of being the actual 'petrified' remains of a once living organism, provide us with a record or 'trace' of the animal's (or plant's) existence. Examples of trace fossils are such things as: worm burrows, dinosaur tracks, impressions left in limestone by a shell that has long since disintegrated, or any of the many kinds of negative impressions left in one material by the actions of another, e.g. bite marks on a bone.

Let's look at a few examples where silicone peels and casts have been used. Figure 1, shows a small block of Eocene limestone which retains the impression of a shell. After brushing a separator

such as green dish detergent over the impression, a clay dam was placed around the low perimeter of this feature, then silicone rubber was poured into the impression producing the cast, also shown in Figure 1, to the right of the limestone block.

Let me take a momentary detour into silicone rubber methodology (it was discussed two issues ago in the casting issue). For quality and simplicity I recommend Silicone Incorporated's (High Point, NC tel: (910) 886-5018) GI-650 silicone rubber with the standard 24 hour catalyst. This is mixed in a 10 - 1 ratio by weight. In the pursuit of bubble free peels and casts we degas the rubber before pouring and after pouring also, if the specimen is small enough to fit into our vacuum chamber. The alternative to degassing the rubber is to carefully brush the rubber onto the feature you are working with. If this feature is porous like the *Platyoptera* imprint in figure 1, always use a separator. The rubber companies sell their own, or green dish detergent may be used.

The depression in the limestone block in Figure 1 is a natural mold, a negative impression, and as such, a kind of inverted mirror image of the original. The silicone cast, the positive, is a true reproduction of the original specimen. It is seen to the left of limestone block. Since the rubber is naturally white or bluish, depending on the catalyst used, we often add a bit black pigment to increase contrast. The resulting silicone cast enabled Roger Portell to identify the specimen as a new species of *Platyoptera*, a predatory gastropod. Barbara Harmon, the Natural Sciences illustrator prepared the scientific journal illustration in Figure 2 from the silicone cast.

Figure 3, introduces a different application of the silicone peel. Shown is fossil bird skeleton in a thin block of ash from the Florissant Formation of New Mexico. The actual skeleton is no longer present. What we see is a negative imprint of the bones. There was not enough information for avian paleontologist Bob Chandler to identify this specimen, so a peel was used to turn this trace fossil into a three dimensional positive for easier identification. A clay wall, or dam, was constructed around the significant features. GI-650 silicone rubber was poured into the dam. Since the block of matrix containing the skeleton was too large for my vacuum chamber, the rubber was brushed into the imprint of the skeleton. After 18 to 24 hours, the silicone peel (Figure 4), which was about 3/4" thick, was removed from the block. As seen in Figure 4, the feet, a wing, and other elements are now easy to see. Dr. Chandler was able to identify the specimen as an Eocene coocoo.

Similarly, Figure 5, shows a block of Green River shale which appears to be etched with strange markings. To the uninitiated eye, these markings might appear to be a well worn copy of the Sumerian "Epic of Gilgamesh" written in cuneiform script, however, the thin peel seen in Figure 6 clearly shows them not to be "Gilgamesh" at all, but rather the footprints of small wading birds such as sanderlings or pipers. This was a quick peel made from GI-650 and Ultrafast catalyst which cures in 15 minutes. It was brushed on the specimen without a dam. As with any peel, it could be coated with a separator such as vaseline, and more silicone rubber applied to it. The resulting peel made from a peel will reproduce the original track as seen in the matrix.

Silicone peels are used in archeology also. Figure 7, shows a section of mastodon tusk, which exhibits probable 'butchering marks'. A silicone peel made with GI-650 and Ultrafast catalyst was brushed onto the cut marks, then peeled off an hour later. The peel registered a good positive copy of the cuts. Specialists who study Indian lithics can now examine the cuts and determine if they were indeed made by stone tools, or whether some other non-human agency is responsible for the marks. In a similar application, I have poured silicone rubber into what appear to be bite marks on the famous Ichetucknee River, *Felis atrox* , skull. When cured and pulled out, the bite marks now resemble the tips of two teeth, in fact, they are similar in dimension and orientation to the upper canine teeth of *Felis atrox*. I would infer from this that another disgruntled *Felis atrox* chomped down on our specimen.

I have listed just a few of the many possible applications for silicone peels and casts. I'm sure you will find many more. As a basic rule, anytime you wish to reverse a negative space or impression, silicone rubber can be used.

Questions, comments, suggestions? Contact Russ McCarty at the VP Prep Lab care of the Florida Museum of Natural History, University of Florida Campus, Gainesville, FL 32611. Telephone: (904) 392-1721.

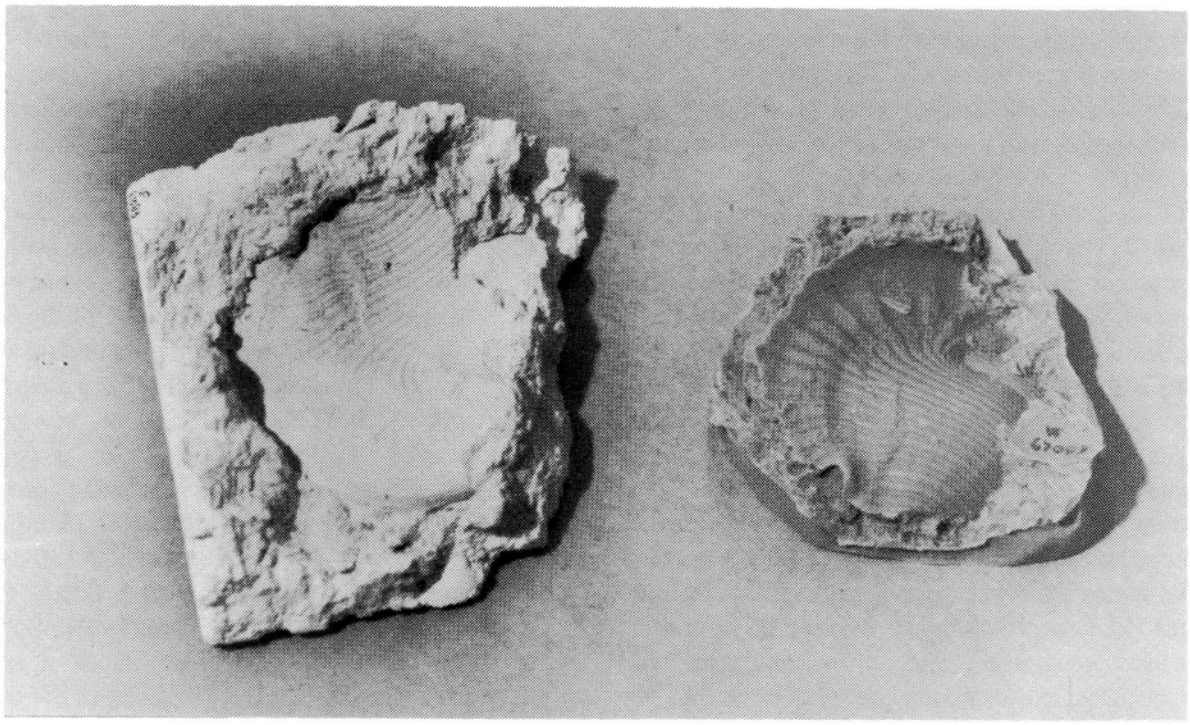


Figure 1. Original impression of a shell in limestone and silicone peel.

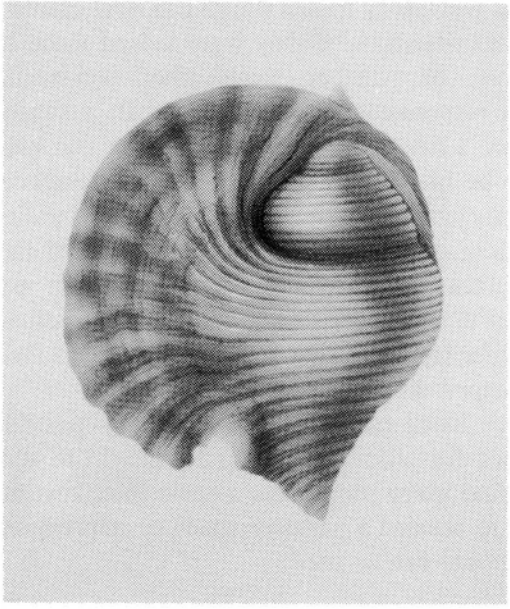


Figure 2. Illustration made from silicone peel in Figure 1.

Figure 3. Coocoo skelton in block of volcanic ash.

Figure 4. Peel made from coocoo impression.

Figure 5. Bird tracks in block of Green River Shale.

Figure 6. Peel showing bird tracks.

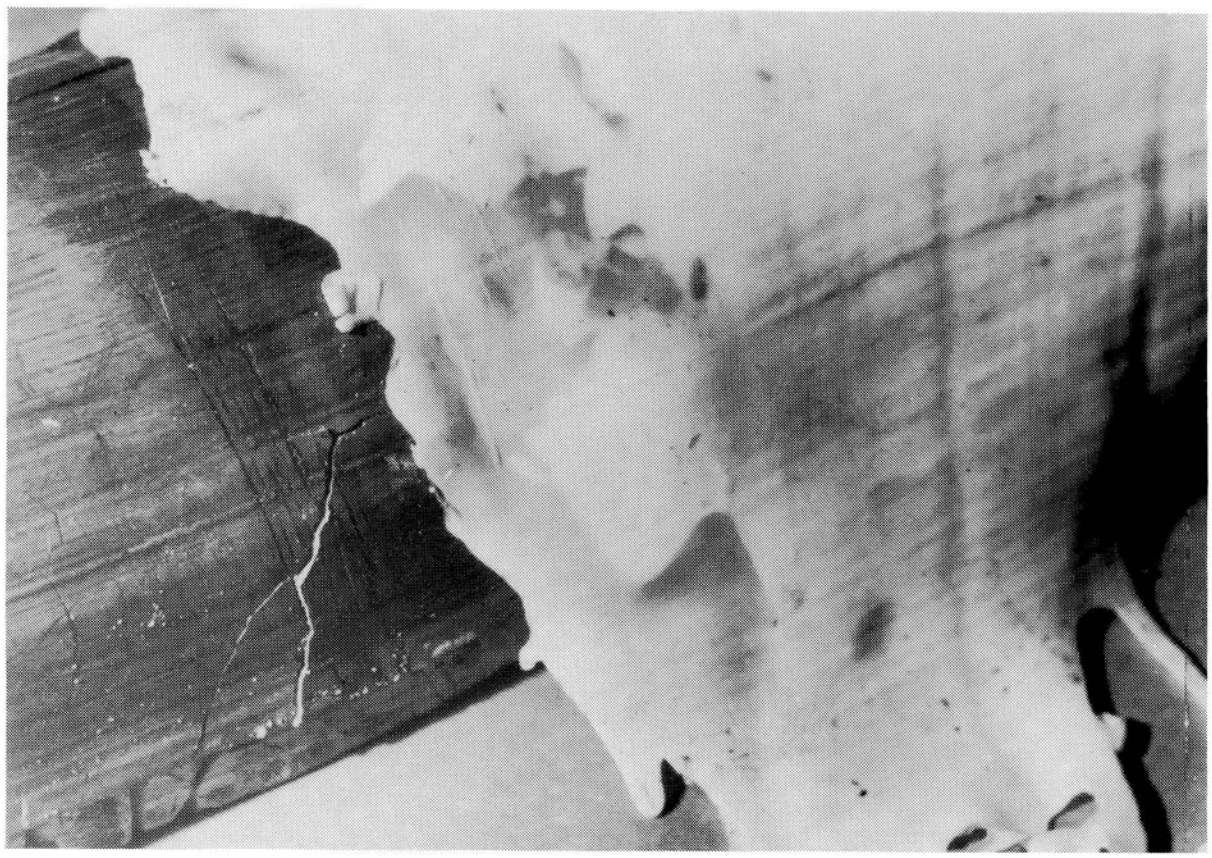


Figure 7. Section of tusk with cut marks and peel made of them.

Announcing the Florida Paleontological Society's

STUDENT RESEARCH AWARD

THIRD ANNUAL COMPETITION

Prospectus and General Overview

The Florida Paleontological Society (FPS) is pleased to announce the third annual competition for its Student Research Award. The purpose of this award is to promote a better understanding of **paleontology and the ancient life of Florida** through new research discoveries. Eligible fields of relevance within Florida paleontology include invertebrates, vertebrates, microfossils and plants. This award is open to any **college student, undergraduate or graduate**, in good standing at a Florida college or university.

For this second competition, the FPS has allocated an award of up to $500. The purpose of this grant is for expenditures such as (but not restricted to) field work, museum research travel, laboratory analyses, research materials, etc. It is not intended to fund travel to scientific meetings, indirect (overhead) costs, or salaries and wages. The **deadline** for receipt of proposals is **1 March, 1995.**

Applications must be postmarked on or before the deadline and be sent to the Secretary at the address listed below. Applications will be screened by a committee and will be judged based on the following criteria: (1) merit of the proposed research, (2) feasibility of the project, (3) clarity of expression, and (4) a letter of recommendation from a faculty sponsor. The screening/award committee shall consist of professional and hobbyist paleontologists. In order to avoid potential conflicts of interest, students whose advisor serves on this committee are ineligible to apply. The Award will be announced on May 15th, 1995 and a check for the requested amount (up to $500) will be sent by the Treasurer to the recipient.

It is expected that, during or after completion of the research, the recipients will present the results of their discoveries and additions to knowledge in the form of (1) a short article of a non-technical nature to be published in the FPS Newsletter and/or (2) a talk presented at an FPS meeting. In the event of the latter, the student's travel expenses to the meeting will be paid by the FPS (but this does not have to be included in the originally requested budget).

Application Process and Requirements:

The application process is intended to be short - thus, items 1-4 below are limited to two pages (minimum 10 point type, standard 1" margins). The application must include:

1. Title of research project
2. Name, address, and phone number of applicant
3. Current college status (where enrolled, major, degree program, anticipated graduation date).
4. Project description written in **general**, i.e., **to the extent possible, non-technical**, terms to include a description of what he/she plans to study, why it is interesting or important, how and when it will be done, and a short budget of proposed expenditures.
5. Appended to this proposal there must be a letter from a faculty sponsor who will vouch for the qualifications of the applicant as well as the importance of the project, and a statement that he/she will supervise the research.

Applications should be submitted by 1 March 1995 to:

Eric Taylor, Secretary
Florida Paleontological Society
Florida Museum of Natural History
University of Florida
Gainesville, FL 32611-2035

A Fossil Hunter's Guide to the Geology of Southern Florida

Thomas M. Scott, P.G. and Frank R. Rupert, P.G.
Florida Geological Survey

In a previous issue of this newsletter we examined the geology of the northern Florida peninsula and the fossil collecting localities in that region. We conclude the three-part discussion of the state's geology and fossil collecting in this issue with an examination of southern peninsular Florida.

The Florida peninsula is the exposed portion of the much broader feature known as the Florida Platform. The exposed portion lies almost all to the east of the axis of the platform. The axis of the Florida Platform occurs approximately along the present-day western coast of the peninsula.

The southern Florida peninsula, for the purposes of this discussion, extends southward from the southern boundaries of Pasco, Sumter, Lake, and Orange Counties. In general, the southern peninsula is characterized by flat plains and coastal lowlands. Hilly uplands occur only in the central northern area in portions of Polk and Highlands Counties. Figure 1 illustrates a geomorphic map of southern Florida.

Puri and Vernon (1964) recognized two broad physiographic regions in the southern peninsula, the Central Highlands and the Coastal Lowlands. The rolling hills of the Central Highlands extend into the southern region from the north and occupy only a small portion of the area. The highlands include the Lake Wales Ridge, the Polk Uplands and several lesser ridges (Figure 1; White, 1970). The highest elevations in southern Florida occur in the Central Highlands (along the Lake Wales Ridge) where elevations of more than 300 feet above mean sea level (MSL) are present. The Coastal Lowlands cover most of the southern portion of the state with elevations generally below 100 feet above MSL. Within the Coastal Lowlands, White (1970) recognized a number of smaller geomorphic features including the Gulf Coastal Lowlands, Eastern Valley, Osceola Plain, De Soto Plain and the Everglades (Figure 1).

The Central Highlands exhibits a rolling topography characterized by numerous sinkhole lakes. Paleo-sand dunes are present along the flanks of the Lake Wales Ridge in many areas. The higher portions of this zone are characterized by thick sand deposits lying on Eocene or Oligocene limestones or the Hawthorn Group sands and clays. On the Polk Uplands, a thin sand cover blankets the phosphate-bearing, very fossiliferous sediments of the upper Hawthorn Group. The phosphate-rich sediments are mined in Polk, Hillsborough and Hardee Counties exposing a plethora of vertebrate fossils. A variable thickness of sand also covers the Hawthorn Group on the Desoto Plain.

The Gulf Coastal Lowlands are underlain by Oligocene to Miocene carbonate sediments. Varying thicknesses of Neogene and Quaternary sediments blanket the older rocks. The contact between the carbonate rocks and the younger sediments is often marked by a lag deposit of phosphate gravel containing water-worn fossil fragments. Large quartz pebbles are occasionally found in this lag deposit. These unusually large clasts are thought to have been transported southward from the piedmont trapped in root clusters of trees. The often fossiliferous sediments that overlie the rubble zone contain a diversity of mollusk species.

Bounding the Central Highlands on the east and south are the Osceola Plain, the Okeechobee Plain and the De Soto Plain. The Osceola Plain is a beach ridge plain formed during a previous sea level highstand. The paleo-beach ridges exert strong control on the drainage on the eastern half of the plain. This is readily evident on the 7.5 minute topographic quadrangles covering the area. The beach ridges are not as evident on the western, higher portion of the Osceola Plain. Elevations on the Osceola Plain range from approximately 30 feet to 80 feet above MSL. A thick sequence of sands with some shell underlies the Osceola Plain. These Pleistocene deposits include a lithified coquina representing an ancient beach deposit.

The De Soto Plain lies to the west of the Osceola Plain and the southern tip of the Central Highlands. The elevations on the De Soto Plain are similar to those of the Osceola Plain. However, the De Soto Plain does not appear to be an ancient beach ridge plain. A variably thick sequence of sands with some shell lies on the Hawthorn Group with the Hawthorn at or near the surface in some areas.

The Okeechobee Plain occurs between the Osceola and De Soto Plains at lower elevations. The elevations of the Okeechobee Plain range from 20 to 30 feet above MSL. The plain is very flat and was considered by White (1970) to be a northern extension of the Everglades. It is underlain by sands with some very fossiliferous zones. Shell pits near Lake Okeechobee yield abundant late Pleistocene mollusk shells.

To the east of the Osceola Plain lies the Eastern

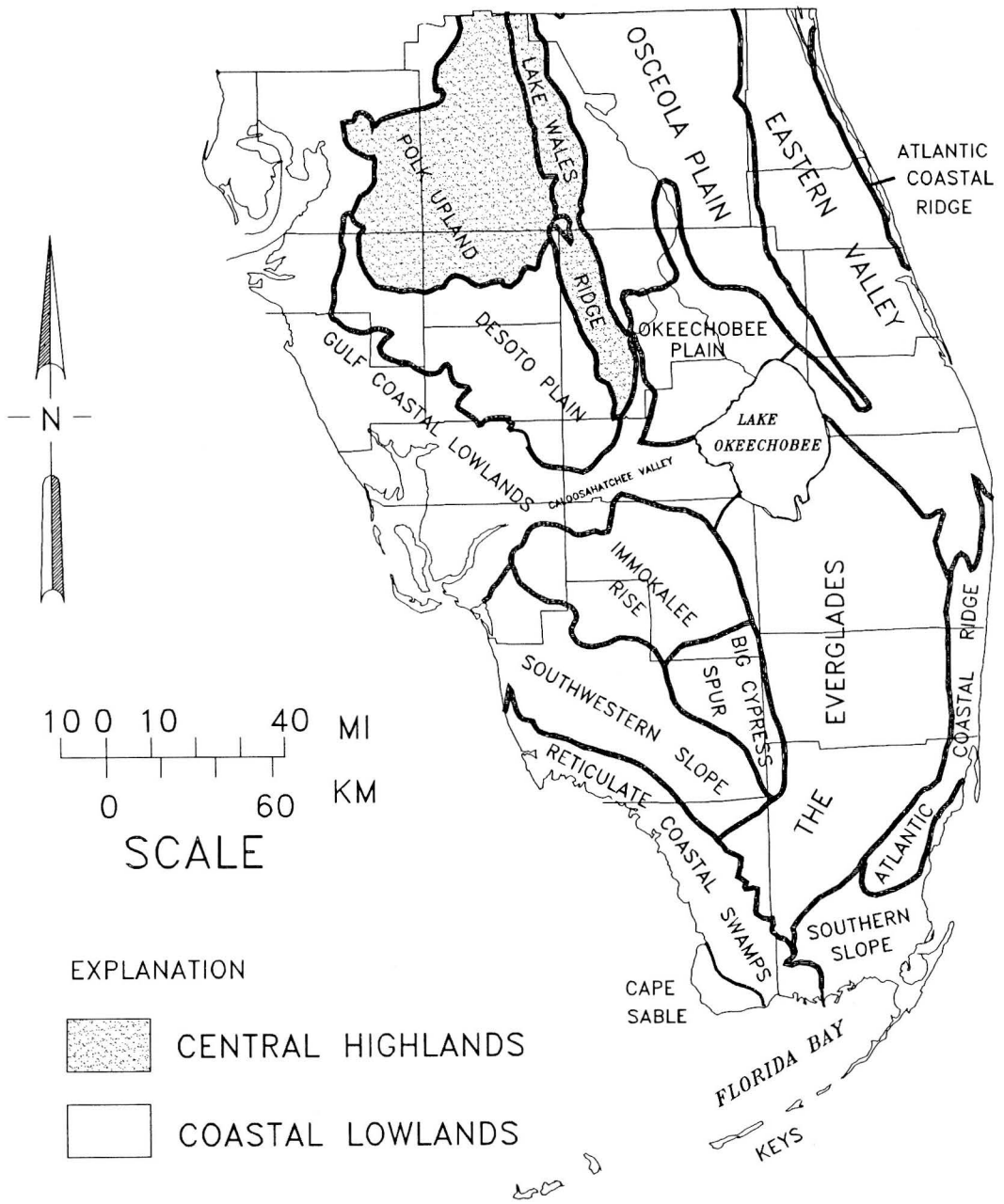


Figure 1. Generalized geomorphic map of southern Florida
[from Scott et al (1991) as modified from White, (1970)]

Valley. This valley is low lying and swampy with shell beds near the surface. The Eastern Valley is a paleo-lagoon that extended far to the north. The St. Johns River headwaters occur in the Eastern Valley in Indian River County. The Atlantic Coastal Ridge borders the valley on the east. The persistent coastal ridge feature is composed of sands and lithified coquina.

The southern portion of the state, south of a line trending east-west through Lake Okeechobee, is quite flat exhibiting very little relief. The Immokalee Rise and its southern extension, the Big Cypress Spur, formed as submarine sand shoals during the Pleistocene covering older limestones. The Southwestern Slope lies to the west of the Rise. On the slope, the limestones are covered by only a thin veneer of sand.

The Everglades occur between the Immokalee Rise, Big Cypress Spur, and Southwestern Slope on the west and the Atlantic Coastal Ridge on the east. The Everglades is a unique and interesting geomorphic feature. It has been called the "river of grass" formed as water sheet-flowed south from Lake Okeechobee to Florida Bay. Peat and organic sediments overlie Pleistocene limestones throughout much of the region. In some areas, such as at Rock Reef Pass in the Everglades National Park, highly karstified limestones are exposed at the surface. Peat and organic sediments fill the dissolutional depressions. White (1970) felt that the Everglades formed in a trough developed by dissolutional lowering of the limestone surface of southern Florida.

The Atlantic Coastal Ridge of southeastern Florida is composed of sands and coquina north of the Palm Beach-Broward County line and predominantly limestone in Broward and Dade Counties. The northern portion formed as a barrier island or shoal while the southern portion formed as an oolite shoal. This persistent topographic feature provided the high ground upon which the cities of southeastern Florida developed.

Geology

The surficial geology and geomorphology of southern Florida is, in general, not strongly affected by subsurface structural features (Figure 2). This is direct contrast with northern Florida where the structural features strongly affect the outcrop pattern of the Eocene through Miocene sediments. The northern portion of the area under consideration exhibits the effects of the structures that influence the geology of northern peninsular Florida. The most prominent of these is the Ocala Platform which can be seen in the northwestern portion of Figure 2. Here the Oligocene Suwannee Limestone and the Hawthorn Group sediments are exposed on the southeastward plunging nose of the Ocala Platform. Younger formations lap onto the flanks of the structure. Cross section A-A' in Figure 3 illustrates how the younger Suwannee Limestone and Hawthorn Group lap onto the structurally high Ocala Limestone. Where the carbonate rocks are near the surface, karst features are common.

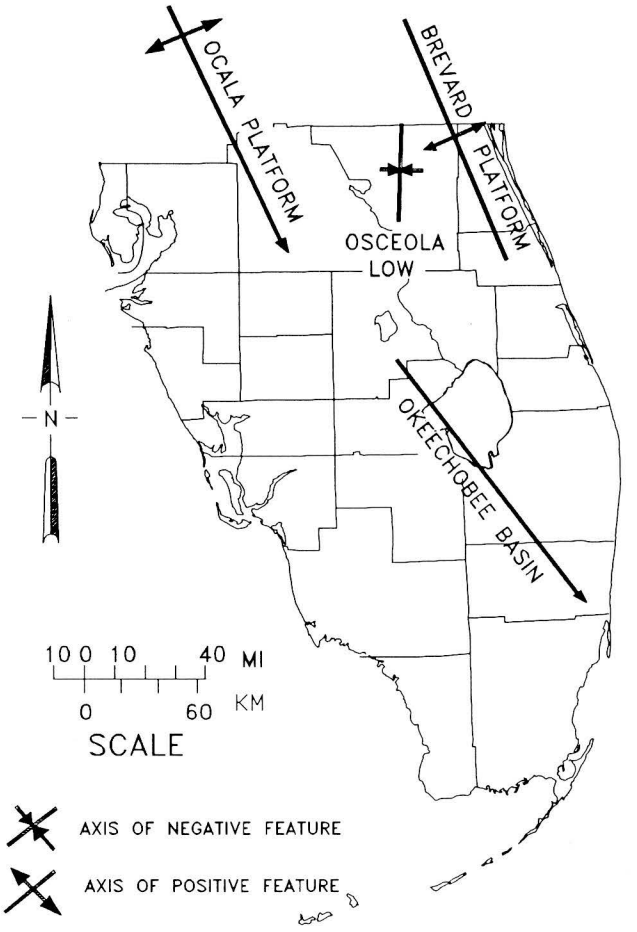


Figure 2: Geologic structures in southern Florida (from Scott et al., 1991)

Other structural features affecting the sediments in southern Florida include the Brevard Platform, the Osceola Low, and the Okeechobee Basin. The Brevard Platform occurs in the northeastern portion of this area. This structure brings the Eocene limestones within a hundred feet of the surface and the Hawthorn Group sediments are thinned to absent over its crest. The Brevard Platform plunges to the south-southeast and affects the formations as far south as Martin County.

The remaining two structural features are basins where the sediments are thicker. The Osceola Low is a relatively small basin in Osceola County and part of Brevard County. The post-Ocala Limestone sediments thicken in the basin to a maximum of more than 350 feet. The Okeechobee Basin is a broad south and

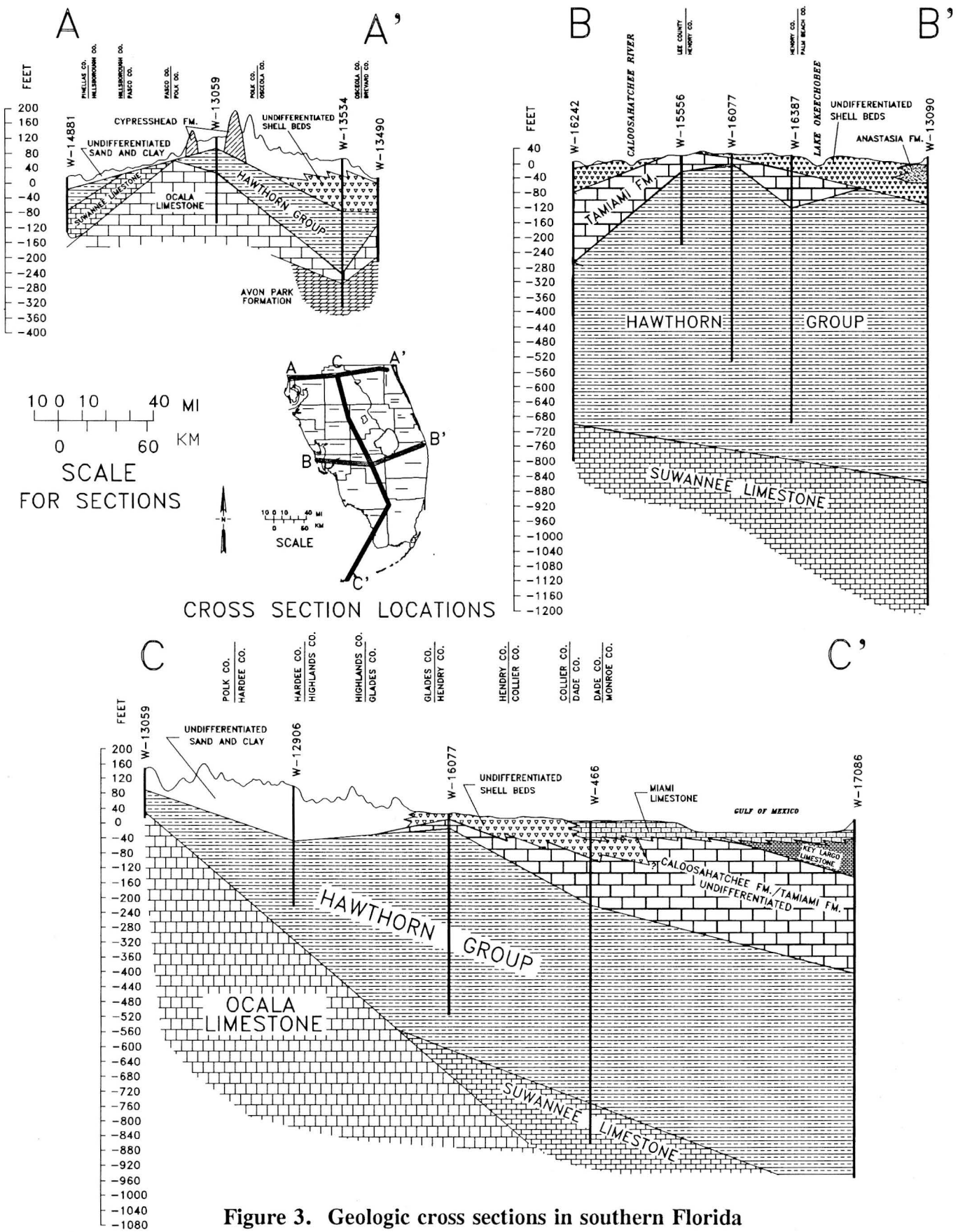


Figure 3. Geologic cross sections in southern Florida

south-southeast dipping structure. Within the basin, the post-Ocala sediments thicken to the south to more than 1300 feet (Figure 3, Section C-C').

Our discussion of the lithostratigraphy of the southern Florida peninsula will begin with the Ocala Limestone, the oldest unit shown on the geologic map of the area (Figure 4). The map in Figure 4 is constructed to show the extent of the formations as they occur within 20 feet of land surface. Each formation may be more extensive in the subsurface, but because each eventually dips below the arbitrary 20 feet depth or pinches out, their entire extent is hidden by shallower units shown on the map. Areas underlain by more than 20 feet of undifferentiated Pleistocene and Holocene sands are shown as white areas on the map.

The Late Eocene (approximately 38 to 35 million years ago [mya] Ocala Limestone is a very fossiliferous limestone containing mollusks, echinoids and foraminifers. It forms an important portion of the major water-bearing unit, the Floridan aquifer system, in Florida and parts of Alabama, Georgia and South Carolina. Where the Suwannee Limestone is present, the Ocala underlies it. The Suwannee is missing due to erosion or nondeposition in the northeastern portion of the southern Florida peninsula. As a result, the Hawthorn Group immediately overlies the Ocala Limestone. The Ocala Limestone is absent under portions of Broward, Dade and Monroe Counties. Presumably, it was removed by the erosive forces of the Gulf Stream when it impinged upon the Florida Platform during sea level fluctuations.

The Lower Oligocene (approximately 35 to 30 mya) Suwannee Limestone is exposed in a very limited area in Hillsborough and Polk Counties (Figure 4). The Suwannee is a very fossiliferous limestone containing foraminifers, mollusks and echinoids. One characteristic fossil of the Suwannee Limestone is the echinoid *Ryncholampus gouldii* which occurs in abundance in some locations. This limestone formation constitutes an important part of the Floridan aquifer system in southern Florida. In general, the Hawthorn Group overlies the Suwannee throughout southern Florida.

Prior to the mid-Oligocene, the Florida Platform was a broad carbonate depositional environment with only a minor influx of siliciclastics (quartz sands, silts, and clays). The siliciclastic sediment source, the Appalachian Mountains, had been subjected to erosion for millions of years and had been reduced considerably in elevation. As a result, little sediment was being shed and entering the carbonate-depositing environment of the Platform. A broad, regional uplift of the southern Appalachians occurred during the mid-Oligocene (some 30 mya), rejuvenating the erosional cycle. The renewed erosion supplied siliciclastic sediments to the marine depositional environment. These sediments were transported onto the Florida Platform, first mixing with the carbonates then, subsequently, replacing carbonate deposition. This dramatic transformation occurred during the deposition of the Hawthorn Group and represents the first major sedimentation change on the Florida Platform in millions of years.

While this shift in sedimentation was taking place, another unique and interesting geologic event was occurring. Phosphate was forming (phosphogenesis). The deposition of abundant phosphate is a geologically infrequent event requiring a very specific set of circumstances. Cold, phosphorous-laden ocean waters upwelled onto the shallow continental shelf allowing many organisms to flourish. The organic-rich sediments that resulted allowed the precipitation of phosphatic minerals. Subsequent sea level fluctuations concentrated the phosphate grains and created the phosphate deposits of the Hawthorn Group.

The Hawthorn Group in southern Florida consists of two formations, in ascending order, the Arcadia Formation and the Peace River Formation. The Upper Oligocene to Middle Miocene (approximately 30 mya to 16 mya) Arcadia Formation is predominantly a carbonate unit comprised of dolostone/limestone with highly variable percentages of quartz sand, clay and phosphate. Based on the variable lithologies, the Arcadia has two named members, the Nocatee and Tampa Members. The Nocatee Member is a sand and clay unit with variable phosphate. The Tampa Member is a sandy limestone with only minor phosphate. The Arcadia Formation, in general, is fossiliferous containing abundant mollusks and other marine fossils with the rare inclusion of vertebrates. The Arcadia Formation occurs at or near the surface in portions of Hillsborough, Pinellas, Manatee Sarasota and Charlotte Counties (Figure 4). Late Pleistocene shell beds overlie the Arcadia in part of this area. A well developed rubble zone containing phosphate gravel, vertebrate fossils and quartz cobbles and pebbles occurs between the units.

The Middle Miocene to Lower Pliocene (16 mya to 4 mya) Peace River Formation is predominantly a siliciclastic unit with only scattered carbonate beds. The phosphate content is highly variable with some beds containing economically valuable concentrations. The most phosphatic beds within the Peace River Formation occur within the Bone Valley Member. The Bone Valley Member, previously referred to as the Bone Valley gravel or the Bone Valley Formation, occurs in a restricted area that includes portions of Polk, Hillsborough, Manatee and Hardee Counties. This area comprises the main portion of the Central Florida Phosphate District and has been the site of phosphate mining activities since the turn of the century. The

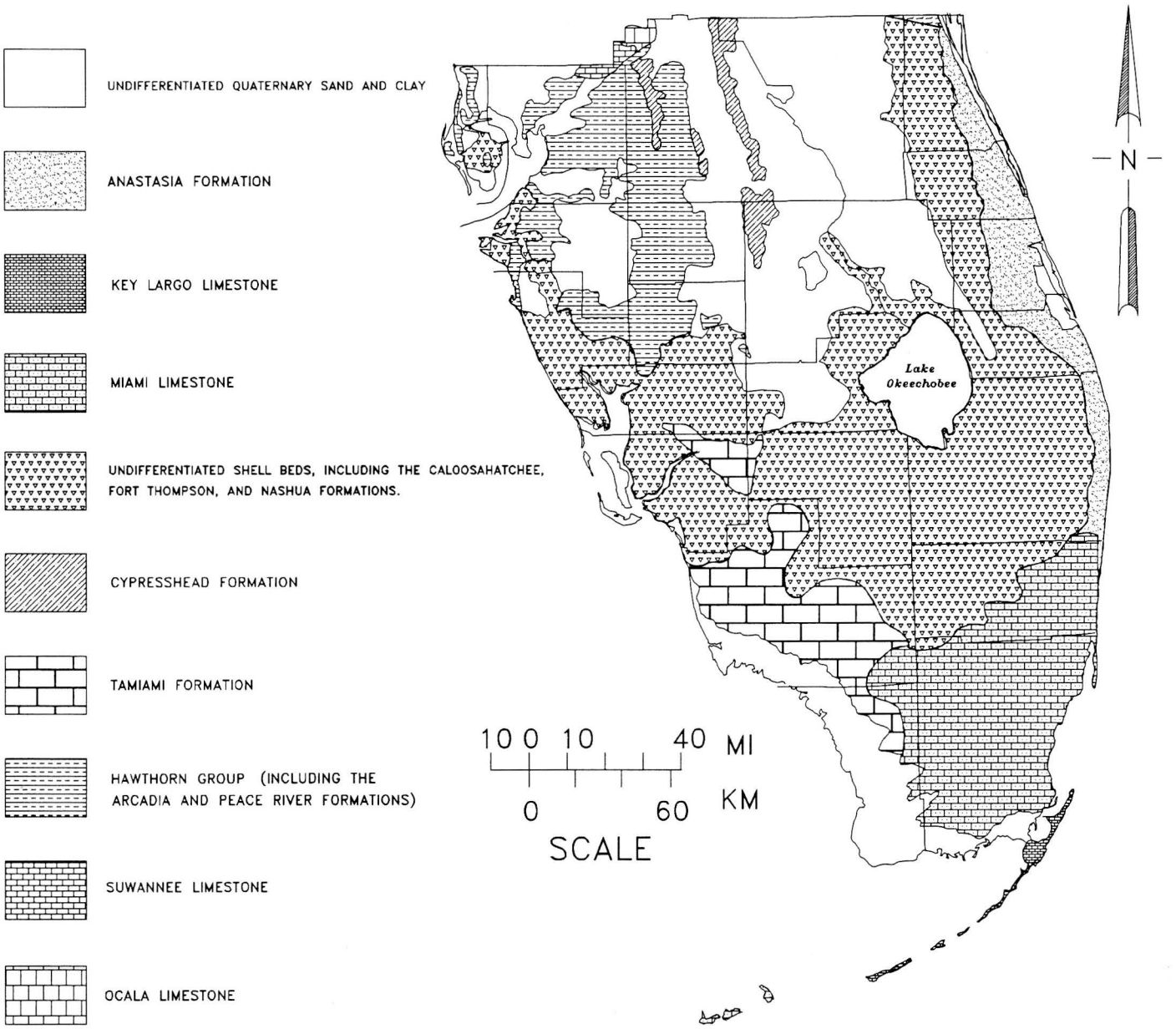


Figure 4. Geologic map of southern Florida
(compiled from county geologic maps of various authors as listed in references)

name is derived from the common occurrence of terrestrial and marine vertebrate fossils within the deposit. A wide variety of vertebrate fossils are found in this deposit ranging from shark's teeth to dugong, whale, horse, and many others.

The Bone Valley Member consists of quartz sand, clay and phosphate. The phosphate occurs as silt- to gravel-sized clasts of the mineral francolite, a carbonate fluorapatite. Phosphatic gravel beds are interbedded with finer grained, sand-sized phosphate beds. The phosphatic sediments contain highly variable admixtures of quartz sand and clay.

Overlying the Hawthorn Group in the central portion of the peninsula is the Upper Pliocene (approximately 3 mya) Cypresshead Formation (Figure 4). This unfossiliferous unit is composed of clayey, occasionally gravelly quartz sands and forms the higher ridges of the Central Highlands. Reworked Cypresshead sands and younger undifferentiated sands make up the remainder of the highlands.

Overlying the Hawthorn Group sediments in much of southern Florida is the Tamiami Formation. The Upper Pliocene Tamiami Formation consists of limestones, sands and clays. Some portions of the Tamiami, for example the Pinecrest beds, are extremely fossiliferous containing a very diverse molluskan fauna that attracts both professional and amateur paleontologists. The Tamiami Formation is exposed or occurs in the shallow subsurface in southwestern peninsular Florida.

Plio-Pleistocene sediments overlie the Tamiami Formation and the Hawthorn Group (where the Tamiami is absent) and consist of limestones and sands with variable fossil content. These units have been recognized as the Caloosahatchee "formation", Bermont "formation" and the Fort Thompson Formation (Figure 4) by many paleontologists. Although a particular lithology may occur in a formation, problems arise from the practice of identifying the units based on the incorporated molluskan faunas. Currently, a particular fauna with its guide fossils is used to determine whether a unit is the Caloosahatchee "formation" or the Bermont "formation". This practice does not conform with the North American Stratigraphic Code. The Code is a set of guidelines adopted by geologists that specify how to identify various types of stratigraphic units. Under the Code, formations are lithostratigraphic units which should be identified based on the sediment types, not on the recognition of the incorporated fossils. In an attempt to rectify the situation, Scott (1992) suggested placing the Caloosahatchee, Bermont and Fort Thompson formations in the Okeechobee formation (informally). Lithologically, the Okeechobee formation consists of limestone, sands and clays with varying shell content. Currently, drilling is being conducted in southern Florida to determine the workability of this approach.

The Atlantic Coastal Ridge in southern Florida is constructed of the Anastasia Formation north of the Palm Beach/Broward County line and the Miami Limestone to the south. The Anastasia Formation is a coquina composed of variably lithified shell and sand. The Miami Limestone consists of oolitic limestone and bryozoan-rich limestone that is variably lithified. Excellent exposures of the Anastasia occur along the coast at numerous locations including The Refuge in Martin County and Blowing Rocks in Palm Beach County. The Miami Limestone is well exposed at Silver Bluff and along canals transecting the coastal ridge.

The Florida Keys are constructed of Late Pleistocene limestones. The upper keys are composed of Key Largo Limestone, essentially a fossil coral reef. Fossil corals of many species and sizes are enclosed in a carbonate matrix. The Key Largo Limestone is well exposed along some of the canals in the upper keys. The State of Florida has purchased the old Windley Key Quarry site where the Key Largo Limestone was quarried for building and decorative facing stone. The site is being preserved as a State Geological Site and will be open to the public in the near future. The lower keys are composed of Miami Limestone oolite facies similar to the southern portion of the Atlantic Coastal Ridge in Dade County.

Fossil Hunting Localities

Southern Florida offers the fossil enthusiast some of the finest Miocene to Recent collecting opportunities in the state. Vertebrate fossils may be found in abundance in the Hawthorn Group sediments, and this area of Florida is also noted for its Pliocene and Pleistocene shell bed deposits, as well as the outstanding Recent shell collecting opportunities at Sanibel Island, near Ft. Myers.

Figure 5 is a generalized location map for the geographic areas mentioned in this article. Some of the classic geologic localities are also illustrated in Figure 6. The latter figure is some 30 years old, so bear in mind that the land ownership and access information is likely obsolete.

With southern Florida's burgeoning population, many potential fossil sites are becoming developed or otherwise off limits. Other popular sites such as the Newburn or APAC pit near Sarasota are closed. Many private mines and quarries are no longer willing to bear the liability in allowing the public into their pits. In at least one instance, a shell pit was closed to all collectors due to unauthorized entry by a group of thoughtless fossil hunters. It has therefore become even more imperative to conduct all collecting in a responsible

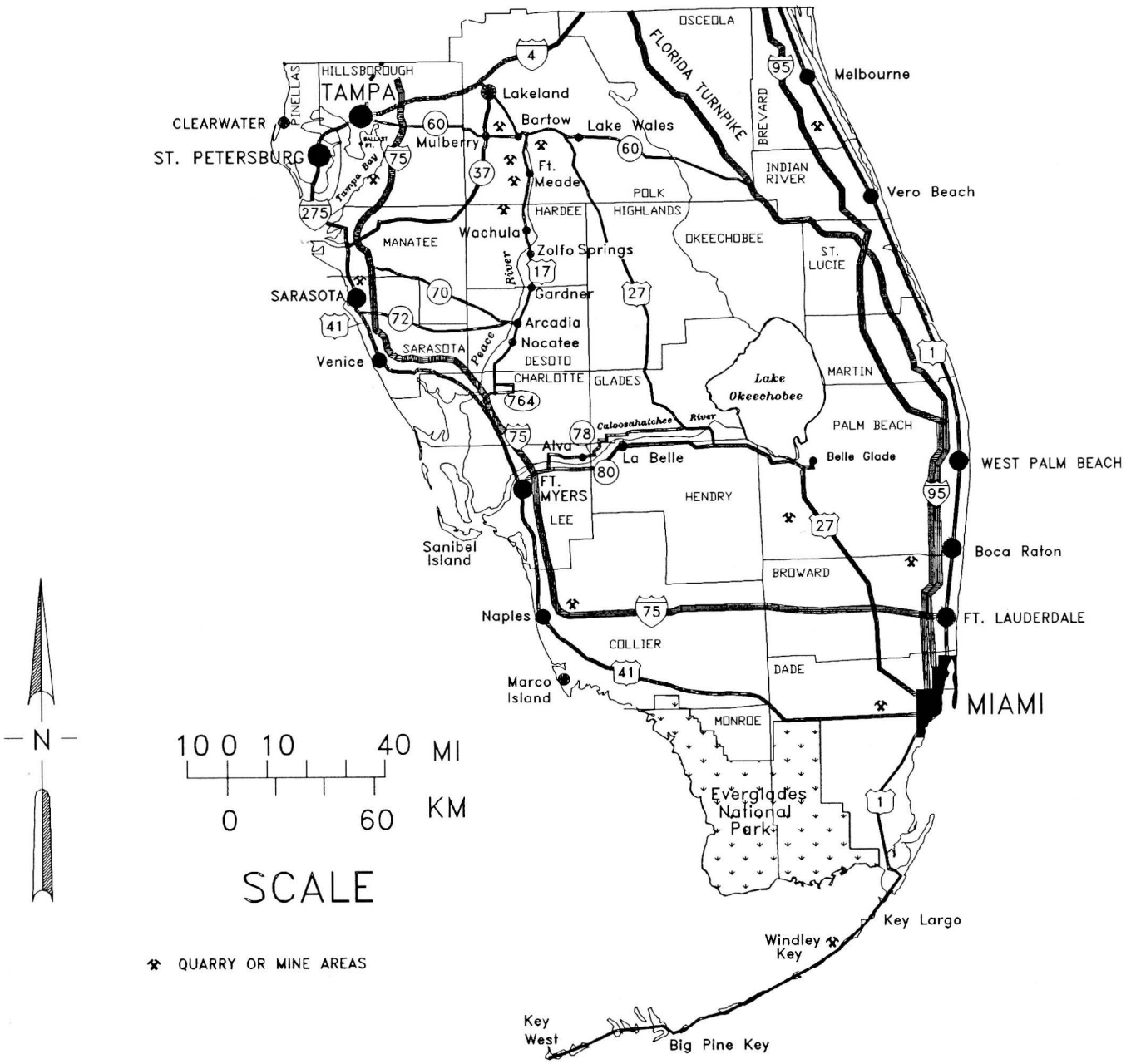


Figure 5. Generalized location map for southern Florida

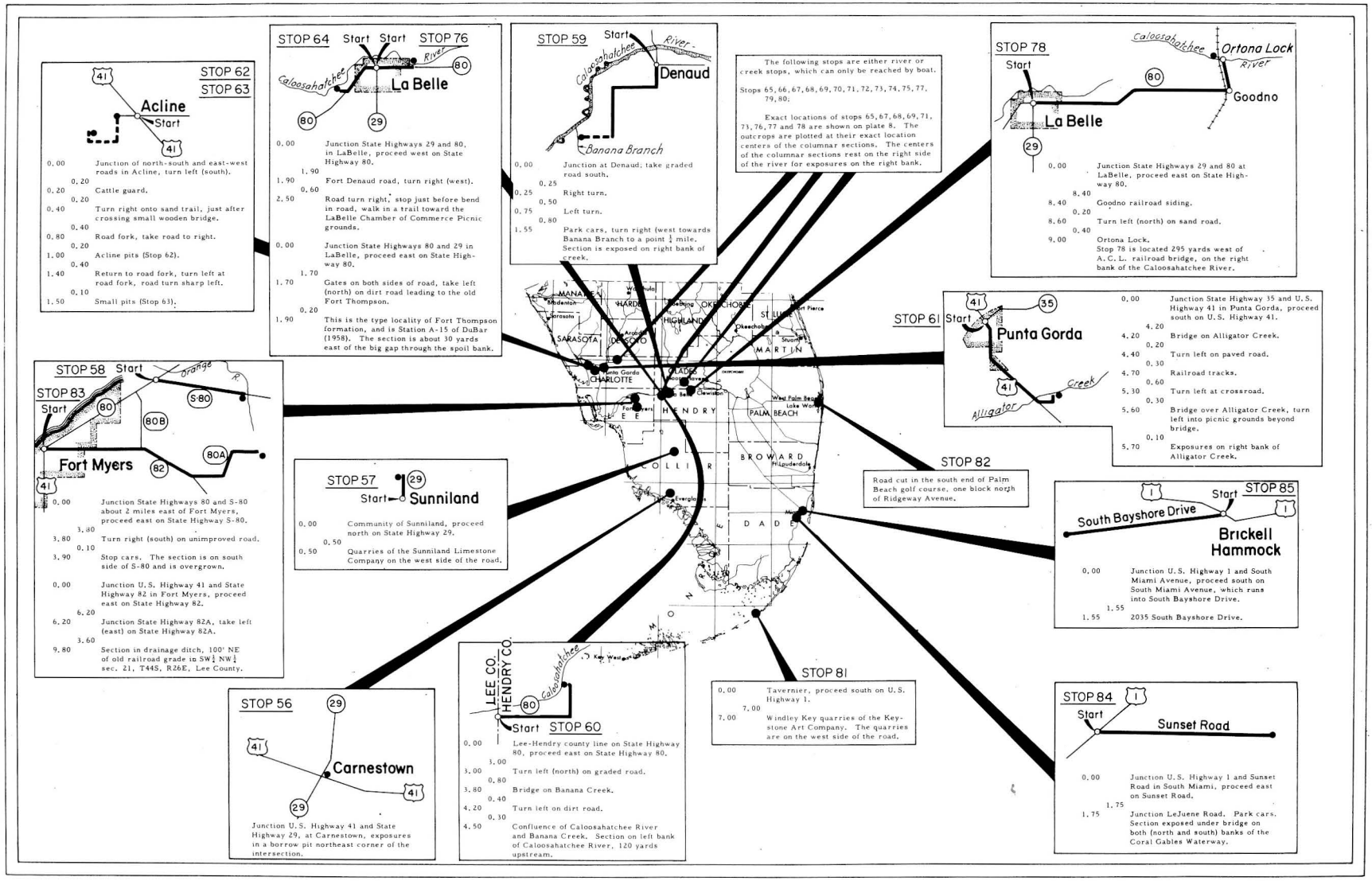


Figure 6. Classic geologic sites in southern Florida (from Puri and Vernon, 1964)

manner, no matter where one hunts. Respect the private property rights of others, and always seek permission before entering anyone's land. To ensure your being allowed to return, avoid littering or destructive digging, and leave it as you found it.

The mines of the Central Florida Phosphate District, nearby and south of Bartow, have yielded some of the richest Miocene and Pliocene vertebrate fossils found in Florida. This region is world famous for its fossils, and has been dubbed the "Bone Valley". Shark teeth and bones from a variety of both terrestrial and marine vertebrates are common finds. Unfortunately, access to the few remaining mines is difficult to come by. Most are closed to the public and many have regular security patrols. At last checking two mining companies still allowed escorted groups (primarily fossil clubs) in to collect: Cargill Fertilizer, Inc., P.O. Box 1035, Ft. Meade, FL, 33841, (813) 285-8125, and IMC Agrico, P.O. Box 867, Bartow, FL 33830. (813) 533-1121. Most collecting is done on the large mine spoil piles, in certain designated inactive areas of the mines.

Individuals may collect fossil material similar to that found in the phosphate mines at numerous sites along the Peace River. This stream is incised into Miocene Hawthorn Group sediments, and yields Miocene to Pleistocene aged fossils. It flows in a leisurely southwestward course from Bartow to Charlotte Harbor on the west coast. The best fossils occur in the stretch from Zolfo Springs to Nocatee. Here stream bottom sediments are composed of fossiliferous sands and gravels, and screenwashing is the preferred method of recovering the fossils. The Peace River is shallow enough to wade over much of its course, and a canoe or boat allows travel to collecting sites away from popular access points. Public boat ramps are available at Arcadia, Gardener and Zolfo Springs. Canoes may be rented at the Canoe Outpost in Arcadia.

For collectors who are landlubbers, several bridges and public parks provide pedestrian access to the river. The following land access sites are suggested by the Fossil Club of Miami in their June, 1994 newsletter. Fossils may be sifted with a hardware cloth screen from the streambed of Joshua Creek, a tributary to the Peace River which passes under State Road 17 a few miles south of Arcadia. Park on the east side of 17 and wade the shallows 100 yards downstream of the bridge. Just west of Arcadia, car parking is available on the north side of the highway 70 bridge over the Peace River. Locals collect shark teeth, vertebrate bones, Indian beads, and old bottles in a gravel bar under the sand in the river bottom near the bridge. A similar collecting opportunity occurs about 100 yards downstream from Crews Riverside Park, at the Wachula bridge over the Peace River (County Road 636, just west of Wachula). Shark teeth and other small fossils are found by digging and sifting in the gravel streambed. Another possibility is Brownville Park, located on a dirt road just south of Brownville Road (take highway 17 north from Arcadia 4.5 miles, then west on Brownville road to the dirt road on the left just before the river). Fossils have been found in the stream bed 100-150 yards north and south of the park.

Many other local creeks and streams in and west of the phosphate district may yield similar finds. Brown (1988) recommends Horse Creek in De Soto County (10 miles west of Arcadia on State Road 72) for fossils similar to those in the Peace River. Hunt in shallow water south of the bridge. A mask and snorkel will help locate fossils in the bottom sediments.

Shallow sediments of the Hawthorn Group extend westward from the phosphate district to coastal portions of Pinellas and Manatee Counties (see Figure 4). This unit lies at shallow depth in portions of the Tampa Bay area. Many of the stream banks which once exposed this unit have long since been encased in concrete during Tampa's urban expansion. One site in Tampa, near the eastern terminus of Gandy Boulevard on Hillsborough Bay, is Ballast Point. It is famous in mineralogical circles for its prized agatized coral geodes which erode out of Hawthorn Group sediments near the shore. These geodes represent silicified Miocene coral heads whose hollow interiors have become lined with variously-colored agate or chalcedony, a finely-crystalline form of quartz. Now a park, the site was effectively picked clean over the years by collectors. The city performed the coup de grace when they constructed a concrete seawall along the shore, covering the remaining outcrop. Today small pieces of agatized coral and small agatized mollusk shells may still be found with diligent searching among the rock rubble covering the beach and offshore area. Similar agatized corals have been found in dredge material along the causeways to the coastal barrier islands in northern Pinellas County and in some of the streams along the eastern shore of Tampa Bay. Future finds of similar material could occur during dredging or excavation work in the Tampa area, and the interested collector should make it a routine to check such sites.

The Hawthorn Group extends offshore on Florida's Gulf Coast onto the broad continental shelf. Shark teeth and fossils from submarine outcrops of the Hawthorn and younger units wash ashore on beaches from Clearwater south to Venice. Venice Beach and nearby Caspensen Beach are famous for their extremely abundant shark teeth. These may be picked up in the strand line and swash zone of the beach, or dredged in the shallows with a hand held screen mesh. Local convenience stores market long-handled screened scoops for just this purpose. Most of the teeth found

on the beach are small. Larger teeth are sometimes found by scuba divers in the bottom sediments offshore. This is one site worth visiting as it is hard to avoid finding fossils here.

Florida's southwest coastal and south-central peninsula areas are truly the realm of the invertebrate fossil enthusiast. Molluskan fossiliferous units of the Caloosahatchee, Bermont, Ft. Thompson, and Pinecrest formations occur near or at the surface over broad areas of the southern peninsula (see Figure 4). These shallow units extend from St. Petersburg southward through Lee County, then eastward in a broad swath near Lake Okeechobee. They continue up the east coast, eventually grading to the north into the fossiliferous sediments of the Nashua Formation. Their distribution reflects the extent of encroaching Plio-Pleistocene seas, and the shelly units form a u-shaped areal pattern around the generally unfossiliferous undifferentiated Quaternary and Cypresshead Formation sediments of the central highlands (see Figure 4).

The Plio-Pleistocene shell units commonly contain abundant well-preserved Pliocene and Pleistocene mollusks, corals, and barnacles as well as some freshwater forms. They occur at variable, generally shallow depths along Florida's southwest coast and portions of the east coast, and are best observed in excavations. Abundant well-preserved mollusks occur in the walls of a drainage ditch around Fossil Park, at 9th Avenue and 71st Street in St. Petersburg.

Shell beds are commonly mined as roadbase material from pits in coastal counties. Prior to their recent closings, such commercial pits provided collectors with access to excellent fossil shells. Shell pits are commonly in a state of flux, and changing ownerships may one day bring more relaxed policies on admitting avocational fossil hunters.

Invertebrate fossil hunters have a number of collecting options open to them. Some general ideas and suggestions are presented here. Manmade canals, excavations and natural creeks which have cut down into fossiliferous strata are likely places to look. Brown (1988) describes a fossil mollusk site at Shell Creek in Charlotte County (four miles west of I-75 on S.R. 17 to County Road 764, then 4.4 miles east to Shell Creek Park. Best collecting is from a canoe launched at the park. Search the high banks for shell-laden beds of the Plio-Pleistocene Caloosahatchee formation. Other deeply-incised streams in the area covered by shelly sediments (Figure 4) are worth scouting out.

Shelly sediments are also exposed in abundance along the Caloosahatchee River and its tributaries, particularly in the 4 mile segment just east of La Belle in Hendry County. The high banks are best explored and collected from a boat or canoe. Boat access is available at the Franklin Lock in Lee County, near the State Road 78 - State Road 31 junction, and at the public ramp on S.R. 78 just west of La Belle.

The Plio-Pleistocene shelly units may contain both land and marine vertebrate fossils. It is not unusual to find fossil bird or horse material in the shell-bearing strata. The famous Leisey shell pit, located on the eastern shore of Tampa Bay near Apollo Beach, gained national attention with the discovery of a fantastically abundant and diverse assemblage of Pleistocene vertebrate fossils in the shell pit strata. These finds are described in Hulbert et al., (1994).

Other Pleistocene vertebrate bearing strata are present throughout southern Florida. The famous canal bank site at Vero Beach and the similar "Melbourne Bone Bed", both discovered early in the century in Pleistocene sands along the east coast, attest to this fact. Abundant fossil sea bird fossils were also recently discovered in a shellpit in southwest Florida (Emslie, 1992).

Hunting for vertebrate material entails searching in the same kinds of areas as fossil mollusks occur. Check any areas where excavation or dredging is in progress. Many collectors walk the sediment spoil piles created by the dredging of canals. Similar material is commonly pumped up as fill in construction and beach renourishment projects. The smaller vertebrate teeth and bones easily survive the dredging process, and diligent searching may yield good finds.

As with the Miocene fossils of the Peace River, Pleistocene vertebrate material commonly occurs in streambed deposits. Vertebrate fossil deposits may be concentrated in holes or other natural impediments on the streambed. Depending on which part of the area one searches, a variety of fossil ages may also be present, due to the stream having cut downward through different ages of strata. Renz (1993) describes his discovery of a nearly complete Pleistocene sloth skeleton simply by wading a shallow stream in southwest Florida.

Collecting opportunities generally decline in the southernmost counties of this area, but fossils are still available. Quarries and drainage ditches cut in the Pliocene Tamiami Formation in Collier County may contain mollusks and echinoids, including the characteristic sand dollar *Encope tamiamiensis*. Limestone portions of this formation are typically more lithified than younger units, and many of the fossils occur as molds and casts or are well-cemented in the rock matrix.

Most of eastern Broward and all of Dade County, as well as the lower Florida keys, are underlain by shallow, generally unfossiliferous oolitic Miami Limestone. The Miami Limestone has some molluskan fossiliferous portions, and Pleistocene vertebrate fossils

have been found in sinkholes in the unit. However, the area is sparse in fossils as a general rule.

The upper Florida keys, from Key Largo to Big Pine Key, are comprised of Key Largo Limestone. This unit contains abundant and well-preserved Pleistocene corals, which may be observed in channel cuts on Key Largo. Most corals are cemented in the rock matrix, but collectors have been able to recover individual corals from areas where new canals are being blasted and dredged.

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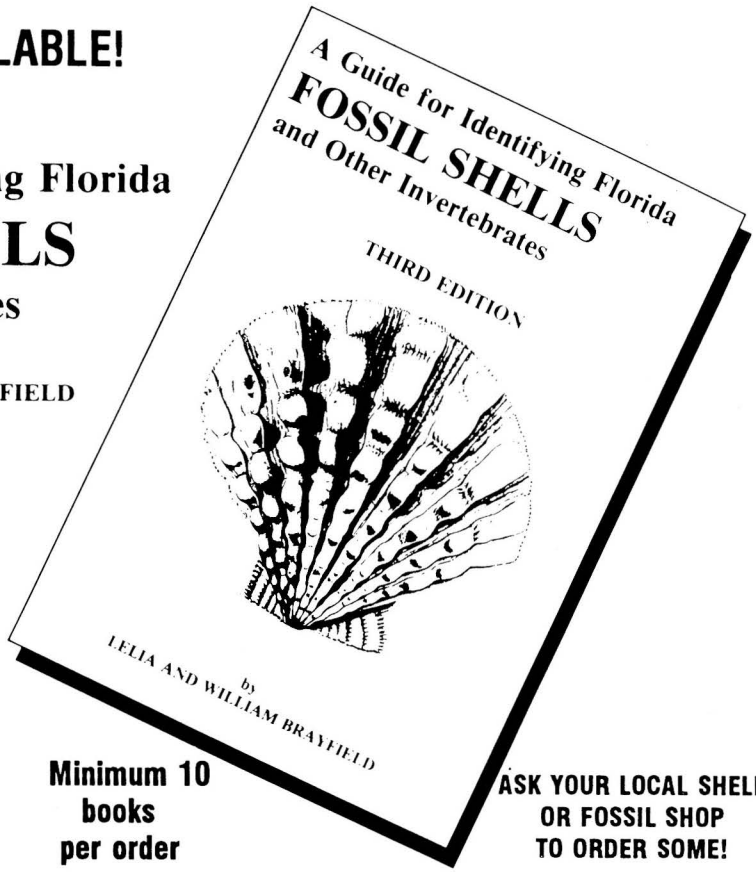

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As stated in the Articles of Incorporation, "The purposes of this Corporation shall be to advance the science of Paleontology, especially in Florida, to disseminate knowledge of this subject and to facilitate cooperation of all persons concerned with the history, stratigraphy, evolution, ecology, anatomy, and taxonomy of Florida's past fauna and flora. The Corporation shall also be concerned with the collection and preservation of Florida fossils." (Article III, Section 1).

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