AN IDIOSYNCRATIC HISTORY OF FLORIDIAN VERTEBRATE PALEONTOLOGY

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The history of vertebrate paleontology of Florida is reviewed, analyzed, and compared and contrasted to that of North America as a whole. Simpson's (1942) organization of the history of the subject for North America into six periods is modified and extended to fit the special case of Florida. The beginning of vertebrate paleontology in Florida is shown to have trailed that of the continent in general by at least a century and a half, and its advancement to have lagged at every period by several decades for most of its history, but to have accelerated dramatically in recent decades, resulting in integration and equality, if not superiority, for Florida at present and for the future.

Key Words: Florida; history; vertebrate paleontology; Joseph Leidy

INTRODUCTION

Unaccustomed as I am to public speaking, this printed paper results from an evolutionary series of four oral presentations, the first and last of which were stimulated specifically by David Webb. At Dave's invitation, the first of these, entitled "Joseph Leidy, the Peace River, and 100 years of Pleistocene vertebrate paleontology in Florida," was addressed to the Florida Paleontological Society at its field excursion on the Peace River and meeting in Arcadia on 22-23 April 1989, commemorating the centennial of Joseph Leidy's (1889a-c) landmark publications on vertebrate fossils from Peace Creek and elsewhere in Florida. The second, modified to emphasize the role in Florida of Joseph Leidy and the Wagner Free Institute of Science, Philadelphia, was presented on 19 October 1991 at that institution, in a combined ceremony to dedicate it as a National Historic Landmark and to commemorate the centennial of the death of Joseph Leidy, President of the Wagner's faculty from 1885. The third, entitled "Joseph Leidy, Ernest Lundelius, and Vertebrate Paleontology; now, then, and later," was presented on 13 November 1998 at the University of Texas, Austin, where the talk was modified to celebrate Ernie's retirement by drawing parallels between Leidy and Lundelius in principle and in practice. The fourth and final presentation, broadened to encompass "An Idiosyncratic History of Floridian Vertebrate Paleontology," was made at Bruce MacFadden's invitation on 10 May 2003 at the University of Florida, Gainesville, in honor of Dave Webb upon his retirement. Thus, anything that might possibly qualify as a contribution in these talks and this paper is attributable directly to Dave's stimulus.

My intent here is to concentrate on the history of the subject in Florida, with emphasis on the Peace River and Joseph Leidy, but with enough general background to place those topics and Dave Webb into broad context. In order to impart some structure to my historical ramblings I have turned to George Gaylord Simpson's (1942) pioneering paper on "The beginnings of vertebrate paleontology in North America," for which he received the Lewis Medal of the American Philosophical Society. Not only is that work valuable in general, but also Simpson may justifiably be regarded as the founder and principal practitioner of one major period in the development of the subject. Further, he had and continues to have profound specific impact on Floridian vertebrate paleontology through his own research from 1928 to 1942, through Dave Webb's service on the board of the SIMROE Foundation from 1980 to 1984, and by donation in 1985 of the Simpson Library to the Florida State Museum (Florida Museum of Natural History since 1988). Dave Webb's arrival in Florida four decades ago will be shown to have been the key factor not only in weaving Florida at last into the fabric of North American vertebrate paleontology, but also in bringing Florida to the fore in advancement of the subject in North America generally.

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Simpson (1942:131) proposed a sequence of six periods, and suggested a seventh, to characterize the development of vertebrate paleontology in North America. I have already published elsewhere (Ray 2001:13-14) my quibbles with his outline and his application of it, but it remains a very useful scheme for North America as a whole, and as such warrants reproduction here, as follows:

> 1. *Pre-scientific Period*.—From the earliest times to about 1762. The first fossil discoveries were made. Toward the end of the period bones were collected and sent to Europe. No truly scientific study of them had been made.
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> 2. *Proto-scientific Period*.—From about 1762 to about 1799. In 1762 Daubenton read a paper on American fossils treating them for the first time in what deserves to be called a scientific way. Vertebrate paleontology was not yet a true science, but basic methods were being invented and sporadically applied. Collections were slowly accumulating.
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> 3. *Pioneer Scientific Period*.—About 1799 to about 1842. In 1799 the first able technical study by an American (Wistar) was published. In Europe this was the epoch of Cuvier, who organized the subject as a true and defined science. Harlan and others in America applied Cuvierian methods and theories to increasingly large collections of fossils. The date 1842 is arbitrary, chosen partly because of the even century since elapsed, but it marked the approximate end of Harlan's career and shortly preceded the beginning of Leidy's.
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> 4. *First Classic Period*.—About 1842 to about 1865. In America the subject was dominated by Leidy, in Europe by Owen. The descriptive science was well established on a comparative anatomical and taxonomic basis, but still lacked the guiding principle of phylogeny. The flood of western discovery began.
>
> 5. *Second Classic Period*.—About 1865 to about 1895. Paleontology became evolutionary and developed the theories of phylogeny. Cope and Marsh were the dominant figures in America, although Leidy continued to work until 1890 and numerous other students entered the field. This was a golden age of discovery when most of the major fossil fields of the continent were found.
>
> 6. *Modern Period*.—Since about 1895. This has been a period of democratization in which great figures like Scott, Matthew, and Osborn were surrounded by increasing numbers of professional research students and the classic centers of study were supplemented by the rise of many others. Discovery is unabated, but better knowledge of previously known faunas, improvement and diversification of means and subjects of study, and unification and synthesis are characteristic.
>
> It is possible that future historians will find that a *sixth* [sic!—seventh] period began about 1930 or during the following decade, for vertebrate paleontology seems to be undergoing another radical transformation, but the outcome cannot now be determined and this is, in any case, beyond the scope of the present enquiry.

Simpson's suggestion of a seventh period is seen in retrospect to have been wellfounded, characterized by application of the new synthesis in evolution with its biological species concept, and application of quantitative techniques to analysis of vastly increasing collections. Here should be mentioned the advent (early in this period), evolution, and wide application of wet sieving techniques for collecting small vertebrates (e.g., McKenna et al. 1994), which have both made possible and necessitated thinking in terms of populations, as well as producing fossils from "barren" strata. Simpson was himself the chief architect of this seventh period and its leading practitioner (a large topic, well introduced by Gingerich 1986, Laporte 2000, Cain 2003, and Hagen 2003). His work established the paradigm to be emulated by every student for a long interval from about 1930 through perhaps the 1970s. Following Simpson's terminology, that seventh period might be called the *Second Modern Period*, but with equal justification, the *Simpsonian Period*. We are now well into an eighth (postmodern?) period, characterized by Hennigian philosophy, cladistic methodology, computer technology (including the barely tapped computed tomography and morphometrics), and isotope studies, for example. I would reiterate Simpson's final paragraph above, and refrain from suggesting a starting point, which could vary widely depending in part on whether onset or dominance of factors is given the greater weight. In any case it is unnecessary for my present purpose, which is to use Simpson's outline as a jumping-off point for history of

the subject specific to Florida.

In this, as in so much of its history, Florida stands apart, both in reality and in romantic conception. In the beginning years of Spanish exploration "La Florida" was thought to be the island of flowers and was the object of the aging King Ferdinand's search for rejuvenation (Fuson 2000:83,115,118-119). People continue to seek the fountain of youth (see for example, Purdy 1991:179; fig. 72c) in this alluring almost-tropical almost-island. Its delight has been its detriment by retarding comprehension of its relationship to the rest of the world. The tendency to view the vertebrate fossils of Florida as isolated bits of buried treasure has persisted for a long time, contributing significantly to the late maturing of the subject and to the need for a modified set of periods to fit its history. Undoubtedly Simpson was aware of all this but could scarcely have addressed it within the confines of his continent-wide outline.

It may be useful to outline my proposed scheme for Florida, with suggested timetable, for comparison and contrast with Simpson's system for North America:

1. *Pre-scientific Period*.—From the earliest times to about 1762. Characterized only by a few fossils recorded from Indian archaeological sites.

2. *Proto-scientific Period*.—From 1762 to about 1842. The year 1762 has no significance for Florida at which time there was no activity; thus the boundary between Periods 1 and 2 is immaterial, unless or until early specimens are discovered in European collections. The first glimmerings of discovery occurred late in this Period.

3. *Pioneer Scientific Period*.—1842 to 1865 (with one peripheral publication in 1875). This period began in Florida exactly when it ended elsewhere, and is represented by only meager collecting and publication.

4. *First Classic Period*.—1881 to 1896. Dominated, in part posthumously, by Joseph Leidy in Florida as in North America as a whole, but delayed by some 40 years. Significant collections began to accumulate at last, in Philadelphia and Washington, accompanied by descriptive publications, substantial in number and content.

5. *Second Classic Period*.—1907 to 1928. Spearheaded by Sellards at the Florida Geological Survey; stimulated by Early Man discoveries, especially Vero, leading to entry of several major workers, notably O. P. Hay. Still trailing North America by decades, and separated from First Classic Period by hiatus (the last) of more than a decade.

6. *First Modern Period* (or *Simpsonian Period*).—1928 to 1963. Initiated and dominated by Simpson. Great expansion of collections and number of researchers and publications; application of new synthesis in evolution and quantitative techniques (including wet sieving for small vertebrates).
Divided by World War II into two distinct epochs:
A. *Paternalistic or Colonial Epoch*.—1928 to about 1942-1947. Characterized by northern dominance, expeditionary collecting, removal of collections from Florida.
B. *Endemic Epoch*.—about 1950 to 1963. Characterized by waning and finally end of external dominance. Rebirth of activity at Florida Geological Survey, and birth and development of activity at University of Florida, both with resident collections, research, and publication.

7. *Second Modern Period* (or *Webbian Period*).—1 July 1964 to present. The only period for which the beginning can be pinpointed to an exact day, Dave Webb's first day in Gainesville. Characterized by explosive growth in collections, facilities, cosmopolitan research, teaching, staff, public programs, and application of new techniques; with major advances in biostratigraphy and correlation.

More than passing note should be made of the fact that two of the Periods in Florida, as in the continent, were initiated and dominated by Leidy and Simpson, two universal giants in the history of vertebrate paleontology. Surely this reflects their recognition of the value of Florida's fossils.

THE FIRST THREE PERIODS, FROM THE BEGINNING TO 1881

Simpson's first three periods—1. Pre-scientific, 2. Proto-scientific, 3. Pioneer Scientific—are scarcely relevant to Florida, where all together they have such meager content as hardly to warrant definition, except to extend their end point some 40 years from Simpson's 1842 to the early 1880s. In the Pre-scientific Period,

pre-Columbian Indians did gather some fossil shark teeth for ceremonial and/or practical purposes (Steinen 1982:74; Purdy 1991:70). Further, in his pioneering archaeological investigations (see du Toit 1986:39), Wyman (1875:81) noted remains of fossil mammals (horse, "ox," mastodon, mammoth, manatee) in four Indian shell mounds along the St. John's River, redeposited "whether by accident or design." For the Proto-scientific Period there is to my knowledge no evidence of vertebrate fossils having reached European museums or naturalists in colonial days, although one may continue to hope that such might yet be identified in surviving natural history cabinets, especially in Spain or possibly Italy. Although I have been unable to verify it, the earliest allusion to a vertebrate fossil from Florida is said to date from 1823, for mastodon remains from Silver Springs.

Then, a decade later, Shepard (1833:164) reported as follows, "When at St. Mary's, in Georgia, I was presented with a small collection of bones, fossils and pebbles, from the famous Suannee spring in Florida; and which had been brought up from the bottom by diving. They principally consisted of fragments of the teeth and bones of the Sea Cow, (*Manatus americanus*,) among which are portions of the rib, whose greatest diameter is one and a half inches, and fragments of teeth above an inch long….But the most interesting portion of this collection consisted of the teeth of the shark, spines of the Echinus, and the palates of fishes, one of which is of a form to me entirely new, and another closely resembling, if not identical with, Fig. 5, of *Palais de differentes espèces de poissons inconnus*, in the *Dictionnaire des Sciences Naturelles*."

The specimens alluded to in "Fig. 5" are myliobatid ray dental plates; thus there is no reason to doubt that Shepard had similar specimens in hand, as they are common in the Miocene deposits of the Suwannee River basin (Morgan 1989:33,43).

With these meager exceptions, Florida remained essentially terra incognita paleontologically for some 3 ½ centuries after Columbus while North America as a whole participated fully in the development of vertebrate paleontology, as documented by Simpson (1942, 1943b) and Ray (1983, 1987, 2001).

Timothy Conrad's expedition in the winter of 1842 may well be taken as the beginning of the Pioneer Scientific Period in Florida, coinciding with its end for the continent as a whole. He travelled aboard the steamer Poinsett, with stops at Savannah, the St. John's River, and elsewhere, en route to its survey of Tampa Bay. His trip was on behalf of the National Institute "in order to furnish its cabinet with specimens of the rocks, fossils, and recent shells of Florida" (Conrad 1846:37). He mentioned: "bones of the *Manatus*…occasionally found in the bluff" near Sarasota Point, forming the southern cape at the entrance of Manatee River (p. 44); fossil sharks' teeth a few miles up the Manatee River (p. 45); "black water-worn bones of mammalia" and "a specimen of the large shark's tooth (*Carcharias megalodon*), a species occurring also in North Carolina" (p. 45-46).

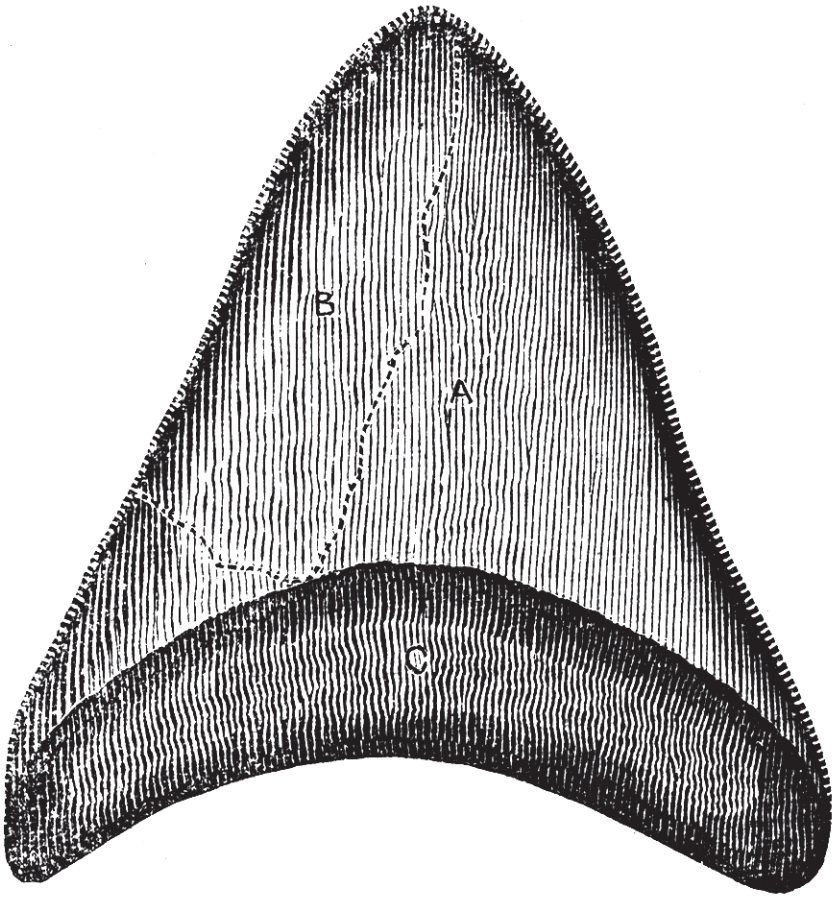
John H. Allen (1846), while stationed in Florida with the U.S. Army, also made observations on the geology of Tampa Bay, including marl beds near Fort Brooke, where he saw "dug out of it bones of the *Manatus* or sea cow" (p. 41). Probably also dating from the 1840s was the "mastodon tooth, from Marianna, Fla. Walter Younge, N.C.," listed in a catalog of the National Institute among specimens exhibited in its case 18 (Gilmore 1941:10-11). This specimen should have been among those transferred to the Smithsonian Institution in 1858, but neither it nor any attributable to Conrad have as yet been recognized in the National Museum of Natural History.

George W. Rains (1850), Brevet Captain, U.S. Army, noted abundant remains of mammoth, mastodon, giant tortoise, giant shark (the first illustrated vertebrate fossil from Florida; Fig. 1), and other animals from Pease [sic] Creek. Then, in 1854, Captain John C. Casey also of the U.S. Army, donated "fossil teeth of mastodon and sharks from Florida" to the Smithsonian Institution (Ninth Annual Report, 1855:39,43; mistakenly noted as donated in 1855 by Gilmore 1941:346).

Meanwhile, elsewhere in Florida, more than a century of largely ignominious history of investigation of early man was inaugurated in 1848 by Pourtales (Agassiz 1853; Lyell 1863:44-45) through his discovery of human bones near old Enterprise, Lake Monroe, on the St. John's River, mistakenly thought by some to have come from coral beds 10,000 years old (corrected by Pourtales 1869). Wyman (1875:18-19) found bones possibly of the same individual, in the sandstone underlying the shell heap, and thought them to be of no great antiquity.

Conrad (1865) made one further allusion to vertebrate fossils in Florida; in reporting on Eocene invertebrates from Ocala, he stated "In this rock no doubt occurs *Carcharodon angustidens*, Agass., of which I obtained a specimen at Tampa Bay, Florida." There are said to be perhaps two additional early notices of vertebrate fossils from Florida, one possibly from Wakulla Springs, dating from the 1840s or 1850s, but I have been

Shark's Tooth found in Pease Creek, East Florida :—



A, is a half size of a shark's tooth, re-produced from B, the fragment found : the enamel on this is perfect. C, root of the tooth.— The shark to which this tooth belonged was probably 90 feet long.

Figure 1. – Tooth of *Carcharodon megalodon* from Pease [sic] Creek, mostly restored, reproduced from Rains (1850) with his caption; the first vertebrate fossil from Florida to be illustrated, more than 150 years after the first from North America otherwise (Ray 2001:7). Note that his figure is reminiscent of that of Scheuchzer, published in 1708 (Ray 2001: fig. 6a). Approximately x1 (enlarged from Rains' half size).

unable to verify these.

FIRST CLASSIC PERIOD, 1881-1896

Following the few modest contributions through 1865 of the Pioneer Scientific Period, there was a hiatus until after 1880 when the First Classic Period began in Florida, belated by some four decades. Probably not by chance, this hiatus and continuing lag coincided with the dismal days following the War Between the States, from which Florida was especially slow to recover (Blakey 1973:13). The great advances made after 1880 resulted from the happy interplay of several semi-independent but related circumstances. These included economic development and the timely emergence of appropriate institutions and individuals in the right places.

Economic development was stimulated by increased activity of the federal government, primarily through the U.S. Army and its Corps of Engineers, beginning with its survey in 1880-1881 for a contemplated steamboat route to connect the St. John's River with Charlotte Harbor or Pease [sic] Creek (Gillmore 1882). This work placed educated men on the ground in the persons of army officers and engineers, some of whom, most notably Capt. John Francis Le Baron, took active interest in fossils, and in the existence and potential commercial value of the phosphate deposits of Pease Creek. Although the steamboat route never materialized, the surveys contributed decisively to the first extensive fossil collecting subsequent to Rains'(1850) initial report 30 years earlier, and to exploitation of the phosphates.

This may be the appropriate point at which to note the derivation of the name Peace River, often rendered "Pease Creek" in the nineteenth century. Its importance in the history of Floridian vertebrate paleontology warrants quotation of J. Clarence Simpson's (1956:114-115) statement in full:

> TOLOPCHOPKO (PEACE RIVER) (See TALAK HATCHEE)
> (PEACE RIVER, U.S.G.B.)
>
> The aboriginal name for a stream now more commonly known as Peace River, which rises in Lake Hancock in Polk County, and discharges into Charlotte Harbor.
>
> Fleuve Pacis. . . . . Le Moyne Map, 1591
> Charlotte River . . . . . Romans claimed discovery, but omitted name ex map
> Tolopchopko or Peace River . . . . . Bradford Map, 1835
> Talakchopko or Peace Creek . . . . Taylor Map, 1839
> Talahkchopko Hatchee or Peas Creek . . .Bruff Map, 1846
>
> The Seminole name, Talahk Chopko Hatchee, or "River of Long Peas", is derived from the Creek Talako = peas, Chapke = long, and Hatchee = stream. The word combination designates cow peas or black-eyed peas. The Contemporary translations frequently employed the obsolete collective plural "pease", thereby giving rise to an interesting coincidental homonymous confusion, as the name means "Pease" River.
> On the other hand, the name R. de la Paz appears at the head of an unnamed bay on the West Coast on the Hernando Colon map of 1527 (Lowery, 1901:1-146). This probably honors the appellation of some member of either Ponce de Leon's expedition along the West Coast or of one still earlier, rather than a commemoration of some forgotten pact of amity. Identification of this stream with the Rio de la Paz and the Fleuve Pacis affords a problem as great as the identification of the Bay of Espiritu Santo.

John F. Le Baron discovered river pebble phosphates along the Peace River in May 1881 and sent samples to Spencer Fullerton Baird at the Smithsonian Institution. Baird urged him to do more geology in the area, but his commanding officer denied the request. Le Baron took a leave of absence in 1882-1883 and tried unsuccessfully to interest investors in the phosphate deposits. He visited the area again in 1886-1887, to no immediate avail commercially (Blakey 1973:19-21). His interest in the Peace River during those years did result in his sending important collections of fossils to the Smithsonian, the first arriving on 10 October 1881. The accession records for that decade contain extensive documentation of the interaction between Baird and Le Baron. Filed with that first historic accession (No. 10597) is a statement by Le Baron, in part as follows:

> From about the mouth of the Little Charley Apopka down to tide water the sand bars abounded in fossils, among which I found numerous teeth of sharks and other fishes, saurians and numerous reptilian coprolites and fossil wood. In several places we found portions of the skeletons of the fossil elephant

> (Elephas Columbi) in one case nearly entire. Numerous teeth of the mammoth occurred in the sandbars. I also found the entire skeleton of a large turtle 38 inches x 14 inches…, which is believed by Prof. Baird to be a new species. I collected several barrels of these fossil remains intending to forward them to the Smithsonian Institution at Washington, but half of them were lost at the mouth of Peace Creek by the swamping of one of our boats by which accident two of my men nearly lost their lives. These fossil bones were generally in an excellent state of preservation. A pelvis nearly entire measured 43 x 36 inches. We found the jaw bones still containing the molar teeth, also nearly all the other parts of the skeleton. These mammoth remains were found on and in a thin layer of what appeared like diluvial drift gravel which covered the limerock….This region would well repay a more careful and extended examination than I had time to give, and it is not improbable that valuable phosphatic beds may occur here.

Others collected fossils on the Peace River (Walker 1884) during the same period and carried out sporadic investigations of the phosphate deposits. The Peace River Phosphate Company was formed in 1887 and furtively bought miles of riverfront property. The great Florida phosphate rush was well underway by 1890, with all the excesses of any boom, well characterized by Blakey (1973:18-44 especially), but it did result in greatly increased population, transportation, and wealth. Another Army engineer, who had served under Le Baron, was the Pennsylvanian, T. S. Moorehead, who started the Arcadia Phosphate Company, which seems to have been the first to start mining, in 1888. Moorehead was acquainted with fellow Pennsylvanian Joseph Willcox through whom he contributed fossils to the Wagner Free Institute of Science of Philadelphia—specimens ultimately studied by Leidy.

Joseph Willcox, a somewhat shadowy figure (Spamer & Forster 1988:29-32), was a longtime member of the Academy of Natural Sciences and trustee of the Wagner Free Institute of Science from 1878 to his death in 1918. He was closely associated with Joseph Leidy at both institutions, and with William Healey Dall of the U. S. Geological Survey, Smithsonian Institution, and the Wagner. He had a long personal interest in Florida, where he spent his winters; he accompanied Angelo Heilprin on the first Wagner Institute scientific expedition to Florida in 1886, resulting in Heilprin's historic publication (1887). He was responsible for much of the material on which Dall based his monumental studies of fossil mollusks of Florida (e.g., Dall 1892:141). His persistent activity in Florida contrary to Heilprin's wishes (letter, Heilprin to Leidy, 21 January 1889, Academy of Natural Sciences Archives), unquestionably contributed to the continuing concentration there on the part of the Wagner Free Institute of Science and Joseph Leidy (see for example, Warren 1998:216).

Space does not permit a full account here of the Wagner Free Institute of Science, for which Garman (1941) and Spamer and Forster (1988) may be consulted, but its importance for Floridian paleontology and its role as showcase for Joseph Leidy demand at least brief commentary. To understand these things, it is necessary to understand something of the character of Philadelphia. It was for a long time the continent's largest population center. It was dominant politically, economically, intellectually, and scientifically. It was and is both progressive and conservative, patrician and plebeian. It is the site of the Declaration of Independence, the American Philosophical Society, and the Academy of Natural Sciences. It has a continuing thread of culture, learning, and science for Everyman. A sense of this remarkable legacy can be had from Vogel (1991). The word "free" is frequent in its institutional names, as in its "free" library. That is taken for granted by us now, but at the time that Wagner began his enterprise entrance to the British Museum remained very restricted.

William Wagner (1796-1885) and his Free Institute reflect much of the history and character of Philadelphia. He traveled extensively in a successful business career that enabled him to build a collection in natural history, a lifelong interest. He retired in 1840, started giving free lectures at his home in 1847, chartered his institute in 1855, and after delay in construction caused by the Civil War, opened the present building and resumed free lectures in 1865. The building and free lectures continue to the present.

The building (Fig. 2) is simple to the point of austerity, capacious, built of brick faced with stucco, with huge windows, and a roof supported by wooden trusses. Its exhibit hall is patterned after the Jardin des Plantes in Paris, its lecture hall after that at the Smithsonian (long since demolished). It includes a library (now housed in a new wing) and laboratory. It was designated a National Historic Landmark in 1991, the centennial of Leidy's death.

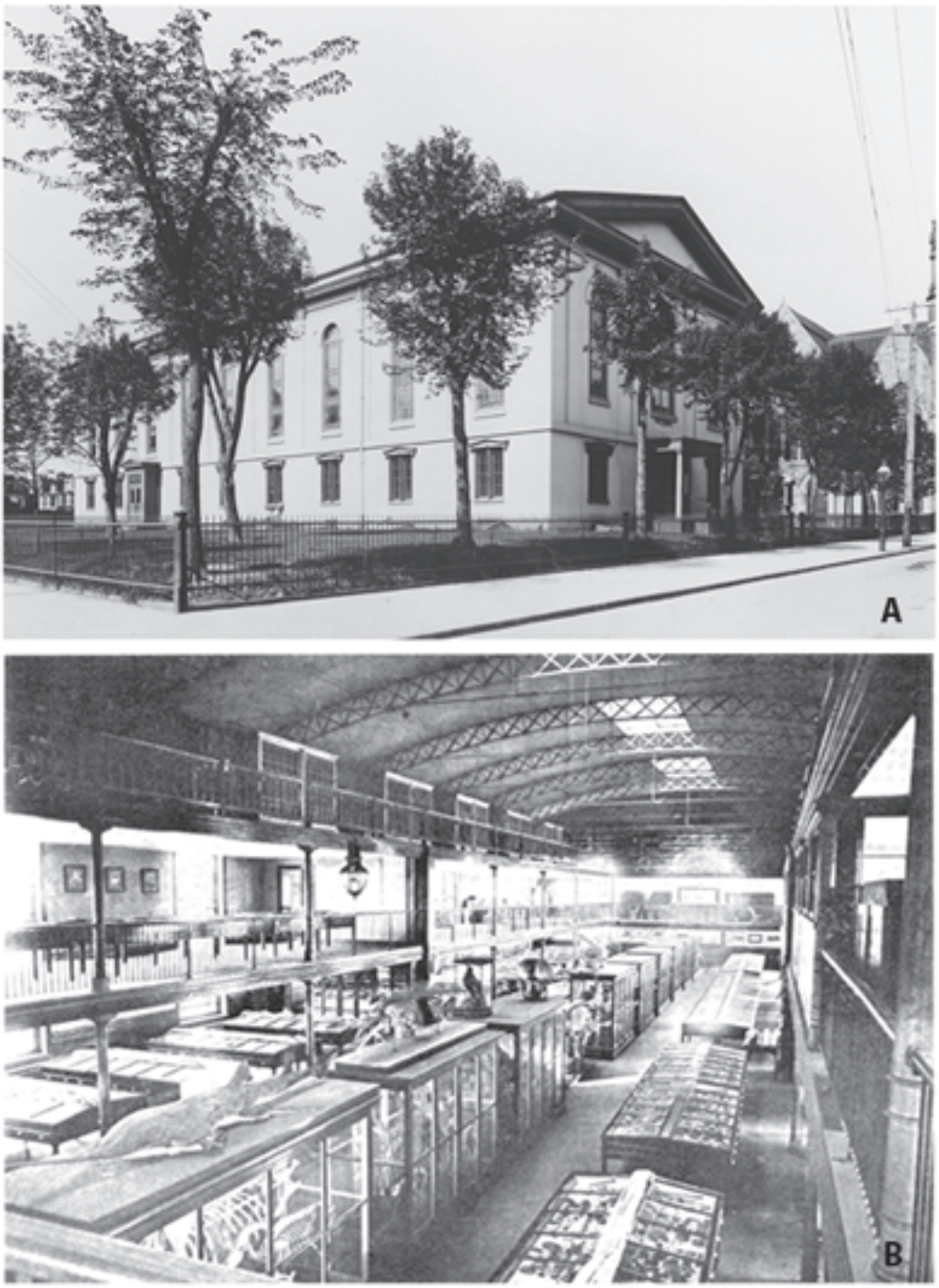


Figure 2. – The Wagner Free Institute of Science, 1700 West Montgomery Avenue, Philadelphia. A, view of exterior, ca. 1900, and, B, view of exhibition gallery, ca. 1910. Courtesy of Wagner Free Institute of Science.

At Wagner's death in 1885, direction of the Institute passed to a Board of Trustees who selected Joseph Leidy as President of its faculty, which he continued to his death in 1891. In addition to continuing the public lectures, Leidy gave more of a research impetus to the Institute's programs. He promoted the arrangement with William Healey Dall that resulted in his monumental publications on Tertiary mollusks of Florida. He greatly enlarged the collections through purchase and sponsored expeditions, including Angelo Heilprin's famous explorations in Florida in 1886. Heilprin also organized the collections under Leidy's direction, and the halls opened in 1891. They remain today almost exactly as you would have seen them then, as does the lecture hall, all with the imprint of Leidy's hand, preserved as if under a bell jar. The Institute should be visited as a shrine to Leidy by every vertebrate paleontologist.

At the Wagner as elsewhere Leidy had to cope with Cope, who did collect some dinosaur remains in the west for the Wagner. Needless to say it did not go smoothly—there was much wrangling over the bill (Spamer & Forster 1988:17-19). At one point Cope offered to bestow himself and his collections on the Institute, outlining how he would make it overnight into the greatest institution of its kind in the world if they would but give him the money.

In 1890, with Leidy's approval, the Wagner considered publishing work offered by Cope. Dall, based on prior experience, warned that they would have to impose strict limitation on pages and illustrations, must have a completed manuscript before starting to print, and must allow no revisions. The publication never materialized.

Cope undoubtedly would have brought the Wagner to ruin just as he already had done with his personal means. He was a fatally flawed genius, at times brilliant in his insights, nervously energetic, recklessly irresponsible, with no patience toward any perceived reticence. Leidy certainly blocked Cope's precipitous pathway both at the Academy and at the Wagner, and learned to be wary of him (he did sometimes withhold information and specimens from him). Yet he supported him financially and professionally even at a late date after Cope had crowded him pretty much out of paleontology; when Cope was in extreme distress Leidy got him appointed to lecture both at the University of Pennsylvania and the Wagner.

W.S.W. Ruschenberger, who was Leidy's predecessor (to 1881) as President of the Academy, complained that Leidy was soft on Cope and Heilprin, the young Turks who wanted to change the Academy, while Cope criticized Leidy for weak support of the proposed reforms (see Rainger 1992:20-29, and Warren 1998:208-212, for details). Leidy steered an evenhanded course while being pummeled from both sides.

He was so far able to maintain relations with Cope that Cope specified in his will that his cremated remains be placed alongside those of his friend Joseph Leidy. Still it was Marsh who was a pallbearer at Leidy's funeral.

Joseph Leidy (1823-1891; Fig. 3) dominated research and publication of the First Classic Period in Florida, just as he had for the continent as a whole 40 years earlier. The story of his career in general cannot be done justice here and has nowhere yet been done justice in print, but its main features have been adequately covered by Osborn (1913), Rainger (1992), Glassman et al. (1993) and Warren (1998). For my limited purpose here, which is to provide essential background and context for understanding and appreciating his role in Florida, it is enough to note that he was and is the founding giant of scientific vertebrate paleontology in North America, that he was the ideal person, perfectly placed and available at the key moment in history, for the founding and first flourishing of scientific vertebrate paleontology in Florida, and to note just a few general highlights to impart an inkling of his greatness: Professor of Anatomy, University of Philadelphia, 1853-1891; offered appointments at Harvard, 1874, and Princeton, 1880; Director, Department of Biology, University of Pennsylvania, 1884; Texts on Human Anatomy, 1861, 1889; Surgeon to Satterlee Military Hospital, Philadelphia, in the Civil War, resulting in published reports on autopsies, 1870-1879; lifelong studies in microscopy and parasitology, resulting in his rhizopod monograph, 1879; accepted Darwinian evolution immediately and promoted Darwin's election in 1860 to membership in the Academy of Natural Sciences, the first such recognition in North America (Numbers 1998:30-31); founding member of National Academy of Sciences, 1863; numerous honors conferred by societies and universities (Osborn 1913:368-369).

His status as the founding giant of scientific vertebrate paleontology in North America has been detailed by Osborn (1913:356-366). In one of his masterpieces on the subject (Leidy 1869:viii) Leidy (with Hayden) stated a working principle that characterized his scientific work in all fields throughout his career, "The present work is intended as a record of facts…a contribution to the great inventory of nature. No attempt has been made

Figure 3. – Joseph Leidy, 22 May 1889, in what was probably his last formal portrait, as he appeared during the Floridian phase of his career, specifically at the time of publication of his principal Peace Creek paper (Leidy 1889c). Courtesy of the Academy of Natural Sciences of Philadelphia.

at generalizations or theories which might attract the momentary attention and admiration of the scientific community….We have endeavored to see and represent things correctly, nothing more…."

Further, Osborn (1913:367) quoted him as stating "I am too busy to theorize or to make money. The time will come when such investigations as I may add from time to time may prove of value, and I believe I can do more good to science in adding some new facts than in preparing articles for popular treatises."

His lifelong adherence to these expressed preferences has been the main source of the only substantial criticisms of his science. It seems human nature to focus on what others have not done rather than on what even the greatest have in fact accomplished. Thus, Warren (1998: 216), in a generally favorable biography of Leidy, commented on Leidy's layout of the exhibits at the Wagner as follows, "Unfortunately, the entire enterprise was founded on longheld notions from the past, both in its minimal theoretical component and in its descriptive methodology. The new, expensive, experimental science, practiced by the most able and imaginative people, seemed to be ignored."

Further, under the heading "The Eclipse of Leidy," Warren's (1998:246) summation included the following, "His descriptive research, though brilliant, was old-fashioned and outmoded, even in his lifetime, involving no risk or controversy, and he missed the transition to modern, experimental science, because change meant uncertainty." And later, on page 252, "We end up faulting Leidy for what he was not and what he failed to do—that is, become a modern, experimental scientist."

No, I am sorry, this just will not do—unless historical, descriptive, observational science was no longer worth doing say in 1890, or even worse, today. In the first place, experimental science was not new in Leidy's time, but had been well-defined and widely practiced at least since the seventeenth century (Boyle 1661 is a good starting point). Of greatest relevance here, Warren's criterion would require that Leidy have abandoned vertebrate paleontology and start in some other discipline, within experimental science, in order to achieve lasting greatness. I maintain that Leidy could step comfortably into the next annual meeting of the Society of Vertebrate Paleontology—the showcase for a robust science practiced by ever increasing numbers of able and imaginative people, who not only apply a broad spectrum of new tools and techniques of observation and analysis (not significantly experimental), but also all the time-honored ones as well. He would remain today a model to be emulated for accurate observation and lucid description—gifts that remain as important and as elusive as ever.

Considering that ours is a generally ahistorical culture, I think that Leidy is scarcely in eclipse within vertebrate paleontology, but is well recognized for his monumental contributions, as are Cope and Marsh. Cope made good copy for the popular press in his day and today, not for his great contributions, but for his outrageous behavior and great flaws (Rowland 2003). On his own, Marsh would have been almost as uninteresting as Leidy to the media, where he was and is known, if at all, as part of "Cope-Marsh." If Warholian notoriety is the measure of success, then vertebrate paleontology is hardly the pathway to it.

Returning now more directly to Leidy's pathway toward his Floridian phase, he had been actively associated with the Academy of Natural Sciences of Philadelphia throughout his career, from 1845 to his death: from 1848 as Chairman of Curators, and from 1881 as President. There he had as a matter of course received for study all vertebrate fossils from Baird at the Smithsonian Institution at least since 1852; following William Wagner's death, he assumed the presidency of the Wagner Free Institute of Science in 1885.

Perhaps most importantly, Leidy had by 1875 all but abandoned research in vertebrate paleontology. Cope and Marsh had each begun in the west in 1868, were at full speed by 1872, and already in heated conflict. Leidy's comments on the Cope-Marsh factor have been widely quoted, but may be repeated here as germane to the topic at hand. Sir Archibald Geikie visited Leidy in 1879 and later recorded the following comments by Leidy (Osborn 1913:365), "Formerly every fossil one found in the States came to me, for nobody else cared to study such things; but now Professors Marsh and Cope, with long purses, offer money for what used to come to me for nothing, and in that respect I cannot compete with them. So now, as I get nothing, I have gone back to my microscope and my Rhizopods and make myself busy and happy with them."

Less widely known is his statement to his young protégé, William Berryman Scott (1924:438), "I can't stand this fighting. It disgusts me and I am going to drop paleontology and have nothing more to do with it because of the way Marsh and Cope are in each other's wool all the time." Leidy did not quite follow through in that resolve, and the West's loss was Florida's gain. The new collections from Florida, beginning in 1881, and flowing to Leidy for a decade through the Academy, the

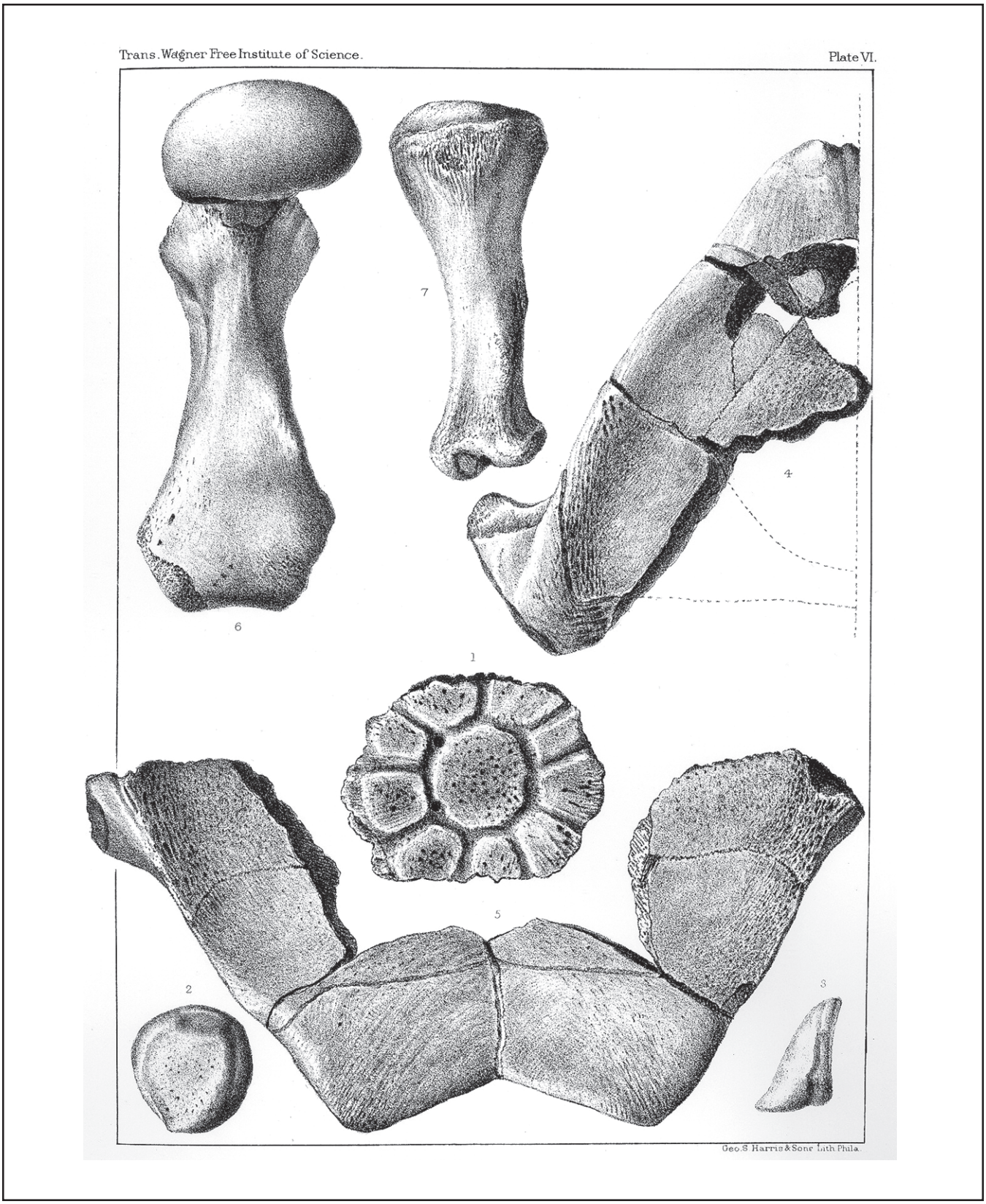


Figure 4. Reproduction of Plate VI, representing bones of glyptodont and giant tortoise, from Leidy (1889c), his most important publication on Peace Creek. Approximately x1.

Smithsonian, and the Wagner, gave him a new lease on life in vertebrate paleontology and gave Florida its belated but brilliant beginning, most spectacularly with Leidy's (1889c) comprehensive and well illustrated (Fig. 4) study of the vertebrates from Peace Creek, the first major source of vertebrate fossils from Florida, and still productive today (Hulbert et al. 2004), and the river is the object of frequent collecting trips by amateurs (e.g., the North Carolina Fossil Club, on 8 February 2003; Brown 1988:44, and elsewhere; Renz 1999: 50, and throughout; 2002:56-62, 101, 112-115, 117, 118).

Fortunately, neither Cope nor Marsh exerted significant impact on Florida, preoccupied as they were each in outdoing the other west of the Mississippi River. Cope was the greater threat, as he was close at hand in Philadelphia and had for many years sought an active role at the Wagner. In 1873, when ill in the field, and thinking himself near death, Cope made a hasty will, in which he proposed that his library and collections should go to the Wagner along with an endowed professorship, all superseded in later wills (Davidson 1997:67, 198, 199). Ultimately, his only direct intrusion upon Floridian vertebrate paleontology was his comparison of the faunal lists of the Alachua clays with his Loup Fork fauna (Cope 1892). Had his ambitions toward Florida and the Wagner Institute materialized, one can only suppose that strife if not ruin would have ensued. On the other hand, Marsh's only action related to Florida known to me was a positive one; as paleontologist to the U.S. Geological Survey he instigated John Bell Hatcher's collecting in the Alachua clays (Leidy 1890), collections ultimately available to Leidy and Lucas for the final landmark publication of the First Classic Period (Leidy 1896; Lucas 1896).

As far as I know, Leidy's first mention in print of vertebrate fossils from Florida was published in 1883, based on specimens collected by Le Baron on Peace Creek in 1881 and forwarded to Leidy by Baird. At a meeting of the Academy of Natural Sciences in 1882 Leidy commented on two bones of a modern type of horse "discovered in association with remains of the elephant, *Elephas columbi*, and a huge turtle remarkable for the thickness of its shell…"(Leidy 1883). This was the first of at least a dozen short notices published in the Proceedings of the Academy through 1890 (see Ray 1957:45-46). Meanwhile he published more lengthy studies of Floridian fossils in the Transactions of the Wagner Free Institute, including, besides his Peace Creek paper (Leidy 1889c), a review of previous finds of fossil human remains with additional records (Leidy 1889a) and his description of *Smilodon floridanus* (Leidy 1889b). His last two titles in vertebrate paleontology were about Floridian fossils, posthumously published. The first of these, published in Dall (1892:129-130), consisted of faunal lists for the Alachua Clays, Peace Creek, and the Caloosahatchie [sic] River, with comments on correlation, obviously submitted to Dall prior to Leidy's death in 1891, as Dall (1892) alluded to Leidy as if living. The second and final publication was a very substantial descriptive contribution on the fauna of the Alachua clays, edited and supplemented by Frederic Augustus Lucas, then of the Smithsonian Institution (Leidy 1896; Lucas 1896). This was a fitting last work by Leidy and a proud participation for the Wagner and the Smithsonian, constituting a milestone marking the close of the First Classic Period in Floridian vertebrate paleontology (coinciding with the end of the Second Classic Period in the rest of the continent), a period created almost alone by Leidy as a final chapter in an illustrious career. Incidentally, he would have been much gratified that the rhinoceroses from those deposits form much of the basis for a modern demographic study (Mihlbachler 2003).

THE SECOND CLASSIC PERIOD, 1907-1929

Following Leidy's auspicious beginning, which placed Florida irrevocably on the vertebrate paleontological map, there was yet another hiatus of more than a decade. This was terminated in June 1907 through the appointment of Elias H. Sellards as first director of the modern Florida Geological Survey (Lane 1998), followed almost immediately by appointment of his former student at the University of Florida, Herman Gunter, as his assistant (Sellards 1908:11). Both men had lifelong active interest in vertebrate paleontology. Sellards discussed vertebrates in his first annual report (1908:23-25) and cited most of the prior literature in his bibliography of Florida geology (1908:73-108). Sellards' Florida years coincided with development of hard-rock phosphate mining in northern Florida and pebble phosphate mining in central Florida, with important impact on development of Floridian vertebrate paleontology (see, e.g., Sellards 1913, 1915). Sellards thus was the founder of the Second Classic Period, who not only encouraged collecting and research by others, but also himself published some 20 titles explicitly on vertebrate fossils, including humans, and several substantial descriptive papers, including new taxa and/or new material of a tortoise, crocodilian, stork, edentate, horse, tapir, and wolf. It is significant I think that these were the first collections, studies, and publications to be Florida-based, even though most of those things left Florida again in 1919 when Sellards left for a

long career in Texas. There, among his other contributions, he oversaw in the 1930s the amassing of great collections of vertebrate fossils under the WPA program of the federal government. Herman Gunter made plans for similar work in Florida, but quietly scuttled the program when he learned that it was to be the object of graft in Tallahassee (Gunter, personal communication, 1956). Had the plan materialized, the history of the First Modern Period in Florida would have been very different.

The greatest boost to Floridian vertebrate paleontology during the Second Classic Period came as a by-product of the notoriety and controversy associated with discovery of human remains at Vero (and later at Melbourne). In significant part because of the authoritarian opposition by Aleš Hrdlièka to allowing humans of such antiquity in the western hemisphere, it seemed for a time that every geologist and anthropologist with pretentions to stature had to express his opinion on Vero Man in print, with the result that Vero probably still retains the title for most articles pertaining to a single vertebrate fossil site in Florida—more than 125 (Ray 1957:91-94; Morgan 1985). This excitement undoubtedly was the major factor in drawing Floridian fossil vertebrates to the attention of scientists of wide reputation, including Glover Allen, J. W. Gidley, C. W. Gilmore, O. P. Hay, F. B. Loomis, C. C. Mook, H. F. Osborn, and R. W. Shufeldt; most extensively O. P. Hay, with more than two dozen descriptive papers based in whole or large part on Floridian specimens (see entries for all of these authors in Ray 1957). After Sellards, this work and the collections were relocated mostly from Florida to the Northeast.

THE FIRST MODERN PERIOD, 1930-1963

The pattern established in the Second Classic Period after Sellards' departure continued strongly through most of the First Modern Period, characterized by dominance of the northeastern establishment, with expeditionary or paid collecting and non-resident research. As for timing, it should be recalled that Simpson's Modern Period for North America had begun in 1895, and that he suggested a seventh, unnamed period beginning about 1930. Our First Modern Period for Florida, beginning about 1930, more than three decades behind the continent, might well be termed the Simpsonian Period, specifically because of his major contributions on Florida from 1928 to 1942, and generally because his entire work incorporated the principles of the new synthesis in evolution, the biological species concept, quantitative techniques, and a cosmopolitan viewpoint in biogeography—all of the factors constituting the research paradigm at least through my own generation of training (lasting well into the 1960s; see Gingerich 1986, for insightful analysis of Simpson's work including that in Florida; see also Cain 2003).

There was however another persistent thread that ran conspicuously and continuously through the fabric of this period, which is the Paternalistic or Colonial factor, especially strong prior to World War II. One can not fully understand this major phase in development of Floridian vertebrate paleontology without comprehension of this factor, which was interwoven with the everlasting exotic aura of Florida. I will try to meld the Simpsonian and Paternal-Colonial factors together, along with the impact of World War II, which caused a wellmarked subdivision of this period into two epochs.

Simpson's work was the innovative force that dominated the pre-war epoch. He published some 15 papers entirely or in large part devoted to Floridian material, from 1928 through 1945 (Ray 1957:57-58). The research for the last of these was, however, completed in 1942 prior to his departure for army service, and the manuscript finished by E. H. Colbert (Simpson 1945:39). Simpson's extensive Floridian experience undoubtedly contributed substantially to at least two additional papers of broader scope: one (Simpson 1936) assessing the reliability of one rich mammalian fauna (the Bridger Eocene) as an indicator of the continental fauna of the time, by comparing the modern faunas of two widely separated and dissimilar areas (Florida and New Mexico, both states of major early interest for Simpson); and the other (Simpson 1943a) demolishing Joleaud's imposing but ill-founded *Hipparion* land bridge, inspired by Joleaud's superficial knowledge of Floridian hipparionine horses, and doomed by Simpson's specific knowledge of them.

Simpson's research on Floridian materials was based largely on Pleistocene collections made by W. W. Holmes for the American Museum of Natural History. Also, he was the first to publish on fossils from the early Miocene Thomas Farm site (Simpson 1932). These had been discovered in 1931 by Clarence Simpson of the Florida Geological Survey, in talings from a well dug in Gilchrist County. Florida has long been, and continues to be, fortunate in the contributions of people other than professional paleontologists. Besides Le Baron and contemporaries in the 1880s, there were notably Holmes, Clarence Simpson, and C. P. Singleton in the 1920s and early 1930s; and many to follow (see, for example,

Brown 1988:182-196). Singleton was the principal collector of the Pleistocene Melbourne fauna, under the aegis of F. B. Loomis at Amherst College, J. W. Gidley at the Smithsonian, and Thomas Barbour at Harvard's Museum of Comparative Zoology (MCZ).

Barbour personifies the paternal-colonial tradition. He was a practicing herpetologist, general naturalist, and Director of the MCZ. His wealthy family had long maintained a winter home in Florida. He knew and loved Florida and vigorously promoted study of its natural history at MCZ. He purchased the Thomas Farm in 1939 and deeded it to the University of Florida, with the proviso that the MCZ and the Florida Geological Survey could also collect fossils from the site. From then through the early 1950s, excepting the peak war years, a small party from the MCZ spent part of every spring in Florida, concentrating mainly on Thomas Farm but usually with side trips to collect in the Ichetucknee River and the Bone Valley district. In the pre-war years, virtually all collecting at Thomas Farm (for many years the only extensive Tertiary vertebrate fauna in the East) was by the MCZ, and Theodore White was the main researcher. Although he published some useful work in at least 10 papers (Ray 1957:63), White continued the long tradition of Florida's peninsularity, describing new, endemic taxa to confirm its separateness.

Others who contributed substantially to the growing knowledge of Florida's fossil vertebrates during the pre-war epoch of the First Modern Period include Glover M. Allen, Edwin H. Colbert, G. M. Conrad, Joseph T. Gregory, William K. Gregory, H. James Gut, Remington Kellogg, Barbara Lawrence, Henry Fairfield Osborn, Alexander Wetmore, and Albert E. Wood—all from the northeastern establishment except Gut, an avid amateur, sometime mayor of Sanford, Florida, and the primary collector and student of the Reddick Pleistocene fauna, among others (see Ray 1957, for citations).

Of great importance for collections, but not reflected in publication until much later, was the field work by the Frick Laboratories of the American Museum of Natural History, New York, beginning in 1939 with Morris Skinner's relocation of the Mixson locality, followed by field work led by Ted Galusha during the winters of 1939 through 1942, that produced major results including discovery and development of the middle Pleistocene McLeod Pit (Evander, personal communication, 2005).

The post-war Endemic Epoch saw gradual changes brought on by an expanding economy, booming higher education, job opportunities, and collections growth in regional centers. The Florida Geological Survey became re-energized when Herman Gunter was able to realize a longstanding goal by hiring Stanley J. Olsen as vertebrate paleontologist in 1956. Stan Olsen had been Alfred S. Romer's laboratory and field chief at the MCZ, and a leader of the MCZ post-war field work in Florida. He established an energetic program in Tallahassee, publishing more than a dozen papers, mostly on carnivores, in the 1950s and 1960s. That program ended abruptly in 1968 when he switched to his other great interest, zooarchaeology, which he pursued with great vigor first at Florida State University through 1972, then at the University of Arizona until his death on 23 December 2003. While in Tallahassee, he enabled me to get my first experience in Florida by spending the summer of 1956 working with him, including field trips to Griscom Plantation, Wakulla Springs, Thomas Farm, Ichetucknee River, and Saber Tooth Cave (where we all contracted histoplasmosis). At the MCZ I had already become well acquainted with Floridian fossils through preparation and study under Ernest Williams' supervision of existing collections from Thomas Farm, Ichetucknee River, Reddick, Bone Valley, and Melbourne.

Meanwhile, Florida-based collecting and research also became established at the University of Florida in Gainesville, where Robert S. Bader was on staff briefly in the 1950s, and where Pierce Brodkorb carried on a long, fruitful, if controversial, career in teaching, collecting, and publishing on fossil birds starting in 1952 (Campbell 1992). He was mentor to several highly productive students, including (at risk of important omissions) Ken Campbell, Steve Emslie, Al Holman, Storrs Olson, and Dave Steadman.

Especially significant in this Endemic Epoch is Walter Auffenberg (deceased 17 January 2004; his career tragically foreshortened by ill health), the first homegrown world-class scientist to contribute major work on Floridian fossil vertebrates, beginning in 1954, mostly on snakes, frogs, salamanders, and tortoises. His productivity and infectious enthusiasm in the field, laboratory, and conversation are unforgettable to all with the good fortune of his acquaintance. Of course his research still required ratification at Harvard in the form of a postdoctoral stint even though the epicenter of activity had by then shifted southward to Florida.

Others who published important contributions during this epoch, who must at least be mentioned and their papers noted (Ray 1957), include Bayard Brattstrom, Charles Lewis Gazin, Coleman J. Goin, T. Dale Stewart, Joseph Tihen, Paulo Emilio Vanzolini, Ernest Williams, Albert Wood, and Horace Wood. All of these except

Goin were northern, absentee, short-term, or part-time researchers on Floridian fossils.

Last and least in this epoch, and in the First Modern Period as a whole, I joined the staff in Gainesville through a split appointment between the Department of Biology and the Florida State Museum (FSM), starting in September 1959 and ending in December 1963, during much of which time I was away from Florida, twice at the MCZ and twice afield out of the country. An additional period of three months was spent closeted at home finishing my dissertation through the courtesy, not to mention insistence, of J. C. Dickinson, then Director of the FSM. I had little idea at the time where I fit into the historical development of vertebrate paleontology in Florida. I knew only that I had a wonderful job in an ideal environment, where one could live close to nature every day, and in the midst of a paleontological paradise, where one could put in a long afternoon of productive collecting (in part literally in my backyard) even after teaching all morning. I was not then aware that I was the end member of the Harvard hegemony, enormously lucky that the MCZ mystique had retained its by then unwarranted power just long enough. I am inordinately proud of my major role in ending the First Modern Period in Florida but much more importantly in singlehandedly performing the essential act that made possible the beginning of the Second Modern Period. What did I do?—I left Florida.

THE SECOND MODERN PERIOD, 1 JULY 1964 – THE FUTURE

My departure created the opening there for the right person in the right place at the right time, and by a rare stroke of luck, genius, or fate, that person appeared in S. David Webb whose first day on the job in Gainesville, 1 July 1964, precisely marks the beginning of the Second Modern Period (I would say the Webbian Period) in Floridian vertebrate paleontology, and the end is not in sight.

First, it is important to try to imagine the context of place and time if one is to comprehend the astounding advancements made thus far in this period. By then the northeastern paternal-colonial domination was over. Like the British Empire, it had its positive, beneficial aspects, but its time had passed. Also, the debilitating internecine rivalry between the Florida Geological Survey and the FSM had subsided, with the result that both the Survey's collections, made in part by Pierce Brodkorb and students, and Brodkorb's personal collection, ultimately came to rest in the Florida State Museum, ending an unstable situation confusing to the public and to legislators.

J. C. Dickinson, Director from 1961 to 1979, had pulled the Florida State Museum up by his bootstraps through strength of will and dogged determination, however concealed by gentlemanly decorum. During my time at the University, influential members of the Biology Department blocked the Museum's receiving an allotment from the University for purchasing literature for the library on the grounds that the Museum was a service department, the sole function of which was to provide teaching specimens to faculty. At that time the vertebrate fossil collections, laboratory, and my office were housed on campus in Building I, a temporary structure (of which there is nothing seemingly of greater longevity) on stilts without control of temperature, humidity, or pests, without indoor plumbing, and without security (the portion of my personal library rejected by the silverfish gradually migrated across University Avenue to the used book shelves of the University book store). Our garden-hose preparational operation on the lawn did lead to a certain distinction: its unsightliness caused the President of the University personally to order us off campus, a communication that I cherish as the only one from him during my employment. Thanks to the effectiveness of J. C. Dickinson, our situation improved in some way every year. We moved up to the basement of the off-campus Seagle Building, where we had ample space, cool air, and the possibility of more than enough water at any moment. When J. C. gave me my first tour of the proposed facility, we walked on stepping stones set in the gravel distribution field, and at my height I was mildly concerned by the high water marks on the walls and columns, which he was able to overlook. However, we did get a sink for the lab, though our waste water had to be pumped up a few feet to sewer level, an everyday reminder of our standing in the University.

Nevertheless, in spite of these primitive facilities and minuscule budgets, those were exciting days of discovery, a principal source of which was the first great popularity of scuba diving. Vertebrate paleontology was the beneficiary of the enthusiasm and skill of numerous divers, tapping previously unavailable resources. Among the first were students at the University of Florida, who contributed important material from Hornsby Springs (Bader 1957), followed by the "Barnacle Busters" club, led by Dave Desautels, who explored Hornsby Springs and Sink. Unfortunately, we soon lost them when they drifted into sky diving; the novelty of removing their air tanks to enable them to squeeze through the "eye" in Hornsby Sink had become too boring.

They were, however, soon replaced by Ben Waller and Robert Allen, rough and ready rattlesnake milkers and alligator wrestlers from Ross (Robert's father) Allen's Reptile Institute at Silver Springs. Robert had been taught to swim by Johnny Weissmuller while shooting the Tarzan movies at Silver Springs (with Ross Allen serving as Johnny's double). That influence probably also explains Robert's everpresent sheath knife on his belt (which once resulted in our being on the wrong end of machine guns in the Dominican Republic, but that is another story). Fair play demands that some attention be given in any history of Floridian vertebrate paleontology to the indispensable contributions of amateurs (I persist in continuing to use that term in its pure, nonpejorative, sense, applied to those who do what they do for love of it, not for material benefit, as inevitably is the case with most researchers). Further, those who publish research also inevitably gain a measure of immortality through their winged words, whereas amateur collectors of the raw materials of paleontological progress remain generally all but anonymous. Ben Waller and Robert Allen may well serve as standard bearers for the legion of heroic amateurs both because of their great contributions and because I have direct personal knowledge of them. Space will scarcely permit justice to their contributions, and cannot convey adequately their effervescent personalities, but I have to try to give an inkling: Ben did a perfect impersonation of Donald Duck; Ben and Robert brought a 12-foot alligator to my farewell party from Gainesville, where we swam with it in J. C. Dickinson's new pool, safely restrained of course—it, not us.

Ben and Robert were introduced to me in 1962 by Charlie Hoffman, then a graduate student in anthropol-

Figure 5. Ben Waller (left) and Robert Allen (right) collecting fossils in the Santa Fe River, Florida, 1962. Photo by permission of Atlanta Journal and Constitution, reproduced from archival microfilm (Sparks 1963:8).

ogy at the University of Florida, also a great benefactor to me through his field work in the Caribbean, continuing to the present. They were said to have been finding large quantities of bones on the Santa Fe River bottom by scuba diving (Fig. 5), and on their first visit to me they shyly produced a specimen from the dashboard of their car—it was a horncore of *Capromeryx*, the first from the east. Naturally I scarcely allowed the two out of my sight after that. By a stroke of good timing we engaged them temporarily to help in moving the vertebrate paleontology collections from Building I to the Seagle cellar. The moment we were moved, they started bringing in bones from the Santa Fe River literally by bushel basketfuls. I spent a rainy Saturday, 5 May 1962, alone in the Seagle cellar sorting out the first few dozen basketfuls; by mid morning I was getting pretty bored by proboscidean rubble when I pulled from the bottom of a basket the holotype of *Titanis walleri* Brodkorb 1963—one of those memorable moments that we live for in vertebrate paleontology. *Titanis* of course continues to excite the imagination—witness the spectacular and unprecedented sculpture represented in Figure 6A, and the account with restorations in a recent popular book focused primarily on dinosaurs by Blount and Crowley (2001:145-147.) I immediately called Pierce Brodkorb, who was at his desk in Flint Hall as usual on Saturday, and rushed there with the bone, the distal end of a huge tarsometatarsus. My elation was quickly deflated by his subdued response. I told him the essential background—collectors, locality, and my guess as to geologic age. Besides *Capromeryx*, I had already recognized *Nannippus*, *Borophagus*, and other taxa that I felt indicated a Blancan assemblage amongst the late Pleistocene overlay. He listened noncommitally, put the specimen in his desk drawer, and I went back to my cellar.

At my morning classes on Monday, students asked me if I had seen Prof. Brodkorb's exciting discovery reported in the Sunday paper—I had not. Later in the day I saw the newspaper and Brodkorb, and found that there had also been a radio announcement based on his press release, in which he had stated that the fossil had been brought in by "two boys."

The newspaper account (Gainesville Daily Sun, Sunday, 6 May 1962:14) reads in part as follows, "The ankle joint of a gigantic ostrich-like bird which is perhaps the largest the world has ever known has been found near Gainesville, by two young explorers. Dr. Pierce Brodkorb, University of Florida biologist and an internationally recognized ornithologist called the find 'spectacular.'…. He said his preliminary studies reveal the bird is more like the large flightless rhea of southern South America than any other flightless bird known to man."

The article includes an excellent photo (unfortunately the microfilm is not good enough for reproduction) of Brodkorb holding the fossil alongside a tarsometatarsus of a modern rhea. The article goes on to discuss probable immigration from South America via the Panamanian land bridge and to mention all living ratites, but makes no mention of phorusrhacids.

By Monday at the latest Brodkorb had also prepared a formal manuscript ready for submission, describing the bird as a giant rhea. I then did not know anything about birds living or dead (and I still do not—our home birdfeeders attract only confusing warblers), but I have always been lucky; in this case, to have had Bryan Patterson as my major professor. He had a long interest in the phorusrhacids, and had brought some of the classic Argentine material from the Field Museum with him to Harvard. Thus, I knew just enough to ask Brodkorb if that might not be a possibility. We never discussed it further, nor did I see his manuscript prior to publication (Brodkorb 1963), but the manuscript was revised, and the specific name was changed at my insistence to help make amends to one of the "boy" collector/donors. However, the groundless supposition of late Pleistocene age did go into print.

Pierce Brodkorb was difficult to comprehend. He named a species after me shortly after the *Titanis* incident, and he never directed open hostility toward me. Among fairly common personal attacks, his most egregiously vicious and continuous, unfortunately witnessed at least in part by me, were those upon Walter Auffenberg, to my knowledge without rational basis or counterattack. He continued his financial alliance with the Florida Geological Survey where he deposited non-avian fossils collected by him and his students. He defended the practice on the basis that his contract called for his teaching classes, and that was all he owed the University of Florida. To his credit, he maintained a rigorous and rigid research regime. One's watch could be set by his walk across the lawn for a brief cup of coffee each morning and by his departure for lunch at home, both followed by long hours of work. Even that however was not entirely simple. It turned out that the inviolable lunch schedule was governed by airing of his favorite soap opera on television, according to his first wife (fortunately for her, there were too many witnesses at our house when she divulged that information).

It is a profound testament to Ben Waller's extraor-

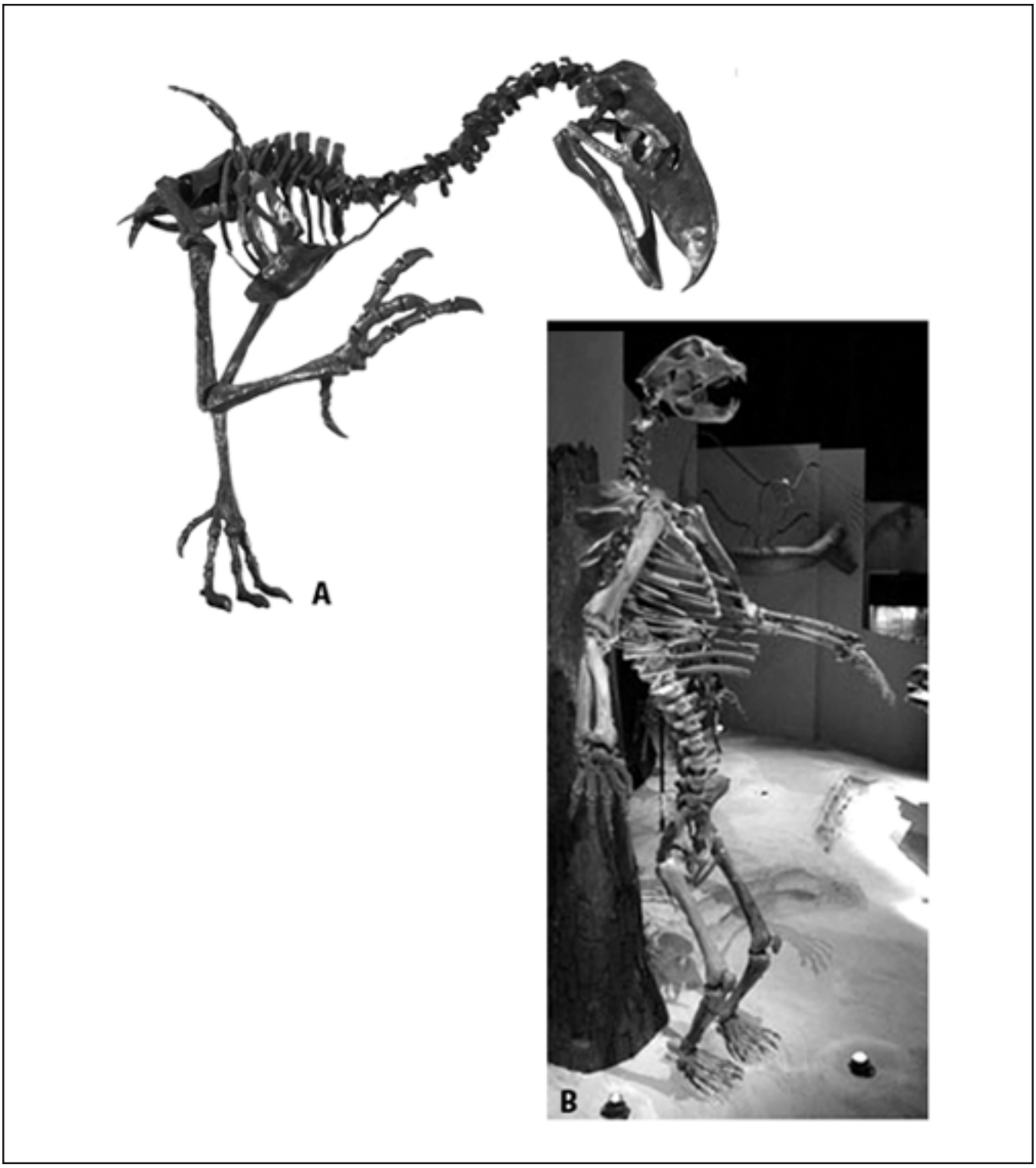


Figure 6. Stellar attractions in the newly opened (22 May 2004) Exhibition Hall of the Florida Museum of Natural History. A, hammered steel sculpture of *Titanis walleri* skeleton, created at natural size, 188 cm (74 inches) tall as it stands, by Richard Webber. B, composite skeleton of male *Tremarctos floridanus* from the Devil's Den, prepared by Matt Smith, standing 234 cm (92 inches) tall in its all too appropriately humanoid posture – note the character of the femur and humerus, the latter with entepicondylar foramen; note also the bearface and the baculum, perhaps the most grossly unhumanoid features of the skeleton. Photos by Tammy Johnson, courtesy of the Florida Museum of Natural History.

dinary character that the *Titanis* experience not only did not drive him away, but also he remained a wonderful friend and contributor to the Museum and to vertebrate paleontology for the rest of his life (Webb 1993). Also, Robert Allen continued at the Museum on temporary funds with field and laboratory work on the Caribbean (funded by the National Science Foundation) and with the first sustained collecting at the McGehee Farm (supported by the Frick Laboratory through Morris Skinner). I tried soon after to hire him at the Smithsonian but that failed, and he went to divinity school, leading to a long career in service to society.

The moral to the story is that good character is innate; it cannot be conferred by higher education or position, only by internal constitution. Fortunately for us, Ben Waller and Robert Allen had that constitution, as seemingly do many amateurs. One can only wonder that saintliness should be a requirement for their persistent association with us professionals. Luckily, we seldom get what we deserve.

We were fortunate also in that the growing collections attracted outstanding visiting scientists, including Dick Etheridge from San Diego, Roy Reinhart from Miami University (the original, in Ohio), Karl Koopman and Morris Skinner from New York, Paul Sondaar from Utrecht, and Björn Kurtén from Helsinki.

The essential point here is that the Florida State Museum (since 1988 the Florida Museum of Natural History) was by 1964 a substantial, functional entity poised for a great leap forward. Thus, Gainesville was the right place and 1964 was the right time. Only now, with nearly four decades of hindsight, can it be asserted that Dave Webb was, is, the right person. That can never be judged in advance of a long record of deeds and accomplishments, although it is now clear that Dave Webb was preadapted for the job.

First, there is innate good character, which can neither be learned nor bestowed by outside forces. Luckily for us and for Florida, Joseph Leidy had it, and Dave Webb has it.

Second, as a far westerner, he carried no carpet baggage with him. Although one hopes that this persistent legacy from the War Between the States now recedes to the vanishing point, as recently as 1962 I was offered a job in the north with the explicit statement that I was being rescued from that "southern cul de sac."

Third, he was reared in the rigorous, far-reaching California school of faunal-biostratigraphic emphasis. Only with that mindset and training could one be prepared to bring the vertebrate paleontology of Florida into the world at large. At the time I had a dim recognition of what was needed but was deficient in the necessary tools, having never set foot west of the Mississippi and having come from a school where geological paleontology was at the time subject to ridicule.

Fourth, he stayed and did the necessary sustained hard work that could never be accomplished by expeditionary means, or by short-termers en route elsewhere.

Inevitably Florida loses some of its allure if it is no longer fantasyland, but in fact Floridian vertebrate paleontology becomes far more interesting if it has a worldly context, and, whether by unerring instinct or by explicit design, virtually everything that Dave Webb has done from 1964 onward has contributed significantly toward creating that context.

For brevity, I will cite very few of his publications here, but refer instead to his comprehensive bibliography in this volume (MacFadden, 2005:136-141). In order to give an impression of his attention to the major themes of his career in publishing, I have made a subjective count of titles in four prominent categories. My counts will not tally arithmetically with his total number of titles, as some are double listed, whereas others are omitted entirely—no book reviews were included, and most abstracts were excluded, especially if identifiable as supplanted by full publication. The categories with number of titles are as follows: "geological" paleontology, including faunal-chronological-correlational studies, 47; the Great American Interchange, 13; "biological" paleontology, including morphological-phylogenetic-systematic studies, 55; Early-Man-related, 23. The following abbreviated discussion is organized under those categories.

No longer is Thomas Farm our only significant Tertiary land mammal fauna in the east. Florida now has a good sequence of Oligocene, Miocene, and Pliocene faunas, plus a sequence within the Quaternary from early Irvingtonian to late Rancholabrean. All are well placed within the North American land mammal ages (Hulbert 2001b). Citations to much of that extensive literature can be found in Hulbert (2001c) and in the Bulletins of the Florida Museum of Natural History. For demonstration of Dave Webb's direct personal sustained attention to this subject, it may be enough to cite just three contributions, two early (Webb 1964; Webb and Tessman 1968), and one late (Hulbert et al. 2002), together with one recent exemplary title by one of his students (Hayes 2000). Further, he participated in the most recent comprehensive reviews of the subject (Woodburne 2004; Gillespie et al. 2004).

No longer is the Bone Valley merely a source of

the occasional gem of free-floating buried vertebrate treasure, but has a sequence of intelligible faunal history. Dave began immediately and successfully to address that previously intractable problem (Webb et al. 1967), continued (Webb & Crissinger 1983), and continues (Hulbert et al. 2003; Webb et al. in press).

An indication of Dave's broad geological contributions is that he is one of the six people to whom "The Geology of Florida" is dedicated "for their outstanding contributions to the understanding of Florida's geology" (Randazzo & Jones 1997:v).

The Great American Interchange has been a continuing theme in Dave Webb's research, for which he is universally recognized. His work has placed Florida firmly into a world context of biogeography. Nothing need be cited here, as Gary Morgan reviews the topic in this volume.

Dave's extensive work in the Quaternary of Florida

Figure 7. Dave Webb at work and play with some of his favorite fossils: A, Dave conducting an impromptu how-to lecture on functional morphology of the Miocene sloth, *Thinobadistes*, collected at Mixson's by the Frick Laboratories in the 1940s, and returned to Florida, courtesy of the American Museum of Natural History, to be mounted for the then-new (1976) exhibition in Dickinson Hall. In the foreground stands one of Dave's remaining "under-studies," the diminutive, undescribed gelocid "Withlacoochee deer." B, Dave emerging from Hickey Creek, on Robin Brown's (of Brown 1988) property near Ft. Myers, after helping to collect a submerged Pliocene baleen whale in 1982. Photos and information courtesy of Richard Hulbert, Gary Morgan, and Dave Webb.

is characterized by steadfast attention to chronology and context, typified by his book, Pleistocene Mammals of Florida (1974), and by Faught et al. (2003). It is interesting to note that one of Leidy's first important contributions to vertebrate paleontology was his demonstration (1847) that horses of modern type lived in North America just prior to its European discovery, whereas one of Dave Webb's latest contributions is on the latest horses and earliest humans in precolumbian North America (Webb & Hemmings in press). As a natural extension of his Pleistocene theme he began investigation more than a quarter century ago of underwater sites in Florida's rivers, particularly those with evidence of Early Man, notably in the ongoing Aucilla River Project, all of which is documented in his forthcoming book (Webb in press).

For several reasons I cannot refrain from comment on Dave Webb's involvement in Early Man studies: first, the nature of that involvement gives insight into his character; second, Early Man has been a powerful factor in Floridian vertebrate paleontology from earliest days, in large part as a source of strife and controversy; third, I have some personal knowledge of one heated interval in that history. I was in Florida (1959-1963) at the time when the discoveries in Little Salt Spring and Warm Mineral Springs achieved their greatest public notoriety (see Purdy 1991:139-158, 178-204, for a balanced, historical account of the public controversy that ensued). I was acquainted with and worked with some of the principal figures, including Harold Kelly Brooks and John M. Goggin, and slightly acquainted with William Royal and Eugenie Clark. By strong preference, I was strictly on the outermost fringes of the entire affair involving the two springs. I was a minor participant in collecting of the Devil's Den fauna, led by Brooks (Martin and Webb 1974). I made one brief abortive attempt to reconcile Brooks and Eugenie Clark. With Goggin and William Sears as co-principal investigators I initiated through the National Science Foundation the program in zooarchaeology at the University of Florida, with Elizabeth S. Wing as first employee (she of course has made that into a spectacular, continuing success appropriately called Environmental Archaeology since 1990, see King and Porter 2003) .

I wish to relate here a cautionary tale demonstrating the pitfalls awaiting anyone who becomes embroiled in the emotion-laden topic of Early Man, especially anyone who dons the mantle of vested authority. Purdy (1991:139) has encapsulated the problem succinctly, stating "Because Royal was not an archaeologist and because his findings were sensationalized by the press, his observations and their signifiance [sic] were minimized, ignored, ridiculed, or discredited by certain well-known archaeologists….Time has demonstrated that many of Royal's first impressions were correct…." She went on to quote Goggin's published statements, in part as follows: "This business of ichthyologists and retired Air Force officers setting themselves up as archaeologists is a little discouraging" (p. 202), and "someone [i.e., Clark] who is a responsible scholar in one discipline seems to carry no responsibility over into another" (p. 203). Regarding Goggin's own character and career, du Toit (1986:50-52) should be consulted.

Underlying at least some of that hostility I think was the partly unspoken feeling that the preserved human brains represented science-fiction sensationalism or falsification. Of course that has long since been shown to be untrue—preserved nervous tissue from wet sites is now well documented and accepted (see for example Purdy 1991:200, 218-220, and Doran et al. 1986).

At the same time that Goggin was decrying the audacity of non-specialists intruding upon underwater archaeology, he himself had called a press conference on the eve of a meeting of the Southeastern Archaeological Conference in Gainesville, hosted by him, to announce his discovery of a bizarre, possibly neanderthaloid, human at Devil's Den, based primarily upon heavy, misshapen postcranial elements, especially the femora, and similarly heavy humeri with entepicondylar foramina.

This was before my participation in collecting at Devil's Den and my having seen any specimens from there. The Friday afternoon prior to the meeting on Saturday I persuaded Goggin to allow me to visit his laboratory to see some of the specimens. My suspicions were immediately confirmed that the putative human bones were those of a tremarctine bear. I should mention here that I can claim no special clairvoyance or genius in this. By purest chance, I had a longstanding interest in and familiarity with these very animals, beginning with material collected at Reddick with Stan Olsen in 1956, had recently reviewed the incidence of entepicondylar foramina in mammals, and had also been sensitized by good teachers to the rather remarkable broad osteological similarity between bears and humans. In any case, Goggin cancelled his press conference and somehow backed away from his announcement at the meeting (I did not attend). He could never bring himself to acknowledge fully the correctness of my identification; the most that he ever said directly to me was that my conclusion might be the more nearly correct (pre-

sumably in a continuous spectrum between bear and human). Those specimens and many more collected subsequently in Devil's Den (Martin & Webb 1974) not only inspired our invitation to Björn Kurtén to come to Gainesville and study that and other new material of Pleistocene carnivores (see especially Kurtén 1966), but also provided the basis for the mounted skeleton of the male *Tremarctos* in the new exhibition hall at FMNH (Fig. 6B).

The essential point to take away from such an anecdote is that little benefit accrues to high emotion and exercise of ego in pursuit of truth in science. Yet, it is a truism that the closer we get to ourselves, the more apt we are to generate more heat than light; witness the Hrdlièka and Goggin parallels. Yet, the Dave Webbs (and Elizabeth Wings) of science are able to overcome this tendency in their own research and have contributed toward bringing Early Man studies in Florida out of the Dark Ages.

Lastly, I must not neglect to note Dave Webb's major contributions to more strictly morphological-taxonomic-phylogenetic studies of fossil vertebrates ("biological" paleontology), perhaps most notably and continuously within a broad range of artiodactyls, starting with his osteology of *Camelops* (Webb 1965) and continuing with at least five papers published or in press from 2000 onward (MacFadden 2005:136-141). As a further indication of his depth and breadth, he is among the top half dozen authors cited in Shoshani and Tassy's (1996) comprehensive book on Proboscidea.

Let us now take stock of the present state of vertebrate paleontology in Florida. The Florida Museum of Natural History is housed principally in two new capacious buildings: Dickinson Hall, occupied in 1970 for research and collections, and Powell Hall, opened in 1997-1998, for public programs. The collections have grown enormously in quantity, quality, and diversity, and are housed and curated to the highest state of the art. The research program based on these collections is robustly productive, as evidenced by several books (Webb 1974; Hulbert 2001c; Woods & Sergile 2001), a steady flow of Bulletins of the Museum, articles in leading outside journals (e.g. Martin et al. 2003, O'Sullivan 2003, and MacFadden et al. 2004), and chapters in compendia. This work is done by highly productive staff and students. As one measure of this vigor, I counted no less than 17 individuals in or from Florida, contributing 12 abstracts, in the program for the 2002 annual meeting of the Society of Vertebrate Paleontology (Journal of Vertebrate Paleontology 2002). A similar pattern of vigorous activity is reflected in subsequent years. In yet another recent collection of papers having no a priori focus on Florida (Flynn 2003), 6 of 24 (25%) specimen-based chapters rest primarily (4) or significantly (2) upon Floridian materials.

The Florida Museum of Natural History has a more attentive and successful record in public programs, including its nurturing of the amateur community, than any other institution in the country (see, e.g. Hulbert 2001a). Dave Webb was the founding president of the Florida Paleontological Society in 1979 and has continued his unflagging recognition of amateur contributions (Webb 1999). A major exhibition hall incorporating much new material opened on 22 May 2004 (Fig. 6).

In recent years an all too common pattern for vertebrate paleontology in natural history museums has been one of doldrums, decline, decay, or discontinuation—witness programs at Princeton University, Smithsonian Institution, Los Angeles County Museum, University of Nebraska State Museum, Michigan State University Museum, Museum of Northern Arizona, and University of Arizona. Against that background of retrenchment the flourishing of vertebrate paleontology at the Florida Museum of Natural History is all the more spectacular.

This is not to say that Dave Webb did all this alone. No man is an island or even a peninsula. For example, in the first years (1964-1977) of the Second Modern (Webbian) Period Thomas Patton was also on staff in Gainesville, where he advised several students (including, luckily, Gary Morgan), conducted field work, and published significant contributions (e.g. Patton 1967, Patton & Taylor 1971). Yet, certain individuals are identifiable in any historical development as the essential participants responsible for propelling that endeavor onward and upward to an unprecedented and previously unimagined height. Viewed across the board, there is no stronger program in vertebrate paleontology anywhere than at the Florida Museum of Natural History, and just as Joseph Leidy, Elias H. Sellards, and George Gaylord Simpson were indisputably the founders and dominant architects of their respective periods, so is S. David Webb of his (Fig. 7). By no means do I intend to slight the contributions of other outstanding staff, present and past, and their students and associates, but their story constitutes a subsequent chapter, perhaps of a new period, to be defined and described by another at a later date. I dare not attempt to enumerate individuals, as the list would be inevitably incomplete or interminably inclusive. However, because of the length and strength of his record, I must mention one name, that of Bruce J. MacFadden, Dave's running mate since 1977, and a leader in the

profession, some of whose contributions other than research I know firsthand through our collaboration on behalf of the Society of Vertebrate Paleontology. One can scarcely guess where Floridian vertebrate paleontology will go from here, but, thanks to Dave Webb more than any other, it could hardly be in a more promising condition for the young millennium.

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