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Changes in Number of Hotel and Motel Units Florida -- 1970 - 1987



Rate of Growth

- Medium
- High
- ▨ Low

Thank You!

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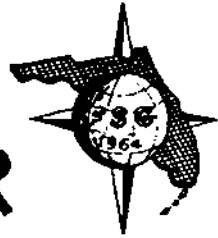


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R&D Facilities and Professional Labor Location Preferences: A Case Study in Tampa-St. Petersburg¹

*Susan Bradbury
Department of Geography
University of Florida*

Much discussion concerning economic growth and development over the past few years has focused on research and development (R&D) and high technology industries. Planners and politicians desire high technology firms to locate in their cities because such firms are generally regarded as having positive effects on economic growth and employment. However, although high technology firms have many locations from which to choose, past research on the geography of R&D has shown that R&D facilities are concentrated in a few areas. The Tampa-St. Petersburg area of Florida has a high concentration of R&D and high technology firms. This study examines the attributes of the Tampa-St. Petersburg area as a suitable and attractive location for high technology firms and their employees, using data from a survey of three firms and their employees.

Location of r&d facilities

In the United States, R&D is strongly concentrated in metropolitan statistical areas (MSAs) located in the traditional innovative core regions of the manufacturing belt and in a few Sunbelt locations. Large urban agglomerations are attractive locations for R&D facilities for several reasons. R&D depends on two factors: the organizational needs of the firm itself and locational preferences of the professional and technical labor force. Corporations are attracted to large urban regions due to the advantages of urban agglomeration, such as availability of labor (particularly those individuals with specific technical, scientific, and engineering skills), face-to-face contacts, proximity to supplies, services, information, and urban infrastructure, including airports and universities (Andersson, 1985; Oakey, 1985; Malecki, 1987; Dorfman, 1983). Various checklists of locational factors specific to R&D facilities have indicated that R&D facilities

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are dominated in their locational decision by their ability to recruit and retain individuals with specific technical, scientific, and engineering occupations (Browning; 1980; Herzog, Schlottmann and Johnson, 1986; Lund, 1986). According to Premus (1982), labor skills and availability were the highest ranking factor considered by firms when ranking regions with respect to location. The choice of geographic location can make a substantial difference in whether desirable professionals will be attracted or remain with a company (Shapero, 1985; Northrup and Malin, 1985). The success of R&D programs depend on the ability of firms to attract and retain highly qualified technical and professional workers. As a result, mobile professional and technical workers largely determine the location of high technology activities and therefore the development of places.

Professional and technical workers

A paucity of research exists on the mobility and locational preferences of professional and technical workers, even though they are the most mobile segments of the labor force (Greenwood, 1975; Kaufman, 1982; Ladinsky, 1967). In spite of this mobility, professionals are also constrained in location, for they have very strong locational preferences and will only live in certain types of places. Although professionals travel farther to look for work than those in other occupations, they are much more likely than other workers to reject a job because of location. In fact, location is the most important factor in the rejection of job offers by job-hunting professionals (U.S. Department of Labor, 1975).

Professional workers have a strong locational preference for large urban areas (Herzog, Schlottmann, and Johnson, 1986). This preference in location can be explained to some degree by the concept of agglomeration economies. In terms of location, professional workers want alternative employment opportunities, not only for themselves, but for their spouses as well. A wider variety of job opportunities is more likely to be present in large urban areas than in smaller cities (Noyelle and Stanback, 1983). Within the labor market, advantages and incentives frequently exist to move from one employer to another rather than advancing within a single institution. Large urban areas give a worker the advantage of changing employers without necessarily changing residence. Furthermore, large urban areas provide a high level of urban amenities which are attractive to professional workers. The built environment and cultural amenities may be more important

than the physical environment. Transportation accessibility, climate, cultural activities, airports, and universities, are especially attractive to professional workers. Such things as variety and quality of shopping, restaurants, recreation, and cultural opportunities reinforce the advantages of urban size because, in general, the largest urban regions rank highest in terms of urban amenities. Obviously, large metropolitan areas have both positive and negative attributes as locations for firms and labor (Table 1).

Table 1

Advantages and Disadvantages of Large Urban Agglomerations

Advantages	Disadvantages
<p>For Firms</p> <ul style="list-style-type: none"> • large skilled labor market • access to capital • access to information • innovation potential • presence of universities, airports and laboratories) • presence of specialized business services • pool of customers • pool of suppliers • greater productivity <p>For Labor</p> <ul style="list-style-type: none"> • greater employment choice • occupational variety • greater consumer choice of goods and services • superior cultural environment • presence of infrastructure (universities, airports) 	<p>For Firms</p> <ul style="list-style-type: none"> • higher labor costs • higher land costs • higher operational costs • lower environmental quality (detracts from a firm's image) <p>For Labor</p> <ul style="list-style-type: none"> • higher cost of living • higher housing cost • lower environmental quality (increased pollution, noise)

Dual career couples

Compelling evidence exists to examine dual career couples explicitly within the context of mobile professionals. Large urban areas appear to be the locational answer not only for professionals in general, but even more so for professionals and their spouses together (Mincer, 1978). Large urban regions contain not only a larger number of job opportunities, but also a wider variety of jobs. The major effect of the dual career couple may be to reinforce the agglomeration effect of large labor markets in two ways: (1) large urban areas will be more attractive when initial employment is sought, and (2) they will be more attractive locations at subsequent times because they increase the likelihood that jobs may be changed without accompanying residential change (Malecki, 1987).

Job-seeking and transfers become even more stressful and complicated in dual career families. Organizations report increased reluctance to relocation among men and women whose spouses have careers of their own (Maynard and Zawacki, 1979). Transfers and relocations are the area where dual career couples have a noticeable impact on corporations.

Quality of life

When discussing locations, or comparing places, the term "quality of life" consistently arises. This term refers to an individual's satisfaction with a particular place, including social conditions and environment, perceived or real. The general attractiveness of a city, or its quality of life, is thought to attract workers, especially mobile skilled workers. Recently, several researchers (Liu, 1975; Boyer and Savageau, 1981; 1985) have attempted to rate regions and urban areas on the basis of quality of life or social indicators. The variables typically found in quality of life studies include: population; housing (availability, quality, and cost); cost of living; quality of health services; retail, personal services, recreational, and cultural facilities; quality of education; crime; transportation; climate; and pollution. Research has shown that certain attributes have an important and significant effect on the likelihood of migration (Herzog and Schlotmann, 1986; Liu, 1975). In this way, quality of life criteria become a major component of locational decisions by individuals and institutions.

Research design

To investigate the locational needs and preferences of R&D firms and their employees, a study was conducted during the summer of 1987 in the Tampa-St. Petersburg area. This study examined both the extent to which local characteristics conformed to the requirements of the firms as well as the relative attractiveness of the area as a residential location for professional and technical workers.

Two questionnaires were prepared: one for the R&D facility (the "corporate questionnaire") and the other for its professional and technical workers (the "employee questionnaire"). The **corporate questionnaire** was designed to elicit information concerning firm characteristics, locational attributes considered important to the firm and its employees, and possible future locations. The **employee questionnaire** was structured to provide information on employee characteristics, location attributes, preferences and job search activities. Four R&D oriented firms located in the Tampa-St. Petersburg area were approached, three agreed to participate. One corporate questionnaire and at least 50 employee questionnaires were distributed to each firm. The employee questionnaires were then distributed by the firm to its professional workers. Thus, three firms and a total of 114 employees (response rate of 71%) form the data base of this study.

Characteristics of firms and employees

Of the three firms in the study, two have been located in the Tampa-St. Petersburg area for over twenty years; the other firm's tenure in the area is less than ten years. All three firms have low employee turnover rates (less than 5% annually) and reported no difficulty in attracting professional employees to their present location. Employees are recruited from all over the country and the firms expressed a preference for experienced personnel over new college graduates.

The employees participating in the study range in age from their mid-twenties to their sixties. Employees were classified into four categories by age (34 and under, 35-45, 46-55, 56 and over). Almost 68% of the employees were 45 years old or younger. Job titles included managers, engineers, scientists, and technicians. The majority had resided in the area for at least ten years.

Results

To examine the locational priorities of R&D firms and their professional and technical workers, the data were analyzed in two different ways. First, the influence of household type was examined. Second, the results of the corporate and employee questionnaires were compared with respect to the importance of locational factors.

Influence of Household Type. Respondents were disaggregated into four categories based on marital status and the spouse's occupational standing to determine if locational priorities varied among different groups of professionals. The four categories are: unmarried or single professional, married but spouse not employed ("traditional couple"), married spouse employed but not a professional ("dual worker couple") and married with spouse an employed professional ("dual career couple").² The employee questionnaires provided detailed information concerning personal characteristics (age, marital status, children) and job search activities, and they were asked to rate (on a scale of 1 to 5) the attributes of the Tampa-St. Petersburg area in terms of satisfying their own personal locational requirements. The attributes chosen correspond with what are generally termed "quality of life" characteristics and include: climate, cultural opportunities, job alternatives, crime rates, presence of universities, and airports. Differences between the four groups were analyzed using significance tests.

The four groups of professionals vary in their personal characteristics (Table 2). Dual career couples appear to be younger, less likely to have children and tend to have switched employers more frequently than traditional couples. Dual career couples also are more satisfied with their--and their spouses'--employment alternatives in the area, and they place much more emphasis on their spouse's job than do traditional or dual worker couples. In the analysis of urban area attributes, the presence of a university and recreational opportunities are especially important locational factors to dual career couples. Also dual career couples demonstrated a desire to be located closer to their family in relation to the other couple groups.

² Dual career couples are defined as couples where both the husband and the wife are engaged in continual full time professional employment which requires a high level of commitment and time and is a source of identity and fulfillment (Bulter and Paisley, 1980; Klenke-Hamel, 1982).

Table 2
Differences by Household Type

Variable	Unmarried	Traditional Couple	Dual Worker Couple	Dual Career Couple
• % with Children*	26%	87%	91%	53%
• % Switched employers Since Living in Tampa*	29%	11%	38%	28%
• % Indicating Job alternatives for husband are satisfactory	33%	32%	19%	44%
• % Presently located Near Family	46%	43%	48%	56%
• % Preferring to live Closer to Family*	24%	29%	29%	31%
Importance in Selecting Job Locations (1 to 5)**				
• Husband's Job	4.61	4.66	4.70	4.61
• Spouse's Job*	1.00	1.43	2.15	3.42
• Job Alternatives for Spouse	1.17	1.49	2.35	2.84
• University	3.09	2.78	2.90	3.19
• Recreation Opportunities	3.96	3.78	3.60	4.03
	n=24	n=37	n=21	n=32

* significant at .05 level

** 1 = least importance; 5 = most importance

For all categories of workers, the locational attributes that people like about the Tampa-St. Petersburg area are: (in order of importance) job opportunities, climate, recreational opportunities, and the cost of living and housing. The locational attributes that workers dislike are: traffic congestion and a lack of job alternatives. Although the majority of workers considered the Tampa-St. Petersburg area as a high technology area, most felt that the area lacks a large number of high technology firms. Overall, in terms of city size, there was a general preference for a location of similar size. A locational preference for a smaller size place was also strongly preferred but ranked second. This is a common result in survey studies. Although people would prefer to live in smaller places, they also prefer that these smaller places be in relatively close proximity to large urban centers so that they can take advantage of the benefits of large urban areas but at the same time are distant enough to avoid the disamenities associated with urban scale (Dahmann, 1983). The attributes considered important to professional and technical workers in rating a future location are: (in order of importance) job opportunities, climate, cost of housing, crime rate, and recreational opportunities.

Comparison of Corporate Questionnaire and Employee Questionnaire Results. For the second analysis, the aggregated employee preferences and rankings of locational attributes were compared with all firms' rankings of their locational priorities. Both the firms and their employees had also been asked to provide a short list of preferred locations and to supply reasons for their choice.

In terms of locational attributes of the Tampa-St. Petersburg area, the presence of a major airport, tax rates, municipal services available, community attitudes, and the presence of a university were considered important to the firms (Table 3). For regional preferences, all three firms chose the Northeast for similar reasons: better access to quality personnel, improved interaction with the rest of the firm and easier access to technology (Table 4). In contrast, employees considered the South Atlantic region the most favorable, followed by the Pacific and the Mountain regions. The reasons given for these regional preferences were: climate, job opportunities and quality of life.

Table 3
Locational Factors

Factors Important to Firms	Rank
presence of a major airport	1
taxes	2
municipal services	2
community attitudes	2
presence of a university	2
Firms' Perception of Factors Important to Employees	Rank
taxes	1
cost of living	1
quality of education	1
job opportunities	2
Factors Important to Employees	Rank
job opportunities	1
climate	2
recreation opportunities	3
cost of housing	3

Table 4
Regional Preferences

Firms	Employees
Northeast	South Atlantic Pacific Mountain
Reasons Cited for Preference	Reasons Cited for Preference
1. personnel	1. climate
2. interaction with rest of firm	2. job opportunities
3. technology	3. quality of life

Of particular interest is a comparison of what firms believe employees' priorities are, with *actual* employee rankings of urban attributes (Table 3). The firms' responses differed greatly from what the employees themselves considered important. The firms ranked taxes, cost of living, quality of education, and job opportunities as being important to employees. Employees ranked job opportunities, climate, recreational opportunities, and cost of housing to be the most important locational attributes. Thus it would appear that these firms do not have a very good idea of what their professional workers desire in a location. Notably, firms tend to assume that factors that are important to them are also important to their employees.

Conclusions

Although the importance of various locational factors differ between R&D firms and their professional labor force, the factors and preferences desired by both can be satisfied best in large urban areas. When asked about city size preferences, respondents chose smaller or similar size cities, yet the attributes they desire in a location tend to only be found in larger places. Locational priorities and preferences differ between household groups, with dual career couples particularly constrained and attracted to the advantages of large metropolitan centers. Thus the pull of large urban areas to both firms and employees is clear, yet firms are also drawn toward locations that maximize intra-firm interaction. The lure of Sunbelt locations, which include environmental amenities, if not the full range of cosmopolitan attributes, constrains firms such as those included in this study. They must acquiesce to preferences by professional workers for such locations, even if they somewhat compromise corporate priorities. Florida cities are attractive to professional and technical workers and thus to high technology firms because they offer a favorable climate, recreational opportunities, and acceptable living and housing costs. However, the needs of American corporations for communication, information, and technology work against Sunbelt locations such as Tampa-St. Petersburg. The leading urban areas of the 21st century may well contain combined attributes that cater both to the priorities of corporations and to those highly educated and mobile professionals. The infrastructure and advantages accumulated in the northeastern section of the country, and more recently in California, pose a challenge to Florida's cities.

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Changing Areas of Visitor Interest in Florida 1950-1987

*Morton Winsberg
Department of Geography
Florida State University*

Since World War II, an enormous expansion in Florida's visitors has been experienced. In addition, large numbers have migrated to the state. The demand for hotel and motel rooms has risen accordingly. In fact, in 1950, the state had 125,980 hotel and motel rooms, while in 1987, the number had risen to 311,980. Although there are many motives for renting a hotel or motel room, in Florida, tourist occupancy ranks among the most common. The number of hotel and motel rooms in each Florida county is, therefore, a useful surrogate to measure the importance of its tourist industry.

The great change since World War II in the spatial distribution of Florida's hotel/motel rooms has resulted primarily from six factors:

- a large increase in the number of visitors who come by automobile;
- a continuing enthusiasm to vacation near the ocean;
- the construction of the Interstate Highway System;
- the establishment of theme parks in central Florida;
- the immigration of many Hispanics into Miami; and,
- the development of the condominium industry.

Changes from 1950 -1970 (Table 1)

During the 37 years between 1950 and 1987, Florida's tourist industry has undergone enormous change in both size and spatial distribution. In 1950, railroads still carried a large percentage of vacationers to the state, although automobiles rivaled the train as a conveyor. Airplanes were just beginning to become significant. The focus of tourism was Miami, and Dade County in 1950 had slightly less than one-third of all hotel and motel rooms in the state. During the 1950s, Dade County (Miami) enlarged its share of the state's hotel and motel rooms, and by 1960 it had 34% of the state's hotel and motel rooms, while Broward County (Fort Lauderdale-Hollywood) increased its share from 4-8%.

Numerous factors arose between 1960 and 1970 to damage the Miami tourist industry. The large exodus from Cuba changed Miami's

character sufficiently, making it less desirable in the eyes of its tourist clientele. During the 1960s, many Caribbean Islands opened tourist hotels, and, increasingly, those who formerly came to Miami only passed through it, or over it, on their way to Jamaica, Puerto Rico, or other islands. Europe as well drew more American tourists, further reducing Florida's share of their expenditures. Between 1960 and 1970, the number of hotel and motel rooms in the state grew by 15 percent, while that of Dade County remained almost stable, though there was a 25 percent increase in adjacent Broward County.

Another explanation for the stagnation of the Dade County hotel industry was the growing popularity of condominiums. Many "snowbirds" (persons who spend part of the year in Miami and part in the North) discovered the tax advantages of buying a condominium (perhaps jointly with other families) rather than spending three to six months living in a Miami Beach hotel. In fact, a number of hotels lost so much business because of this trend that quite a number decided to "go condo" themselves by rebuilding their interior space.

In the late 1960s, the Interstate Highway System began to have an impact on the distribution of hotel and motels. This can be seen in the enormous increase in accommodations in Columbia and Hamilton Counties, where the northern interchanges of I75 were built. As automobile tourists moved off the Federal highways and onto the Interstates, in certain parts of the state the need for motel or hotel rooms declined, and in a few counties there was a net loss in their numbers. This was particularly true of the middle portion of the Panhandle, and in St. Johns and surrounding counties. Though it is hard to explain, the Tampa Bay area (Pinellas, Hillsborough and Manatee Counties) was also one of slow hotel and motel expansion between 1950 and 1970. During this period the hotel and motel industry expanded spectacularly in and around Panama City and Naples.

Changes from 1970 - 1987 (Table 2)

One factor alone explains most of the change in the distribution of hotel and motel accommodations between 1970 and 1987, the opening of Disney World near Orlando in 1973. Other theme parks soon clustered around the Disney complex. Whereas in 1970, Orange County (Orlando) had 5,512 hotel and motel rooms, by 1987 the number had risen to 40,062. Adjacent Osceola and Seminole counties

Table 1

Changes in the Number of Hotel and Motel Units -- 1950-1970

(Only includes counties that have ever had 125 or more units)

Counties with High Rates of Growth	Number of Units		%Change
	1950	1970	
Collier (Naples)	514	2553	+397
Bay (Panama City)	1923	7191	+274
Broward (Ft. Lauderdale)	5069	17269	+241
Okaloosa (Ft. Walton Beach)	753	2118	+181
Columbia (Lake City)	474	1291	+172
Glades (Moore Haven)	53	140	+164
Lee (Ft. Myers)	1810	4761	+163
Monroe (Key West)	1550	4016	+159
Holmes (Bonifay)	26	65	+159
Escambia (Pensacola)	987	2333	+136
Hamilton (Jasper)	120	263	+119
Marion (Ocala)	1256	2640	+110
Taylor (Perry)	328	664	+102
Brevard (Melbourne)	2323	4659	+101
Pasco (New Port Richey)	465	877	+89
Alachua (Gainesville)	768	1428	+86
Counties with Low Rates of Growth			
Pinellas (St. Petersburg)	16376	20373	+25
Hillsborough (Tampa)	4734	5849	+23
St. Lucie (Fort Pierce)	873	1566	+18
Jackson (Mariana)	292	342	+17
Osceola (Kissimmee)	419	480	+15
Levy (Williston)	310	351	+13
Wakulla (Sopchoppy)	132	148	+12
Flagler (Flagler Beach)	238	262	+10
Walton (Santa Rosa Beach)	311	333	+7
Putnam (Palatka)	412	428	+4
Santa Rosa (Milton)	396	408	+3
Gadsden (Quincy)	172	176	+2
Okeechobee (Okeechobee)	124	127	+2
St. Johns (St. Augustine)	2352	2407	+2
Manatee (Bradenton)	1603	1636	+2
Clay (Orange Park)	455	451	-1
Franklin (Apalachicola)	269	254	-6
Suwannee (Live Oak)	137	120	-12
Gulf (Port St. Joe)	197	145	-26
Seminole (Sanford)	655	342	-48
State Average			+67

Table 2**Changes in the Number of Hotel and Motel Units -- 1970-1987**

(Only includes counties that have ever had 125 or more units)

Counties with High Rates of Growth	Number of Units		%Change
	1970	1987	
Osceola (Kissimmee)	480	17887	+3626
Seminole (Sanford)	342	3010	+780
Orange (Orlando)	5512	40062	+627
Holmes (Bonifay)	65	192	+196
Sumter (Wildwood)	225	632	+181
Hillsborough (Tampa)	5849	14697	+151
Leon (Tallahassee)	1792	4225	+135
Alachua (Gainesville)	1428	3047	+113
Suwannee (Live Oak)	120	253	+111
Walton (Santa Rosa Beach)	333	669	+100
Escambia (Pensacola)	2333	4599	+97
Okaloosa (Ft. Walton Beach)	2118	4171	+97
Collier (Naples)	2553	4852	+90
Pasco (New Port Richey)	877	1656	+89
Clay (Orange Park)	451	820	+82
Flagler (Flagler Beach)	262	452	+73
Counties with Low Rates of Growth			
Martin (Stuart)	869	1037	+19
Hendry (Clewiston)	280	331	+18
Bay (Panama City)	7191	8240	+14
Bradford (Starke)	391	429	+10
Dixie (Cross City)	126	139	+10
Pinellas (St. Petersburg)	20373	20292	0
Levy (Williston)	351	345	-2
Highlands (Sebring)	1190	1054	-11
Nassau (Fernandina Beach)	757	673	-11
Dade (Miami)	63738	54459	-15
Jefferson (Monticello)	149	127	-15
Sarasota (Sarasota)	4794	3849	-20
Wakulla (Sopchoppy)	148	118	-20
Taylor (Perry)	664	501	-25
Gadsden (Quincy)	176	110	-37
Gulf (Port St. Joe)	145	79	-46
State Average			+49

had even more spectacular rates of hotel accommodation growth than did Orange. The growth in tourist attractions in the Orlando area, along with mounting social problems, contributed to an actual decline of almost 9,000 hotel and motel rooms in Dade County between 1970 and 1987, though, in the same period, rooms in Broward County grew by over 10,000. Hotel accommodations in the Naples area continued to increase rapidly after 1970. Tampa's hotel and motel accommodations almost doubled between 1970 and 1987, but the construction frenzy did not extend to nearby Pinellas County (St. Petersburg), which continues its slow post World War II growth in hotel rooms. There also appears to have been a relocation of tourist interest in the Panhandle. Growth in the number of motel and hotel rooms in the Panama City area has almost ceased, but in the smaller resort towns farther to the west there has been a large increase.

The opening of I75 to Tampa in the 1970s, and the fact that the interchange which connects it with Florida's Turnpike was built nearby, had a great impact on Wildwood, almost tripling its number of motel rooms. Also, during the 1970-87 period, the rate of hotel and motel room growth in Tallahassee and Gainesville was far more rapid than that for the state. Growth in guest accommodations in the latter two cities was more a reflection of their importance to Floridians than visitors from other states. The former is the state capital and has two state universities, the latter has the state's largest university.

Aside from Tallahassee, the Big Bend area has suffered badly from being isolated from the Interstate Highway system, Taylor County being the worst victim. Until I75 was completed, Perry had become something of a post stop for Middle westerners on their way to the Sun Coast. In 1970 the county had 664 motel rooms, but by 1987 it had only 501, with a lower occupancy rate than in 1970. The Florida Highlands, which in the nineteenth century attracted a substantial share among the few Florida visitors, since 1950 has been of little interest to those who visit the state. Florida's coasts early overwhelmed the interior highlands as the state's most important physical environmental attraction.

The future

In September, 1988 it was announced that, to that date, 340 hotel and motel projects were to be initiated in 1989, among them 35 in the Tampa Bay area, 26 in Dade County, and 25 in Palm Beach County.

Two major surface transportation projects have been proposed for Florida which could cause substantial redistribution of the state's hotel and motel accommodations. The "bullet train" would provide high speed travel between Miami, Orlando, and the Tampa Bay area. This might reduce the relative importance of hotel accommodations in the Orlando area, since people could use the train to commute to that area's tourist attractions from a longer distance. Of course it might work the other way, with more people choosing to stay in the Orlando area and make commuter visits to other cities.

Another large project was proposed in 1988. A turnpike is being entertained which would connect Jacksonville with the Tampa Bay area. Where it crosses I75, one would anticipate a great increase in the number of rooms rented to visitors. Beyond these two projects, which are only in their initial planning stages, little exists to suggest the development of a new focus for hotel and motel construction in the state.

References

The source for the data in this study is the State of Florida, Department of Business Regulation, Division of Hotels and Restaurants, Tallahassee, Florida, 1988.

The Causes of Sinkholes: Man and Nature, The Culprits

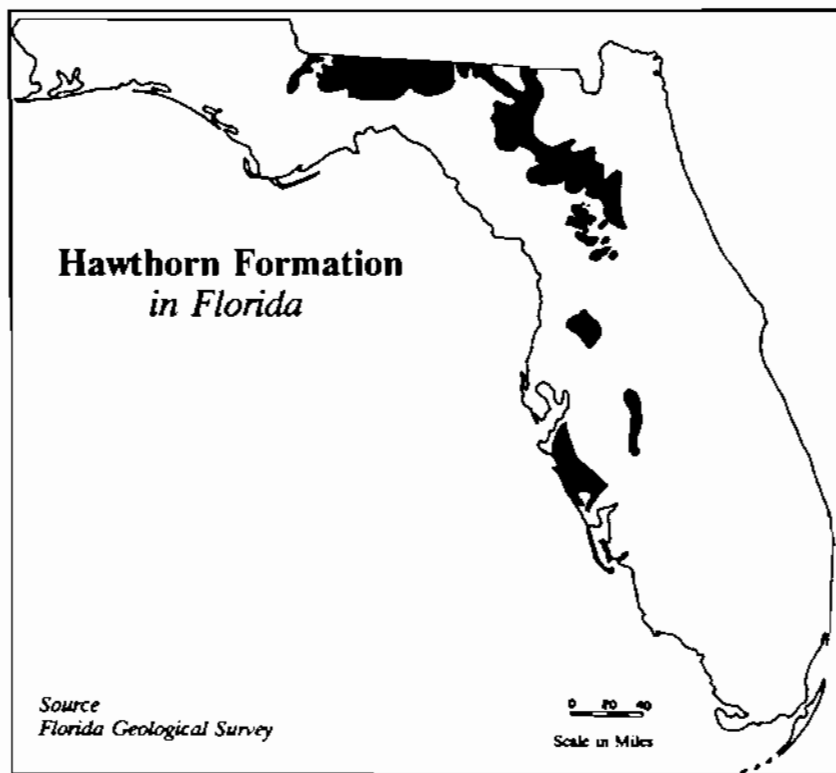
*Louis A. Paganini
Department of Geography
University of Florida*

Most of Florida's present day sink holes, in populated areas, are being formed and are appearing because of a disregard for, or a lack of understanding of, underground drainage by engineers, planners, developers and others. Through either reckless or deliberate action they impede, alter, or induce a new course for subsurface water movement in order to construct roads, highways, and buildings or to otherwise improve an area. Little thought is given to the erosive forces of even the smallest amounts of uncontrolled water. Even less thought is given to the great property damage or the great monetary loss that might occur. No thought is given the possible displacement of human beings when their homes are lost in sinkholes--sinkholes that develop from redirected water flow or from water which escapes from swimming pools and sewer lines.

This thoughtlessness in regard to the formation of sinkholes in populated areas may not be solely the fault of planners. Until recently, literature dealing with sinkholes considered only the physical, or natural, aspects of their formation. It is commonly held that their occurrence is a natural phenomenon induced by natural causes. Seldom have the actions of people been considered responsible for the sinkhole formation.

The hawthorn formation

Underlying Central Florida and extending to great depths are limestone deposits (the "Avon Park/Lake City limestone") of marine origin. These are overlain by other limestones of the Ocala formation in which much of the solution of caverns occurs. The Hawthorn formation (Figure 1), a mantle of unconsolidated sands and clays, lies uncomfortably over the Ocala limestones and extends to depths of over 200 feet. A mantle of recent sediments consisting of variegated, thinly laminated and cross bedded sands, gray to white in color, covers the Hawthorn layer. The Hawthorn layer contains many pure deposits of montmorillonite, a clay used chiefly for cat litter, among whose characteristics is the property of great water absorption. This



clay, at one time, covered most of Florida. When saturated, it swells and can form a layer through which water has difficulty penetrating. When ground water percolates through the surface mantle, clays, marls and phosphates are removed and are deposited in an impervious layer forming an aquiclude over thick layers of limestones, several thousands of feet in depth, which underlie almost the entire state of Florida. The limestones are porous layers formed during the Eocene. They and their impenetrable aquiclude form an artesian aquifer under the state of Florida. These limestone layers are said to contain more water than is held in all the Great Lakes put together (Marcus, 1975).

Sinkhole formation

Limestone is soluble in acid laden groundwater. The water enters the limestone through vertical fractures and areas in which the impermeable layer is discontinuous. It dissolves the limestone leaving tubes, channels, and caverns in the remaining limestone.

Sinkholes are formed when surface materials drop into hollow caverns in the subsurface limestone. Contrary to general opinion, they are not always formed through the cataclysmic collapse of a cavern roof. They are more commonly formed by a process called "revelling," in which surface materials collapse and are sucked into the hollow caverns that have been carved into the limestone layers. A "swallow hole" develops and becomes enlarged where running ground water enters a cavern at the juncture of two crossing fractures. Materials from the surface layers drop into the swallow hole creating a domed cavity above the aquiclude. The revelling process continues increasing the size of the dome in width and height, forming a shape that resembles an upright light bulb. Vibrations in the earth (caused by natural and human activity), movement of water below the cavity, and spalling of its sides enlarge the dome until the shear strength of the overburden cannot support it. Then all comes crashing down, falling, sliding and being sucked into the swallow hole. Movement of materials continues until the cavern in the limestone is filled or until the sides of the sinkhole reach a comfortable angle of repose.

Florida sinkholes

A review of precipitation records indicates a severe drought had occurred in the Orlando area in recent years. Many lakes had gone completely dry. In those months of dryness, a decided increase in water consumption occurred. The lack of rainfall necessitated a large use of water from city and private wells for watering lawns and for irrigation. The water pumped from the limestone aquifer caused a serious draw down, providing circumstances conducive to the formation of sinkholes. The removal of water decreased the cohesive quality of the soil, facilitating the collapse of revell cavities with their encompassing soils.

The Winter Park Sinkhole. On May 7, 1981, a Friday afternoon, a woman in Winter Park, Florida looked out her kitchen window in

time to see a 40 foot sycamore disappear into the ground. She describes it as going down with a "whoosh." Within a period of hours, a sinkhole had opened in the ground that measured approximately 350 feet in diameter, slightly longer on its east/west axis and slightly shorter on the north/south axis.

According to observers, the hole appeared to measure approximately 75 feet across, with perpendicular sides, after its initial collapse. The sycamore had been growing in the center of the area where the hole appeared. It widened over a period of hours and assumed the shape of a shallow bowl about 60 feet deep. In the center of the bowl a perpendicular swallow-hole could be seen. The limestone in this particular region lies 200 feet below the surface.

The area in which the sinkhole developed is historically known as Lake Menasen. It is situated in one of the lowest portions of the city. It is, at present time, a marshy area that drains surrounding blocks through a culvert system. Through time, much of it has been filled in by the city of Winter Park with landfill materials, refuse, and sands from borrow pits. The filling was done so that an apparently useless marsh could be converted to usable land. Parts of it were made stable enough to sell as commercial property. Much of it remained as marsh and the remainder was used as a public park. Two baseball diamonds and a swimming pool were constructed.

It is precisely the conversion from pure marsh to commercial fill-land and recreational property in a heavily populated area which led to the premature collapse of the sinkhole. Before its reclamation, the marsh most likely served as a recharge area for the limestone aquifer below. The collected water percolated gently through the aquiclude into the porous Floridian aquifer. Faulty construction of an olympic sized swimming pool lead directly to the catastrophic development of the Winter Park Sinkhole.

Swimming pools are constructed with a necessary drain placed in their deepest portions. The pool in Winter Park was done in like manner, except the drainage installation proved inadequate. It developed an enormous leak shortly after completion. It had been known for ten years that the pool was losing many gallons of water each day and the pool was refilled constantly. Because the pool was public property and the city owned the water supply, it was probably thought cheaper to fill the pool than to dig out and replace the drain assembly.

Two weeks before the sinkhole collapsed one of the pool caretakers discovered a slight subsidence in the soil around the south end of the pool. He probed with a long rod and felt a cavity in the soil below, but at the time did not realize the size or the seriousness of the cavity. He neglected to report it.

After the collapse of the sinkhole, a cave was discovered beneath the swimming pool that extended half its length and to a depth of twenty feet below its bottom. The leaking water from the drain area had carved a channel along the top of the Hawthorn layer southward to a point over the fissure created by the crossed fractures and down through a solution tube that had developed. A swallow hole enlarged in the limestone and, over it, a revell cavity opened up. A cavity shaped like an enlarging light bulb developed in the soft overburden. Heavy vehicular traffic, including large trucks, on the four lane highways that border the sinkhole area on three sides contributed a great amount of tremor to the subsurface sands, causing a continual sifting and spalling to occur. The leakage of many gallons of water per day removed the steadily sifting sands to the solution channel. When the thickness of the dome became too thin to bear the weight of the overburden, the structure collapsed and within hours filled the caverns in the limestone.

At the immediate opening of the revell hole, after the sycamore tree had dropped in, a precipitous cavity, not too large in diameter, was revealed. Within seconds, it continued to enlarge and in the hours that followed it opened to a diameter of around 325 feet. Four commercial businesses, one private dwelling, two streets, telephone cables, sewer pipes, water lines, three new automobiles and one camper disappeared into the hole. The pool remained cantilevered over its cavity until the next day when its structure could no longer hold the weight of the water contained in its bowl. Thousands of gallons of water were catapulted into the chasm creating even more instability and havoc. After a year and a half, the sinkhole was more or less stable and is filled with water within twenty feet of its rim.

Maracaibo Sinkhole. On July 5, 1982, in south Gainesville, Florida at the Maracaibo Apartments, a student complex, a cavity opened up in the parking lot. In the late evening, the blacktop began to settle beneath the wheels of a brand new Oldsmobile. By ten o'clock the front wheels of the auto were submerged in the pavement. Residents, observing the event, attempted to pull the car from the ground when

the pavement gave way and the car plummeted into the earth. The plunge ended with the car in a nose down position with its rear end 30 feet below the pavement. The front end of the vehicle wedged itself tightly into the swallow hole, thereby preventing any further sloughing of material into the hole. The next day more sand fell from the sides and completely covered the car. The car remains in the hole.

The circumstances leading to the formation of the Maracaibo sinkhole were similar to those that preceded the collapse of the Winter Park sinkhole. The area in which the Maracaibo apartments was built was a low area of subsidence in which there was evidence of sinkhole activity. All of the waters of that portion of south Gainesville drained into the lowland swamp. The builders brought in many loads of fill dirt, filling in the northern half of the swamp area. They recovered it and made it, or so they thought, a suitable foundation on which to construct an apartment complex. The fill raised the contour 25 feet above the original bottom of the swamp and rerouted the flow of drain water. Also, on the southern edge of the fill, a swimming pool was constructed and it, like the Winter Park pool, developed a leak in its drain. Many gallons of water were lost for a period of three years. No estimate was ever made as to the amount lost each day. It was noted that there was a substantial loss and the pool kept filled.

Engineers and sinkhole specialists determined that the surface of the limestone, at this point, was 40 feet below the parking lot. Leaking water from the swimming pool had worked its way downward and along the top of a thin aquiclude in a northward direction and opened a solution pipe in an area of two crossing fractures.

A rell cavity opened over the swallow hole and was aided in its enlargement by the movement of traffic in the parking lot causing ground tremor. The spalled and sifted sands were removed by the steady stream of pool drain water. The cavity continued to enlarge until nothing remained in the dome area except its blacktop roof. All that was needed for its collapse was the weight of a vehicle.

Fortunately, the Maracaibo sinkhole was not too large. The management had little difficulty having it filled. The automobile plugged the hole, stopping any further enlargement. Engineers plugged the hole with a mixture of cement and sand and topped it with asphalt.¹

Conclusion

In recent years, many other sinkholes have opened up in the Winter Haven, Castleberry, and Gainesville areas. The descriptions of these are beyond the scope of the current paper; but, their occurrences can all be attributed to the same causative factors as the sinkholes reported above. All developed mainly through redirection of surface water flow, leaking drainage, water and sewage systems and in many cases, heavy traffic in their vicinities. Nature provided the porous limestone, fractures, solution channels, and vacant caverns. All of these sinkholes may have developed in time, but, Man's cultural activity clearly hastened their advent.

References

- Marcus, Robert B. (1975). *Florida: A Geographical Approach*, (Dubuque, Iowa: Kendall/Hunt Publishing Co.), p. 64.

¹ The sinkhole at the Maracaibo apartments attracted many curious sightseers. Among them were hordes of reporters, television technicians, and experts of every kind. Much discussion ensued among these experts (some of which was pertinent and some of which was not). Many experiences were recounted to the reporters; among these was the revelation from a plumber employed by the city of Gainesville, Florida stating that the municipal pool at Westside Park has been losing a foot of water everyday for the past few years. No estimation was given as to the number of gallons, but the pool is of olympic size and the amount of one foot of drainage per day can be easily determined. Upon examination of the berm and the grassy areas to the south of the swimming pool a definite subsidence can be detected.

The pointing out of the leakage, the consequences of the water loss, the explanation of the soil subsidence, the warning of the disaster that appears imminent were all to no avail. No one with any responsibility feels that it can happen here. "Sinkholes," they say, "only happen under natural conditions."

Florida's Emerging Cultural Regions

Morton Winsberg
Department of Geography
Florida State University

During the era of mass migration into the United States, it was popular to refer to the nation as a "melting pot," where people of many cultures blended together and become "American." Today Florida is attracting huge numbers of immigrants, especially from Latin America, as well as retirees from elsewhere in the nation.

Regrettably, the evidence for Florida supports the *reverse* of a melting pot, at least in the geographical distribution of the various populations. From the manner in which the immigrant groups have been spreading over the state, it appears that culturally Florida is increasingly a lumpy stew, or perhaps even more descriptively, a layer cake, with concentrations of various groups becoming more distinct in different parts of the state (Table 1).

Whereas many social scientists believe the nation should strive to achieve a pluralistic society, one in which ethnic and racial groups live in harmony with each other while maintaining their cultural individuality, the majority of Floridians do not. In November of 1988, they voted overwhelmingly in favor of a bill making English the official language of the state.

Since Florida became a part of the United States, two large racial or ethnic minority populations entered to live among the numerically and economically dominant non-Hispanic white population: the blacks and the Hispanics. First came the blacks, brought as slaves to work on the farms of North Florida. That movement ended with the Civil War, and, since then, the increase in numbers of this group has been more through an excess of births over deaths than immigration into the state. Though Hispanics have been coming to the state since the middle of the last century, their arrival only assumed large proportions following the success of the 1959 Cuban Revolution. At that time, hundreds of thousands abandoned the island to settle in Florida. Since then, poverty and civil unrest throughout the Caribbean Basin have attracted hundreds of thousands more Hispanics to the state from many other nations.

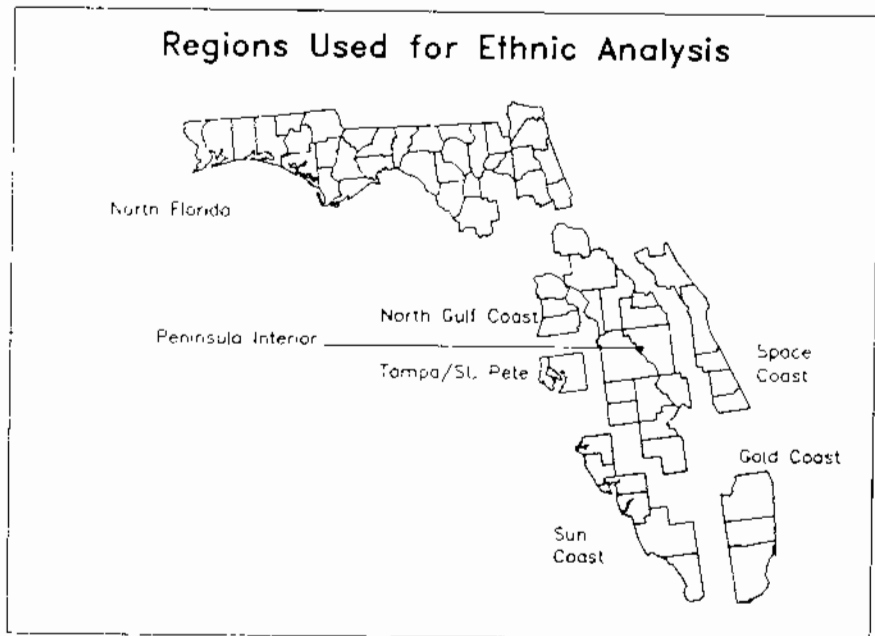
Table 1
 Percentage of Various Groups Living Within Florida Regions

	Black		Hispanic		non-Hispanic White Aged		non-Hispanic Whites		Total					
	70	80	70	80	70	80	70	80	70	80				
Tampa-St. Pete	11	10	6	5	9	19	19	64	66	62	100%	100%		
North Gulf Coast	4	3	2	1	2	28	29	32	67	64	100%	100%		
Sun Coast	8	7	6	4	5	28	24	25	60	65	100%	100%		
Peninsular Interior	17	14	13	2	4	5	10	12	13	71	70	69	100%	100%
Gold Coast	15	15	15	14	20	23	14	16	17	57	49	45	100%	100%
North Florida	19	18	17	1	2	1	6	8	9	74	72	73	100%	100%
Total	15	14	13	7	9	10	13	15	17	65	62	60	100%	100%

NOTE: 1970 and 1980 US Census. 1987 data for blacks and Hispanics based upon school enrollment figures for that year. For non-Hispanic aged and those under 65 years of age, the figures are based upon information from the Florida Statistical Abstract and 1980 census data.

Beginning after World War I, but increasing enormously after World War II, non-Hispanic white retirees began to arrive. Today, this population's share of Florida's total population is far higher than that of any other state in the nation. In 1970, blacks, Hispanics and the non-Hispanic white aged together constituted 35% of the state's population, but by 1987 it was estimated that the share had risen to 40%. In the later year, an estimated 13% of Florida's population was black, 10% Hispanic and 17% were non-Hispanic whites 65 years of age and older.

For purposes of simple geographical discussion, Florida has been divided into seven regions (Figure 1). All but the Peninsular Interior are entities with sufficient homogeneity that they have been recognized by others. The Peninsular Interior is large, and includes the rapidly growing area centered on Orlando as well as rural counties to the north and west of Lake Okeechobee whose population growth continues to be slow. So as not to fragment the state into too many regions for intelligent discussion it was decided to use as the criteria for inclusion the absence of a coastline.



The Gold Coast. When Florida began to attract white retirees, many chose to live on the Gold Coast (Dade, Broward and Palm Beach counties), and it soon held a greater share of that group than any other region. Later, the Gold Coast drew the majority of Hispanics entering the state, and within it most have chosen to live in Dade County (Miami). Since the 1960s, blacks as well began to immigrate in large numbers to Gold Coast counties, particularly Miami.

The degree of concentration of the Hispanics on the Gold Coast, as well as the magnitude of the migration, is most impressive. In 1970, the three counties within the region held nearly three-quarters of this group, a share which remained the same in 1987. During the 17-year period, their numbers in the three counties, however, increased from 328,421 to an estimated 856,000. Though blacks have not concentrated on the Gold Coast to the same degree, nonetheless the region's share of this group rose from 32% to 38% between 1970 and 1987. In large part this was due to blacks migrating from elsewhere in the United States, but many from the Caribbean, particularly Haiti, have come to live there.

The social problems which accompanied the rapid increase in Dade County's Hispanic and black communities quickly convinced many non-Hispanic white retirees that Greater Miami no longer was a desirable area in which to live. This precipitated a rapid redistribution of older people throughout the three counties. While, in 1970, Greater Miami still had a national reputation as a place of retirement and held 46 percent of the Gold Coast's non-Hispanic white aged, by 1987 it had lost most of its appeal, and held only 30 percent of that group. The entire Gold Coast appears to have lost a degree of its reputation as a retirement area. Between 1970 and 1987, its share of the state's non-Hispanic white aged fell by 3 percentage points.

North Florida. North Florida, until well after World War II had most of the state's blacks, and in some counties they were in the majority. Since 1950 a decline in the need for agricultural workers throughout the region has motivated many blacks to leave, mainly to large cities both in Florida and elsewhere. Although the black population of most North Florida counties continues to increase slowly, the non-Hispanic white population, particularly those less than 65 years of age, has grown far more rapidly. The result is that in many rural North Florida counties the black population has lost relative importance

within the total population. Only in the region's two large industrial counties, Escambia (Pensacola) and Duval (Jacksonville) has their share actually increased. Seven North Florida counties which, in 1970, had shares of blacks in their populations above the state average, by 1987 had percentages below the state average. It might further be added that North Florida counties are not attracting retirees as rapidly as many on the Peninsula, and the percentage of the state's non-Hispanic white aged living there in 1987 was lower than in 1970. Few Hispanics have found this region inviting.

The non-Hispanic white aged since 1970 have rapidly concentrated in a number of counties within the middle half of the Peninsula. In an effort to avoid the urban social disintegration of counties with large minority populations, they mainly have been selecting counties on either the Gulf of Mexico or the Atlantic with small cities. The arrival of many retirees to these counties overwhelmed the slowly growing black communities, and today, blacks constitute a far smaller share of the total population than they did in 1970. Few Hispanics have ever lived in those counties which have recently become attractive to the aged.

The evolution of Florida into this lumpy social stew, rather than the national ideal of a homogenous milk shake, further exacerbates a state political environment already noted for its regional divisiveness. As different parts of Florida develop distinct mixtures of the major elements within the state's population, one can predict increasingly greater acrimony in Tallahassee as elected officials from the various regions fight to win economic and social benefits for their constituents.

St. Leo, Florida: A Catholic Anomaly in Protestant "Cracker" Country

*Harry J. Schaleman, Jr.
University of South Florida*

*Dewey M. Stowers, Jr.
University of South Florida*

Located in west central Florida, St. Leo, the town, and St. Leo, the College lie approximately 25 miles north of the Tampa Bay metropolitan area and 65 miles west of Orlando. Both are located in the San Antonio area and are historically part of the original district settlement plan. Remote from the urban environment, St. Leo captures the calm and serenity of rural Florida. In an area of rolling hills, wooded countryside, and spring-fed lakes, an interesting religious community took root a century ago. St. Leo: the Abbey, College, Priory and Town, was recently designated a National Catholic Historic Site (Figures 1 and 2).

On February 15, 1881, the Feast of St. Jovita (a second century Italian martyr about whom very little is known), Judge Edmund F. Dunne, a former Chief Justice of the Arizona Territory, and his cousin Captain Hugh, rode on horseback to a hill overlooking the lush wilderness of an area in west central Florida. Judge Dunne had been commissioned by Hamilton Disston, owner of four million acres in Florida, to represent him with the state authorities in the choice of lands for development. For his efforts on behalf of Disston, Dunne, an Irish Catholic, was to receive 50,000 acres of land upon which he intended to establish a Catholic colony. Upon his arrival, and following the acquisition of a resident priest, the settlement began to attract Irish Catholic families. His efforts earned him the nickname "O'Dunne."



Figure 1

Dunne envisioned an octagonal plan of farm villages interspersed with forest and agricultural areas, all approximately two and a half miles from a central village to be named San Antonio (Hendley, 1941, 13). He planned San Antonio in honor of St. Anthony of Padua.

Reminiscent of many European communities, the settlement incorporated a central public square as well as areas set aside for schools, a monastery, a convent, and an orphanage (Figure 3). In the square today stands a shrine to the patron saint. Nearby, at the far end of the green, is St. Anthony Catholic Church and adjoining Catholic School. The midpoint of the colony is southwest of Lake Jovita (Clear Lake on Federal maps). Lime and castor bean trees, planted by Dunne from seeds he procured from Sicily and Egypt, lined the Palma Christi Road leading outward from San Antonio to the other villages in the colony. The community of St. Phillip (San Felipe in Figure 3) disappeared in a few years, but St. Thomas and Carmel survived until the turn of the century. Each village had a post office and a church (Dayton, 1978, 2).

Before the arrival of Dunne, the area was largely uninhabited, with the exception of a few Protestant "crackers," such as the

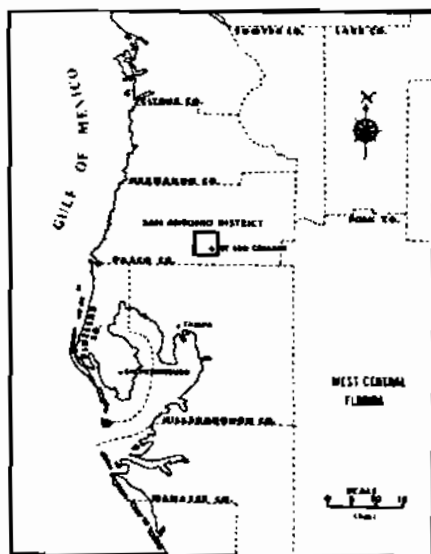


Figure 2

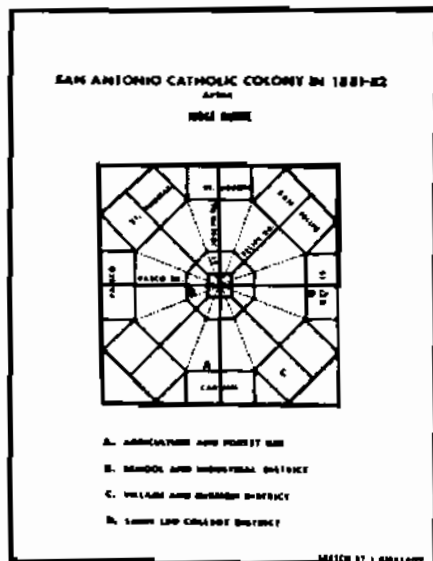


Figure 3

Osburns, Platts, Tuckers, Wischers; and these generally accepted the newly-arrived Catholics. Many even attended church with the Catholics since there was no established Protestant church in the area. Until the late 1880's, San Antonio was isolated, the only means of transportation being an oxcart or wagon. It was located in what was then known as Hernando County, later to become Pasco County. The nearest port was Tampa, 30 miles distant, and the closest railroad connection was 40 miles from San Antonio in Wildwood, Florida.

The census of the colony by June 16, 1883, was 130 and grew to 500 by 1885. There were no blacks except at a mission for blacks in St. Thomas. At the time approximately 800 Catholic blacks lived in all of Florida (Dayton, 1978, 2).

By 1883, San Antonio was well established with several stores, a barn-like church, and a school. By 1884, Dunne had created a newspaper called *The San Antonio Herald*. The wealthy, well educated physician, Dr. Joseph Corrigan owned a palatial home that he had constructed himself. Although the house was completely destroyed by fire in 1915, the palm trees lining Dr. Corrigan's driveway still stand intact. A Justice of the Peace, Judge John Flannagan, lived in a huge Victorian-style home, which still stands today. Judge Dunne resided in a book-filled cabin on the hill at the present site of the St. Leo Abbey.

Alfred Mame and his sons described, in *Un Francais Dans la Florida, 1890*, their trip through remote wild, areas of the state. The descriptions of poverty and primitive conditions surrounding the San Antonio enclave and the colonists' attempts to form an oasis of civilization in the midst of the wilderness provide a background of knowledge about the early years of the colony. According to Mame, the only church then serving the colony was a barn with a crude cross, a lantern, and a bell attached to its roof. Mame was amazed that his host, Judge Dunne, had an excellent library and was an extremely well-educated gentleman who was fluent in French, Italian, and Greek--although "weak" in German, such weakness being "in common with us French, (and) one more reason to like him." Mame notes that the population in 1890 consisted of twenty Frenchmen, one hundred Germans, and two hundred Irishmen. Land sold for \$2.50 an acre and was available within the enclave only to the Catholics, but

the land surrounding the octagon could be purchased for a higher price by the Protestants (Mame, 1975, 2).

The year 1887 brought further changes to the colony. Pasco County was formed from Hernando County. The South Florida Railway was constructed to pass through Dade City enroute to St. Petersburg for connections with the Orange Belt Railway, thereby enabling the shipment of citrus from San Antonio to northern markets. The town of St. Leo was founded when Judge Dunne donated his land to the Order of St. Benedict in 1889. A small group of monks led by Father Charles Mohr, O.S.B. from Belmont Abbey in the Carolinas arrived to establish a monastery and a Catholic school to serve immigrants who settled in Central Florida. A large building designed to house the monastery, school, and church was built, and the groves that had been planted by Dunne were supplemented. With the advent of the railway to San Antonio, new settlers continued to arrive. In 1889, a bank was established in San Antonio, with the citrus industry providing the principal source of revenue for the young colony. At this time, the Benedictine Sisters arrived to establish a private girls school. Their convent, Holy Name, was in the Sultenfuss Hotel (located on the north end of the town square) before the building was moved by mule train to the hilltop where the Holy Name Priory now stands.

In 1891, St. Leo became the first incorporated city in Pasco County. In 1894, St. Leo became independent from its Mother House in Pennsylvania and, by consent of Pope Pius IX, all missions in Florida were turned over to the Benedictine Order. The education that St. Leo students received during the early days was at the level that would be designated now as "high school" and "junior college." The school was fully accredited and provided the degree of "Masters of Accounts." Although initially a military school to instill discipline and train the youth of the area for protection of the colony, St. Leo gradually abandoned its military aspects during the early twentieth century, as it evolved from preparatory school to an independent Catholic college.

While St. Leo was being formed, the Barthle family led some Catholic immigrants from the German Empire to the area and founded the village of St. Joseph. Here a small board-and-batten church was built and dedicated to the Sacred Heart of Jesus. Because of the economic hardships at home in Europe, many German Catholics were attracted to this new Catholic colony in America. As new settlers arrived in

increasing numbers, the name of the local newspaper was changed in 1896 to the *Florida Staats Zeitung* (Dayton, 1977, 13). As St. Leo received more German settlers, the ethnic composition changed from its original predominantly Irish character.

A severe freeze in 1895 caused citrus damage of immense proportions, killing many small Florida towns that had been dependent upon the citrus industry. As citrus was the main source of income for St. Leo, it behooved the German settlers to experiment with a wide variety of other crops. They had limited success in growing strawberries. The area became a strawberry center, but the citrus industry was resumed and flourished in spite of later freezes, superseding the strawberry industry in that area.

The Pope raised the status of St. Leo to that of Benedictine Abbey in 1906. At the time, three Catholic orders existed in Florida--the Josephites, the Jesuits, and the Benedictines. By 1912, St. Scholastica Hall at the Holy Name Convent was completed with Brother Anthony Poiger as the architect of both the convent and the Abbey. Both buildings still exist today.

The Abbey Church, Lombardic-Romanesque in design and focal point of the college campus, is often referred to as "the church that was built with orange juice" because it was financed partially by profits from the Abbey citrus groves. It was built over a 12-year period (1936-1948) and incorporates many wooden appointments of red cedar from the Abbey grounds, as well as numerous locally fired, stained glass windows adorned with illustrations and figures of religious significance. Constructed of handmade limestone bricks, the structure culminates in a sturdy square tower capped by red-tile roof, and dominates the hill-studded lake landscape of Pasco County.

Before World War I the enclave retained its German character. Florida, like many other areas of the United States, harbored strong anti-German sentiment during the war. The anti-Catholic movement in Florida, led by former Baptist minister, Governor Sidney Catts, also caused many settlers to move to more friendly areas. A rumor attributed to Governor Catts was that the German monks of St. Leo had an arsenal and were plotting to arm local blacks in order to stage a revolt in support of Kaiser Wilhelm II. After the insurrection, according to the rumor, the Pope would take over Florida, move the Vatican to San Antonio, and close all Protestant churches. Abbot

Charles, then in charge of St. Leo, published a rebuttal to this rumor in the form of a volume entitled *Those Murderous Monks of Pasco County, Florida* and slyly listed the author as being *one of them*.

In 1926, during the Florida land boom, San Antonio was reorganized as the "City of Lake Jovita," and its boundaries were extended. Judge Dunne's street names were changed: e.g., Sacred Heart became Rhode Island Avenue; Pope Pius IX Avenue was now called Curley Street. Later, during the Depression years, the town reverted to its original name of San Antonio and withdrew its city limits to the section lines of Dunne's 1881 plan, where the boundaries have remained to the present day.

St. Leo continued to operate as a college preparatory school for approximately 800 boys until the 1960's. Approximately 400 girls were enrolled in the Holy Name Academy. The institution gradually became a coeducational liberal arts college during the 1960's, operating on a non-profit basis. St. Leo College then was operated by a lay board of trustees, and by 1965 employed only three monks in the entire college. Today, the Catholic college serves nearly 6,000 students in resident and off-campus programs (*Tampa Tribune*, September 4, 1977).

The Abbey's accomplishments are many and varied. The Fathers of St. Leo began missionary activity prior to 1900, establishing the Isle of Pines Mission in Cuba. The Priory Printing Company, later called the Abbey Printing Company and today known as the Abbey Press, evolved from the newspaper, *Florida Staats Zeitung*. Other projects of the colony include an on-campus carpentry shop, a ceramics shop, an art studio, a saw mill, a power house, and a branch station of the Weather Bureau which was operated by the brothers until the late 1970's. A packing house for the citrus products is also located on the campus. Many visitors to the area enjoy the "Grotto of Lourdes" shrine created by a local Tampa sculptor.

The first stage of St. Leo's twenty-year building was a monastic wing, a library, a dormitory, and classrooms. In 1962, the second stage--the William P. Mc.Donald Center, a \$500,000 building housing a cafeteria, a student lounge, service offices, a barbershop, a snack bar, and a post office was built. A third dormitory, an administration building, and a gymnasium have been added, financed by the citrus industry and other projects of St. Leo.

The campus today is relatively compact with modern functional architecture most prevalent. The science building and gift shop/security offices structures flank the gateway entrance with the Theater Building at the far end of a tree-lined drive. The men's dormitories are centrally located on campus, but the women's housing is more remote and closer to the Abbey Church area. Across the main highway is the St. Leo Golf Course.

Of the 900 acres owned by the Catholic Church, 240 acres comprise the college, pastures, and related structures and recreational facilities, such as the swimming pool, tennis courts, and ball diamonds. A substantial portion of St. Leo's present income is derived from its "Pilgrim Center," a retreat founded in 1975 for use by both the Catholics and non-Catholics. Over 50 acres of woods, lakefront, and scenic walkways create an atmosphere where modern pilgrims can meditate, relax, and enjoy the peace and tranquility of nature and their faith. Retreats, seminars, workshops, and pastoral conferences are conducted all year to meet the needs of groups and individuals. Group marriage encounters are also held on the site.

Over half the present community of St. Leo are more than fifty-seven years old; many are retired Brothers who are physically unable to contribute the labor necessary to maintain the ground and groves. Few young men of today are interested in leading the monastic life and therefore the enclave is undergoing a "shrinking" process with future status uncertain. According to Brother Bernard, a cigar-smoking, jovial sixty-five-year-old monk wearing "cut-offs" (*Tampa Tribune*, September 4, 1977), the population of St. Leo at that time was 1300. By 1985, the population was listed in the *Florida Statistical Abstract* as 955. Father Fidelis Dunlap, the fourth Abbot to lead St. Leo since its inception, was still presiding.

The most prestigious member of the St. Leo colony has probably been Father Jerome who was born March 18, 1885. Father Jerome was a scholar, a poet, a researcher, a horticulturalist and authority on tropical plants, an author, a Florida historian, and a collector of rare books. He received the State Historical Award on August 30, 1966, just prior to his death in September of that same year, for his book *La Floride* which is considered to be the most scholarly work on early Spanish Florida History. According to an article in the *Tampa Tribune* on June 23, 1963, Father Jerome was a ninety-eight pound, five-and-a-half foot "pint-sized package of piety," with a feisty

manner and a thoroughly delightful sense of humor and personality. Father Jerome was responsible for introducing many varieties of citrus to St. Leo. The Abbey Library houses his Floridiana, including copies of all Florida books published within the past 200 years, recordings of eminent singers during the 1890's, and a collection of marine mollusks. This library also now includes several examples of early Seminole Indian pottery.

Today, the annual highlight in nearby San Antonio is the "San Antonio Rattlesnake Roundup," whereby the reptiles are removed from the area but are not harmed. Thousands of visitors from the urban Tampa Bay area arrive for this festival and participate in "mud slings" and square dancing. The San Antonio community is still the local area's largest and has a city commission of three members and a police force totalling five (*Tampa Tribune*, January 15, 1978).

A community with strong agricultural ties, Judge Dunne's Catholic Colony is now an enclave comprising the cities of San Antonio, St. Leo, the unincorporated village of St. Joseph, and miles of orange trees and pastureland. The Catholic church still plays a central role in the life of the community, as was envisioned in 1881 by Judge Dunne, its architect and founder. A successful combination of geography and history, St. Leo is today an interesting educational oasis amid a prosperous rural countryside.

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Book Reviews

Rudloe, Jack (1988). *The Wilderness Coast: Adventures of a Gulf Coast Naturalist*. (New York, NY. Truman Books) 262 pp., \$22.50

To most Americans, Florida is Miami and Miami Vice, retired people and Disney World. *The Wilderness Coast* introduces the reader to another Florida, the West or Gulf Coast. Rudloe aptly describes this area when he writes "The eastern Gulf of Mexico which extends from the Florida Keys north and west to Mobile Bay, has some of the richest and most diverse wild coastline left in the continental United States" (p. 3).

Jack Rudloe is a biological-specimen collector and researcher. This book relates many of his memorable adventures while collecting and studying marine organisms. Although most of the stories deal with the Gulf Coast, one expedition strays to Surinam and another to Cape Canaveral. The interesting, informative and well-written vignettes introduce the reader to alligators, sea turtles, mullet, toad fish, sawfish, rays, sharks, horseshoe crabs, lobsters, octopi, worms, and giant sea roaches. Rudloe's excitement about this wilderness coast and its relatively unknown biota are strongly conveyed in his writings.

The Wilderness Coast is richly illustrated by Julia Damon Hanway's line drawings and map as well as nineteen black and white photographs of fair to good quality. Unfortunately, the map lettering is unclear in my copy. The photographs taken by Anne Rudloe were particularly good, but many of the photographs are from the public relations files or organizations. I would rather see more of the photos taken by Anne and Jack Rudloe. Photograph 15 is of an osprey, with a caption about the impact of DDT on osprey populations, but it is not relevant to the text.

I have two major complaints with the book. First, I believe that the book needs a list of significant references on the wilderness coast. Rudloe has whetted our interests in learning more about this area and its biota but what are some sources of information? Secondly, I think that Rudloe stopped too soon. The book needs a synthesis chapter telling the reader what all these adventures mean to this wild coast. What is the state of knowledge about the Gulf and its resources, how is resource management affected and what about threats from pollution, increasing population and economic development, particularly from oil, gas and chemical manufacturing and tourism. Surely Rudloe should make a plea for preservation of unique and critical habitats and species of the Gulf Coast. I am not sure from

reading the book whether Jack Rudloe is interested in environmental protection and restoration or he just assumes that environmental destruction is inevitable. From his interview on National Public Radio (July 1988), I know that the author does have strong environmental leanings.

The Wilderness Coast is an excellent chronicle of the trials and tribulations of field research, particularly when a researcher is forced to counterpoise limited time and money, environmental conditions, and physical discomfort and danger with gaining additional knowledge or that "last bit of data"-- choices that all field workers are forced to make. It is very interesting and enjoyable reading and I would recommend the book to academics and the general public. This book would be useful as supplementary reading in a coastal geography, marine biology, or field methods class.

Thomas J. Eley
Department of Earth and Atmospheric Sciences
The University of West Florida

THE FLORIDA

GEOGRAPHER



The Florida Society of Geographers was chartered in 1964 as a non-profit organization for the purpose of furthering professionalism in geography through application of geographic techniques in all areas of education, government, and business in Florida.

The Society supports these objectives by promoting acquaintance and discussion among its members and with scholars and practitioners in related fields by stimulating research and field investigation, by encouraging publication of scholarly studies, and by performing services to aid the advancement of its members and the field of geography in Florida.

The Society holds meetings once a year, usually in February. At this meeting, papers are presented and matters of mutual concern are discussed. Meetings move geographically to different parts of the state and always include field trips to allow participants to gain first hand knowledge through field experience.

Persons interested in membership in the Florida Society of Geographers should contact:

Ira M. Sheskin
Editor, *The Florida Geographer*
Department of Geography, Box 248152
University of Miami
Coral Gables, Florida 33124

Regular membership is \$10 per calendar year; student membership is \$5. Membership includes a subscription to this journal.

From the Editor



The Florida Geographer is the official publication of the Florida Society of Geographers and is distributed free to members of the Society. It is a state-wide journal, with coverage of geographical topics relating to the state. Manuscripts should deal with some social science or physical geography aspect or include Florida as an important component of a larger study.

Manuscripts are solicited from all who feel they have research worthy of dissemination. For stylistic requirements, see the articles in the present number, but authors should not be dissuaded from submitting articles for review because of format considerations.

It is expected that authors will submit the final copy of the paper on an IBM-compatible diskette (3.5" or 5.25") in either normal or high density format. Wordperfect files are preferred; if not, please save your files in ASCII (DOS text file) format.



This is my first issue as the Editor of *The Florida Geographer*. We all owe a debt of gratitude to David Lee of the Department of Geography at Florida Atlantic University for his many years of fine service.

A number of years ago, Dave moved the journal from the typewriter to the word processor. Time marches on, and as is obvious from this issue, we now have the ability to desktop publish using Wordperfect 5.0, and HP LaserJet printer and an HP ScanJet. In addition, Mapmaster is available to generate high quality maps of the US by state, Florida by County and Florida by 5-digit zip code. We also have the ability to do any type of "business graphics," including bar charts, pie charts, line graphics, etc.

Ira M. Sheskin
Editor, *The Florida Geographer*
Department of Geography, Box 248152
University of Miami
Coral Gables, Florida 33124