Memorial to Harry D. MacGinitie (1896-1987)

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HARRY D. MACGINITIE

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Back in the early 1950s, a bus trip from Portland, Oregon, to Boston would have been a long one, especially for a kid just entering college. But not for this freshman, because I had along Harry D. MacGinitie's recently published "Fossil Plants of the Florissant Beds, Colorado." The copy is now well worn, the binding tattered. Why a budding paleobotanist could and should have read this book is part of the story that follows.

In December 1952, I visited Berkeley—then the Mecca of Tertiary paleobotany—and met with R. W. Chaney, the widely accepted leader of this field. Chaney assigned Marie Pabst the task of entertaining this possible novitiate. Among the many questions asked of Pabst were: who produced good work, who was a model? Unhesitatingly, Pabst reached for the bookshelf and pulled out MacGinitie's (1941) "A Middle Eocene Flora from the Central Sierra Nevada." "This is the best work that has been done in western Tertiary paleobotany," she declared. "This is *the* work to emulate."

Mac MacGinitie was a paleobotanist's paleobotanist to Pabst, as well as to his other colleagues. He considered all evidence that bore on a scientific problem, and his conclusions and hypotheses were written logically and clearly, eschewing jargon whenever possible. He considered all reasonable alternatives and stated basic assumptions. If he changed his mind on a subject, he clearly stated this and the evidence that resulted in the change. His knowledge of leaf architecture of the angiosperms was immense, and the great bulk of his determinations of fossils are still valid. Most importantly, Mac shared his knowledge continually by discussions with his colleagues and would even spend his time in the herbarium helping with identifications. In both personal contact and his publications, Mac has had a profound influence in Tertiary paleobotany in North America.

By modern "publish or perish" standards, Mac's publications were few. Each, however, contains a few to several essays that could have readily been extracted as separate papers. And, each typically contains new approaches to Tertiary paleobotany.

Mac's first publication in 1933 was the first comprehensive account of an upland Miocene flora from the Columbia Plateaus. In this paper, Mac's discussion of the climatic implications of the flora is the first to attempt to assign numbers to climatic parameters and clearly reveals his interest in, above all, paleoclimate. I recall one discussion with Mac in which he stated that he entered paleobotany largely because he thought that fossil plants were the best indicators of paleoclimates. He was well aware of the significance of altitude, and his assignment of about 2,500 feet to the Trout Creek has not been significantly altered by newer (and supposedly more reliable) techniques.

The Weaverville flora, published in 1937, was Mac's Ph.D. thesis, which was completed under R. W. Chaney in 1935. This year also saw another major event in Mac's life; Beatrice MacGinitie

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(nee Hess), who became his wife on February 2, 1935, was a constant source of encouragement and emotional support to Mac for the rest of his life.

The Weaverville flora reveals Mac's increasing involvement with both the detailed climatic implications of fossil-plant assemblages and the possible causes of climatic change. Further, the detailed discussion of the geologic occurrence of the fossils and of basinal geology placed the Weaverville flora in a taphonomic context. Mac attributed the Weaverville flora to the early Oligocene, recognizing that the flora contained elements that indicated an age younger than the Goshen flora.

The monograph of the Eocene Chalk Bluffs flora, published in 1941, shows a maturation of many concepts. As in his earlier works, Mac considered the paleoecological significance of the fossil taxa in a depositional framework. He presented solid evidence for the co-occurrence of taxa whose modern counterparts have markedly different climatic tolerances and suggested that at least some tolerances have changed through time. Mac documented that the neotropical element in the Chalk Bluffs was today largely found in the Mexican uplands and that the flora also contained a large paleotropical element. This monograph also contains the first significant discussion of the plant biogeography of the North American Eocene. Mac laid the cornerstones for future discussions of the historical biogeography of the western North American Tertiary.

The taxonomy in the Chalk Bluffs paper has largely withstood the test of time. Mac, using solid leaf-architectural criteria, demonstrated that the many leaves of "*Aralia,*" a major element in western American Paleogene floras, represented a platanaceous genus. He referred the leaves to *Platanophyllum* and discussed the phyletic relationships of the species; recently they have been reassigned to the new genus *Macginitiea,* named in his honor. One of the major reasons that most of Mac's taxonomic determinations and paleoclimatic inferences still remain valid is revealed in the Chalk Bluffs monograph: "In no case were ecological considerations given weight in the choice between two living forms as modern representatives of fossil plants . . . . If identifications are based on ecology, and then ecology is deduced from identified species, the result is a kind of cyclic reasoning which may lead to considerable error" (MacGinitie, 1941: 96).

While teaching briefly at the University of Colorado, Mac was associated with T. D. A. Cockerell, the paleoentomologist who had worked extensively with insects from the famous lake beds at Florissant, Colorado. No comprehensive treatment—systematic or ecologic—existed of the Florissant flora, and, at the urging of Cockerell and the vertebrate paleontologist Childs Frick, Mac began work on the Florissant flora in 1936, work that culminated in his 1953 monograph of the flora.

Mac's research was, however, interrupted by World War II. Although Mac was 45 when the United States entered the war, he still decided to serve. Because of Mac's expertise in the theoretical aspects of climatology and meteorology, he enrolled as an instructor in the U.S. Army Air Corps. Lt. MacGinitie's primary responsibility was teaching crewmen the significance of, and to recognize, different cloud formations. After the war, Mac returned to Humboldt State and to his work on the Florissant.

Above all, the Florissant work involved carefully detailed taxonomic work. Mac reduced the 258 species previously attributed to the flora to less than half that number, but still the Florissant is the largest flora yet described from the Tertiary of western North America. One common practice in Tertiary paleobotany was the erection of a "fossil" species for fossils that resembled a given living species. Mac, however, challenged that practice: "Fossil plants in two different floras may be likened to the same *living* species without in any way implying identity of the two fossil forms. Their differences may be great enough in opposite directions to place them in different species . . ." (MacGinitie, 1953: 79). As Mac noted, the usual practice led to erroneous concepts of age and floristic relationships.

In the Florissant monograph, Mac introduced and elaborated on a number of new ideas and observations that have subsequently been well substantiated. Particularly significant is the idea that given lineages may persist in a region by adapting to changing environmental conditions; he was led to this conclusion because of the sharing of numerous lineages between the older Green River flora and the Florissant. Mac also clearly stated (p. 46) that fossil leaf assemblages typically are biased towards streamside or lakeside vegetation and, hence, may not adequately reflect the regional flora and vegetation; this point has been increasingly made apparent by many taphonomic studies. In discussing the paleoclimatic significance of floras then placed in the Oligo-

cene, Mac noted: "The point emphasized by this discussion is that if we accept a Middle Oligocene age for the Goshen flora, the remainder of that period must have witnessed an almost complete revolution in the flora of the region, and more critical events must be crowded into the Upper Oligocene than paleontologists have hitherto been willing to concede" (MacGinitie, 1953: 67); Mac was the first to recognize the major and rapid climatic change that is now placed near the end of the Eocene.

Mac completed the Florissant study in 1951. Probably because of administrative duties as Chairman of Natural Sciences at Humboldt State, Mac did not immediately start on a new project. In 1954, James Bump sent Mac some leaves from a new site in Nebraska, and encouragement from Bump and Harold J. Cook enticed Mac to start fieldwork on the Kilgore flora, which was completed in 1958. Following his retirement from teaching in 1960, Mac finished the systematics of this assemblage. He had become increasingly aware of the value of palynology in paleoecological interpretations, and, despite no prior palynological experience, he became knowledgeable of basic pollen morphology with the help of Estella Leopold. The Kilgore paper was the first in North American Tertiary paleobotany to illustrate both megafossils and microfossils and extract from both types of fossils paleoecological data. The climatic discussion in the Kilgore paper was based on a wide range of data (paleobotanical, sedimentological, vertebrate, and molluscan) and probably remains the most comprehensive discussion of Neogene climates in the Plains region of North America.

The Kilgore paper also contains an expansion of the thesis, first expounded in the Florissant paper, that many plant lineages can persist in a given region despite significant climatic change. If, as Mac demonstrated, the bulk of the Kilgore species were derived from older species in the same region, then ". . . it should be questioned whether any flora, as a unit, migrated during the Tertiary . . . . The terms 'Arcto-Tertiary,' 'Madro-Tertiary,' and the like imply extremely useful concepts if we do not think of these terms as representing areas or centers from which mass migrations occurred. They picture to us in a general way the vegetation occupying an area, although the particular type of vegetation was slowly changing" (MacGinitie, 1962: 87). This statement by Mac represented a clear-cut departure from the geofloral hypotheses then so widely accepted in North American Tertiary paleobotany and historical plant geography. However, as originally submitted to the Board of Editors of the University of California Publications in Geological Sciences, Mac's manuscript was uncharacteristically vague about this point. Clyde Wahrhaftig, one of the editors, asked me what Mac meant. From numerous discussions with Mac, I knew what he was attempting to state, and at Wahrhaftig's request, Mac rewrote his manuscript to the statement quoted above.

On retiring from Humboldt State, the MacGinities moved from Arcata to Napa, a move that was beneficial to Mac and especially to many students and colleagues. He was made a Research Associate at the University of California Museum of Paleontology and had ready access to extensive paleobotanical collections (many of which he had made) and the University of California Herbarium and libraries. He was in an area active in the geological and botanical sciences, and Mac was often to be found in deep discussions with students and colleagues, to whom he freely gave of his time. Every thesis in paleobotany completed at Berkeley from the 1960s through the 1980s acknowledges Mac's assistance.

With typical enthusiasm, Mac then began work on the Eocene floras of the Rocky Mountains to understand better the floras and vegetation that preceded the Florissant. The first of these floras, that of the upper part of the Green River Formation in Utah and adjacent Colorado, was, like the Florissant, a classic flora. The last significant descriptive work, that by Roland Brown, was more than 30 years old, and the paleoecological significance of the Green River flora had never been thoroughly investigated. At the same time, Mac also began collecting from early and middle Eocene localities in Wyoming. In 1968 he completed work on the Green River flora (MacGinitie, 1969) and in early 1972 on the Kisinger Lakes flora (MacGinitie, 1974). He continued work on other Wyoming Eocene floras, but, unfortunately, none were completed for publication. A major hindrance to completion of these works was a deterioration of leg joints, which required surgery and made fieldwork difficult and painful.

In Mac's last two works on the Green River and Kisinger Lakes floras are the same type of careful and detailed discussions of paleoecology and paleoclimatology that are present in his earlier publications. Certain parts of these mono-

graphs should be carefully read by any paleobotanist or student in paleobotany, e.g., the chapters "Certain Aspects of Floristic Evolution" and "Paleobotanical and Botanical Species" (MacGinitie, 1969: 68–70, 81–86), and "Distribution of Correlative Living Species" (MacGinitie, 1974: 29–34). Indeed, Tom Taylor and Edie Smoot selected the second-listed chapter as one of eight papers on Tertiary paleobotany in the "Benchmark Papers in Systematic and Evolutionary Biology Series" (MacGinitie, 1984). Mac's discussions of systematic determinations also had become more sophisticated; he continually discussed the exact reasons certain generic determinations were made (not that a fossil taxon simply "looked like" an extant taxon) and illustrated much of the material in detail. Written with Estella Leopold, who also contributed a chapter to the Kisinger Lakes paper, the summary of floristic and vegetational development in the Tertiary of the Rocky Mountains (Leopold & MacGinitie, 1972) remains a most useful and concise summary on that topic.

The symposium held in honor of MacGinitie at the 1983 annual meeting of the American Association of Stratigraphic Palynologists was a well-deserved tribute. Palynologists recognized both the wide scope of Mac's contributions throughout his career and his bringing together of palynology and megafossil research in the Kilgore and later papers. During a tribute listing his many accomplishments, Mac, sitting in the front row, nudged Estella Leopold and whispered, "I never realized that I was that good." Mac had generally lived in the shadow of R. W. Chaney, and even when disagreeing with Chaney or other colleagues, was careful not to cite by name the originators of hypotheses; instead, Mac would simply and clearly, through data and logic, refute the hypotheses. One of the rare instances when Mac named names was, in fact, at the 1983 AASP symposium when he stated of a colleague, "He was a nice man but a terrible paleobotanist," much to the amusement of the audience.

One of Mac's major attributes was his ability to grow intellectually, to accept new concepts and weld them into his already considerable framework of floristic evolution and vegetational/climatic change in the Tertiary of western North America. If new and/or refined techniques of analysis (e.g., palynology and leaf architecture) appeared, he was among the first to use these techniques. Mac kept up with advances in paleobotany even after he was no longer an active researcher in the mid 1980s. Above all, Mac was always ready to discuss with colleagues any problem of mutual interest and to share with them his vast wealth of knowledge and experience. Fortunately, part of Mac's legacy to us—his enquiring mind and thoughtful statements—will endure in his publications. When Mac ceased being an active researcher, he, in typical generosity, brought down to Berkeley his entire professional library, leaving for present and future students an additional legacy.

Thanks are due to Beatrice Ann Minkler (nee MacGinitie) for supplying much pertinent biographical material. Howard E. Schorn supplied the accompanying photograph and contributed to some of the content of this memorial. Patrick F. Fields supplied the list of MacGinitie's publications.

Biographical Data

Harry Dunlap MacGinitie was born in Lynch, Nebraska, on March 29, 1896. After graduating from high school in Sturgis, South Dakota, he moved to California. He attended and received an A.B. from Fresno State College in 1926, after which he attended Stanford University for a year. In 1926–1928, MacGinitie taught high school before obtaining a position in 1928 at Humboldt State College (now University) in Arcata, California, where he taught until 1960, except for a year (1932–1933) when he attended Berkeley full time, a year (1936–1937) when he taught at the University of Colorado (Boulder), and two years (1943–1945) when he taught meteorology in the U.S. Army Air Corps; he was chairman of the Division of Natural Sciences from 1947 to 1960. MacGinitie did his graduate work in geology and paleontology at the University of California (Berkeley), receiving a Ph.D. in Paleontology in 1935. His research in the 1930s and 1940s was done as a Research Associate of the Carnegie Institution of Washington. Following retirement from formal teaching in 1960, MacGinitie was appointed a Research Associate of the University of California Museum of Paleontology. He was a Fellow of the California Academy of Sciences and the Geological Society of America and a member of the Paleontological Society. He died on January 31, 1987, in Napa, California.

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