by

DAVID L.

An autobiographical sketch

Dilcher



A CURIOUS LIFE

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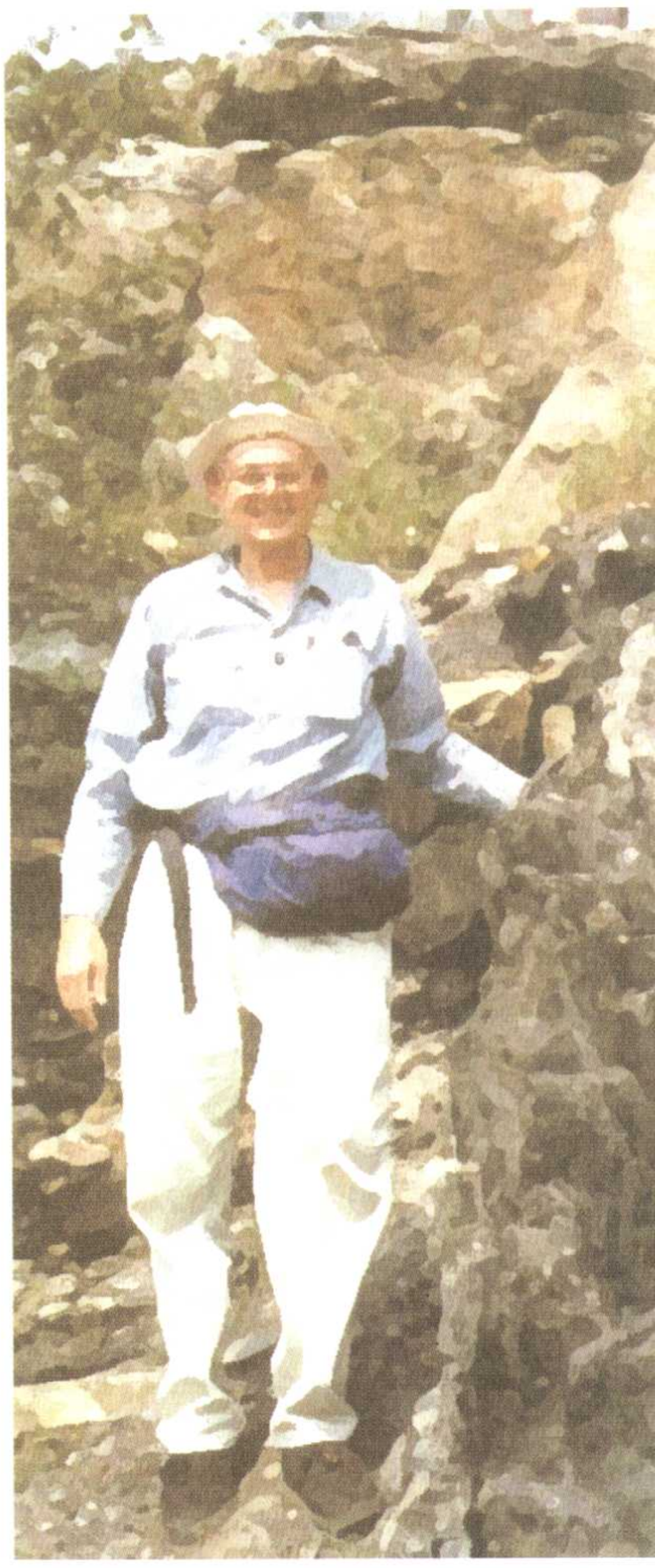
by David L. Dilcher



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Introduction

With much respect and pleasure we are looking forward to the celebration for the 70th Year of Prof. Dr. David L. Dilcher, a well-known and outstanding paleobotanist in the world, of the University of Florida. For nearly fifty years Professor Dilcher has made important contributions to paleobotany, botany, geology, and their related research areas, particularly to the study of the origin and early evolution of flowering plants. Under his supervision many well-known Ph.D. and M.S. students, post-doctoral scholars, and scientists from the USA and abroad have received his kind advice and help. Several of them are now leading scientists and major contributors of paleobotanical research.

This memoir book records autobiographically and briefly the personal career of Professor Dilcher for his past seventy years. Through this history, not only can we understand the interesting stories of his growing up, his professional training, his contributions to science and education, but also we can comprehend his high academic quality and open mind that has led him during his career. Also, in remembering and recounting the events told here, we as readers can enjoy sharing in and for some recalling these past events. The readers may learn from the stories that are told and be encouraged for the future in their own lives.

I first met David in Nanjing, China in 1986 when he was invited by the Chinese Association of Science & Technology as an honorable visiting professor. Later, in 1988, I was very delighted to share an office room with him in the British Museum of Natural History, London when I was a Post-doctoral Fellow there. We had many discussions about paleobotany during which he enlightened me about the study of early angiosperms. After that, we began cooperative research on early angiosperms and since 1993 have exchanged research visits nearly every year. During the last two decades, I have learned so much from him scientifically, particularly in our research work on the study of *Archaefructus*, the earliest known angiosperm in the world. During all the unforgettable times we worked together, I have always had great esteem for him, both for his scientific quality and open mindedness. His diligence and carefulness in his professional work, and his honest, modest and kind character have given me feelings of warmth, friendship and encouragement.

The publication of the memoir book will give great pleasure to all of David's friends and colleagues. Many thanks should be given to Professor Zhou Q. F., Academician and President of Jilin University, and Professor Sun C. L., Vice-President of Jilin University, for their kind support, who also give thanks to David for his many contributions to Jilin University over several years. I am happy to see the memoir book published in the Shanghai Scientific and Technological Education Publishing House in which the joint book *Early angiosperms and their associated plants from western Liaoning, China* written by David and myself with other coauthors was published five years ago. I congratulate David on its completion of this memoir

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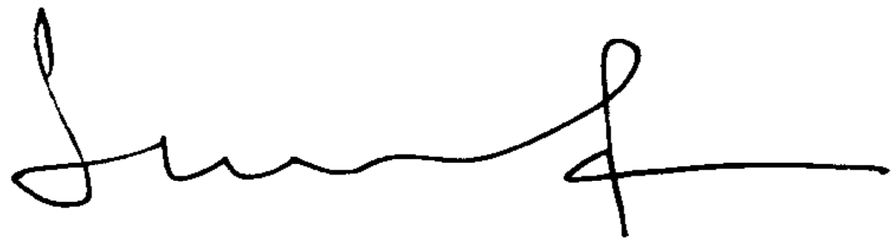
book, and hope all the readers will find it interesting and enjoy it. As the book title implies, we should search nature more with curiosity, and make more contributions to the marvelous world of paleobotany.



Ge Sun
Professor of Paleobotany, Ph.D.
Director, Research Center of Paleontology, Jilin University
Vice-President of Paleobotanical Society, China

Preface

This book was first envisioned by Professor Ge Sun when we were discussing the celebration planned for my 70th Year. I give special thanks to Professor Qifeng Zhou, Academician and President of Jilin University and to Professor Chunlin Sun, the Vice President of Jilin University for their kind support that has made possible the publication of this collection of memories and papers. As an Honorary Professor of Jilin University I feel particularly happy that they were so helpful in the publication of this book.

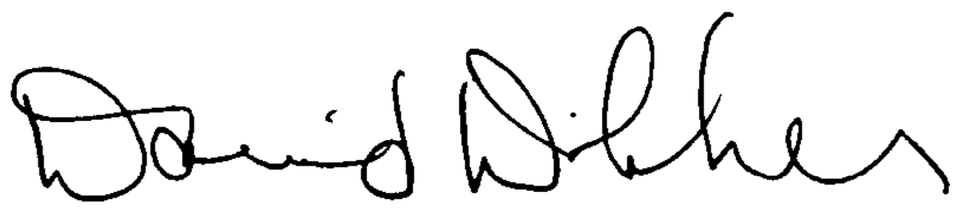
The form the book has taken is a hybrid of what Ge Sun proposed, his guidance and help, in relation to what I could accomplish in practical terms of a short schedule and the ability to format and organize the sections of this publication during the fall of 2005. Special thanks must go to Professor Ge Sun for his continued help with many aspects of the organization and publication of this book and to Terry Lott who helped with many of the practical details of putting it all together. Thanks would be extended to Mr. Jingyi Weng, the Director of the Shanghai Scientific and Technological Education Publishing House, and Prof. Yulin Bian, the Executive Editor, and Mr. Shiliang Tang, the designer, of the book, for their kind help in edition and publishing work for this book.

A personal history, even a much abbreviated one, may be too long. The compromise between a simple list of dates and facts versus all of the small events and background that goes into the real history of what happened or how something happened is impossible to accomplish. What is written here is presented as a compromise of these two methods but with so much background left out. The readers familiar with the things reported here can elaborate on any aspect of what is said from their perspective. This book includes aspects of my life, as I remember them, however imperfectly told or remembered. I have divided the book into discreet sections so any interested reader can focus upon those times or places that are of most interest to them. I have selected only a few photographs to go with this text. Several photographs are included to help illustrate the long road and various paths my life's journey has taken thus far. I used photographs in which I was included. However, when searching my photographs I found that most are photos I took and thus I am not included in the photo. I imagine many of my colleagues could compile better photographs, placing me in the times and places, than I am able to do.

The other sections of the book include a list of my current publications and abstracts through October 2005. I do not view this list as complete as I expect more papers to be published as more research is done. There is a list of my graduate students and postdoctoral research assistants to whom I owe so much for their work and help with my research program. Also included is a list of my technical assistants who have worked in a variety of capacities in their help with my research program. Collection Managers are listed in chronological order.

Finally, some parts of a few of my publications have been selected and reproduced here. These are selected to demonstrate what I thought might have or still could make a difference in my area of paleobotany. Most are not complete but are given here grouped under selected heading that show the different areas that I have worked in. Most are works done in collaboration with others and I think that this is the highest kind of science. Through collaborations and cooperation with others, we always do better than working in isolation.

The title of this book is "A Curious Life: an autobiographical sketch". It was suggested by my wife Kathy and here the word curious might be considered to have a double meaning. Curious is one who asks questions and is looking for answers, also it can be something or someone who is just a little unusual.



David L. Dilcher
Graduate Research Professor, Ph.D., NAS
Florida Museum of Natural History
University of Florida
January 1, 2006 in Gainesville

A young boy learns about nature

I was born in the late morning of July 10, 1936 in Cedar Falls, Iowa. My father was Leonard George Dilcher, and my mother was Hannah Elisa Short Dilcher. This is the time before air conditioning which is a fact that was emphasized by my mother as she often commented upon how hot that summer was in Iowa, especially during the time she spent in the hospital after my birth. I was a curious child with many memories of first encounters with Nature. The questions I asked of the natural world around me formed memories of those times which have stayed with me over the years. Such times include a serious discussion with a few other 4-5 year olds. We were standing on a bridge over a small creek, observing the direction of the flow of the water. We debated back and forth, looking for answers as to whether the creek was flowing toward or from the ocean. Little did we know that if we understood the water cycle that both answers were correct. Also, the flowers in our front yard and our neighbor's front yard were a great attraction for me. Once I picked a bouquet of the neighbor's flowers and was required to present it to them and apologize. Questions and observations about earth worms, baby rabbits, rhubarb leaves, mourning dove calls, gravity, bee stings, gardening, baby birds being feed in the nest, the fragrance of whole butternut fruits, raising caterpillars on dill plants and releasing butterflies, wet feet from the creek, visiting the big rock and stepping in the center of freshly baked pumpkin pies. Such memories include coming home from the corner store, playing with a loaf of bread like an accordion when the wrapper split open and the slices fell out on the sidewalk. There were so many adventures and experiences that took place while I was a young child that I am sure have shaped me in subtle ways unknown to me. But I know I longed to explore the natural world and to hike over the next hill and around the next block and ask questions about the world I observed there. I was a curious child.



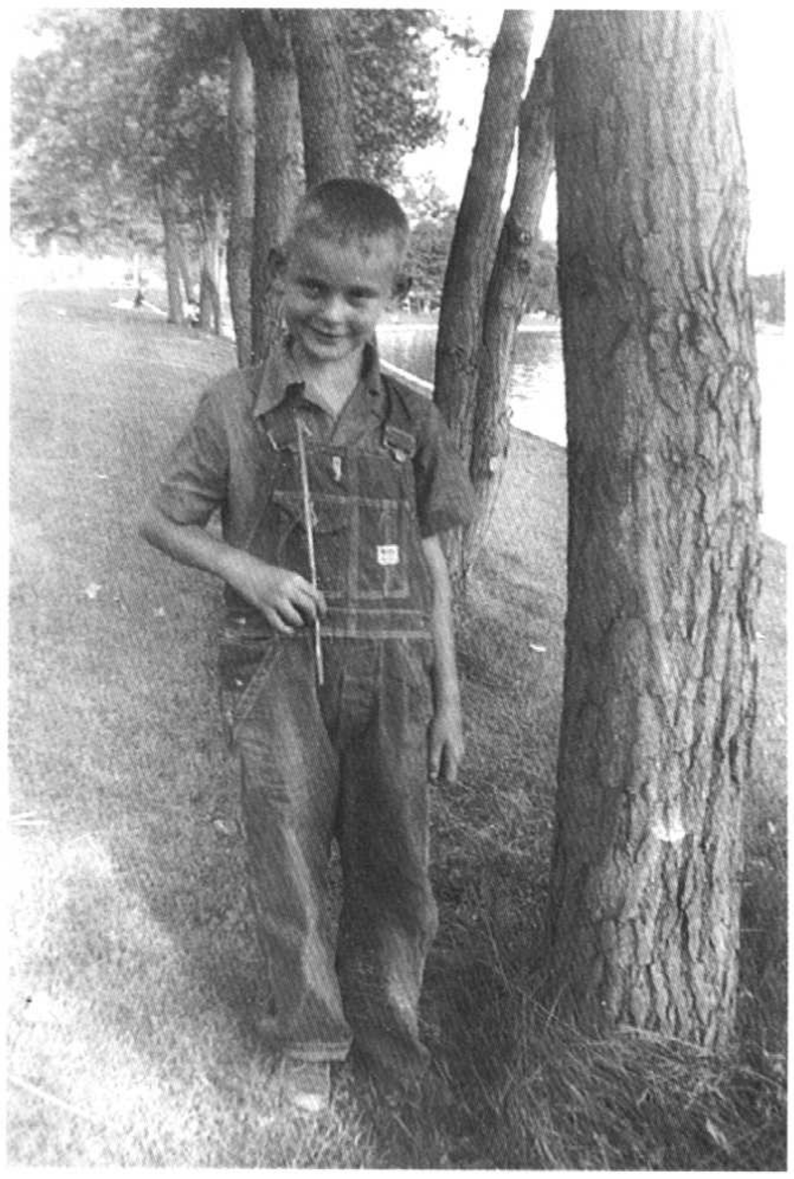
1. David Dilcher, age 1, backyard of 1913 College St., Cedar Falls, Iowa.



2. David Dilcher, age 5, standing by his favorite flowers, Cedar Falls, Iowa.

Growing up

World War II had a profound effect upon my life because we moved to Minnesota where my father worked as a machinist in the Northern Pump Factory. This factory produced can nons for the battleships of the Pacific fleet. My family in 1942 consisted of my parents and my sister Suzanne, who was 20 months older. The summer I turned six, we moved 200 miles north to the small town of Anoka, Minnesota. This is where I grew up living there from ages 6 to 22. Anoka's Main Street crosses the Rum River about six blocks before that river joins the Mississippi River and 1/2 block below the last dam on the Rum River. We lived on the west side of the Rum River while the small business district and high school were across the river. I often roamed along the banks of these rivers, waded in the shallow Rum River below the dam and learned to swim in the Mississippi River. I delivered the Star and Tribune evening newspaper to about 30-40 customers 7 days a week from ages 9 to 12. Collecting house to house on Friday evening and Saturday mornings was always a chore. But the rigor, importance of delivering the paper on time, and the routine of walking the paper route each evening when school was out taught me to persevere, even when I did not enjoy the work and would rather have played. I learned that there could be a sense of finishing the work in front of me that could bring some slight satisfaction. Many a winter night I would come home in the dark after walking about 3-4 miles, picking up and delivering my papers. In the cold Minnesota winters my toes would often lose all feeling and ached when they began to thaw when I was home preparing for supper. From age 9 and on I earned the money I needed for clothes, entertainment, and miscellaneous expenses.



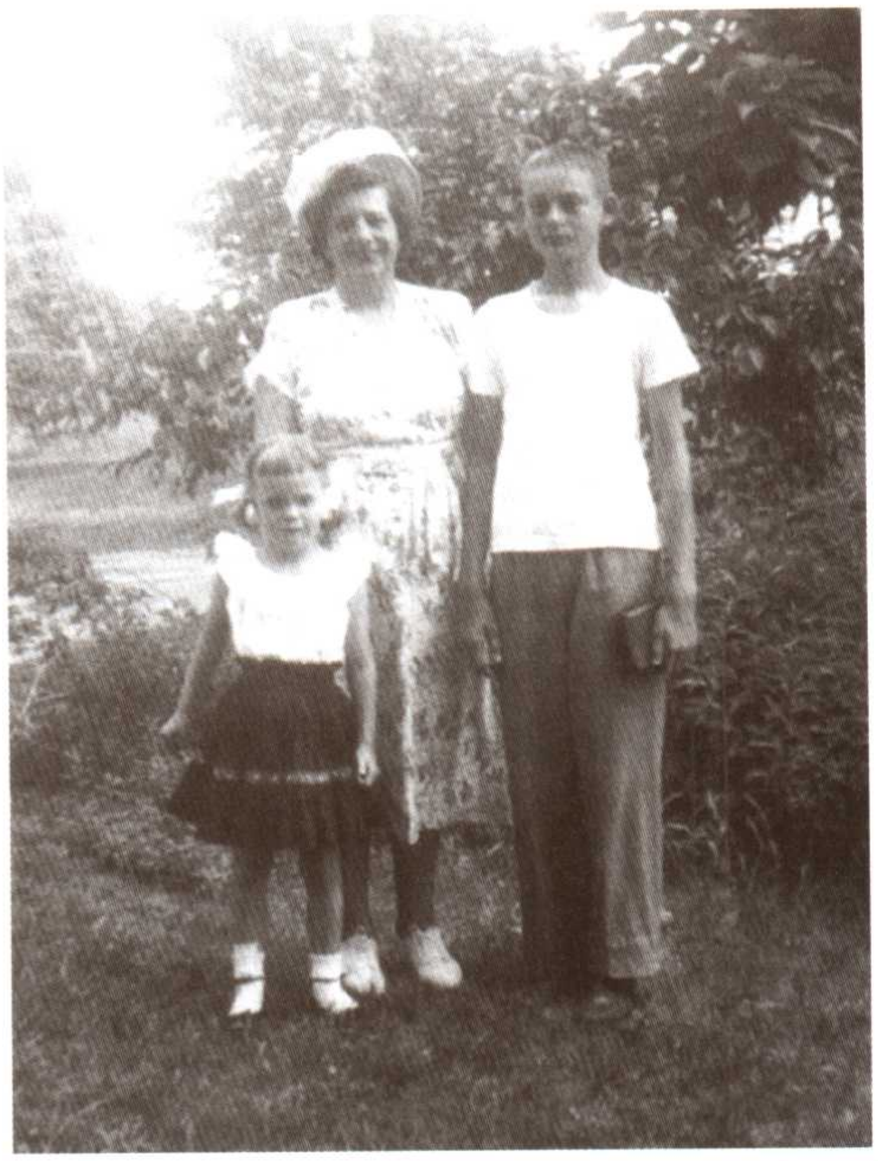
3. David Dilcher, age 8, Como Park Zoo, St. Paul, MN.

Grade school, Middle school, and High school opened new views of the world in geography and social studies while reading and spelling were the most difficult for me. In later years I learned I was dyslexic. It was in the second and third grades, as a member of the slowest reading group, that I remember struggling to memorize words and how to spell them. I never learned the phonic method of sounding out a word. Still today I may invert b and d as well as p and q or reverse two digit numbers when I am tired or distracted.

Middle school years were a struggle that provided time alone to learn to play the snare drum. I was placed in classes with the non college track kids and thereby

not allowed to take algebra. I asked my parents to intercede on my behalf, as I saw other kids do, so I could be placed in algebra, but my parents were reluctant to talk to the school officials. So I got a poor start in math from the beginning.

Band was the high point and typing class the low point in high school. Being more awkward than athletic, I applied myself in band, even playing snare drum solos my junior and senior years in the state music contest, for which I received an A each year. Debate was also an activity I worked at and traveled on the debating team for Anoka High School. The parts of physics I liked best involved learning the algebra I had missed that was necessary to work the problems. There was little chance to travel when I was young, but I would plan exploring trips along the Rum or Mississippi rivers or bicycle out past the edge of town to find and explore some woods and lakes in the region. I dreamed of exploring far away places and looked in comic books for names and addresses of pen pals in far away places to exchange letters with. My writing skills were poor and my language was restricted to English but I did exchange a few letters. As kids, we were busy with many projects, schemes, games and adventures too numerous to mention here.



4. Dianne (babysitter), Aunt Minnie Smith, and David Dilcher (age 14), Bible in hand, ready for church.

High school was also filled with working at Hogland's Greenhouse in my neighborhood. At first I shoveled snow, then later on I tended gardens and lawns, helped selling plants, delivered bouquets and plants, made corsages, took phone orders, washed floors, and anything else required in running a small greenhouse and a florist shop. I would work on weekends, after school, and during the summers, even into my early university years.

I enjoyed high school and became a better student more by learning how to perform in class and take exams than how to study. Several good friends from high school are still good friends and I married by high school sweetheart and classmate, Katherine Swanson. I managed to finish as an honor student (upper 1/3 or 1/4 of a class of 200) in the Anoka High School class of 1954 while Katherine was the Class Valedictorian.

My conservative Baptist background influenced my high school years. I was active in organizing a Christian Fellowship Club in the school and served as it's President. Influenced by my Baptist background I helped organize an alternative celebration



5. Katherine Swanson and David Dilcher, ca. 1956.

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to the junior/senior prom for those who objected to dancing and we had a great time. From this background I came to the University well aware of and clearly warned about the professors who would try to teach evolution which would conflict with all we had been taught in church. This never happened, but I learned how life changed through geologic time while evolution was never mentioned.

Now over 50 years since my high school graduation, I marvel at and celebrate all the diverse directions my classmates have taken and their successes. Perhaps one student of Anoka High School who was just a few years behind me, Garrison Kellior, has captured the spirit of a small town in Minnesota in his books and radio shows in with his characterization of Anoka in the mythical "Lake Wobegone". Occasionally I recognize the thinly disguised characterization of the people he describes in his stories, for they formed a real part in my life growing up in Anoka.

Growing up in Anoka, Minnesota was special. While it did not seem easy in a day to day routine at the time, when I look back upon it, the life in that small town was a sheltered and nurturing environment in which to grow up.

A student looking for focus

Upon finishing high school in June 1954, I had three choices before me. I could join the military for 2-4 years depending upon the program I entered, I could work in manual labor such as a factory or in sales, and later go into the military as a draftee, or I could go to college and later be drafted into the military. I decided that going to college would be the best option. I had no specific area of study in mind. I had been told by a high school counselor that I should not consider medicine (it seemed implied that I was not bright enough for Medical School) but if I liked biology, I might consider veterinary medicine (her husband was a veterinary medical doctor). I knew I liked music, also I liked the organizational and leadership roles I had in my church and felt a certain amount of fulfillment in being helpful and useful to others, so perhaps a minister. Thus, faced with no clear focus, I planned to attend the University of Minnesota after high school.

My choice of college or University was limited to what I could afford. Perhaps because I was not included in the "University Track" in high school, there was not much mention about University or college applications. The spring of my senior year I began to think about what I would do after graduation and had even written to Oberlin College for a catalogue and admission information. Also, I had catalogues or access to catalogues at school from various colleges in Minnesota. What stands out in my mind was the cost for students at Oberlin College which made it clear to me that in reality the only place I could attend was the University of Minnesota. My application to the University of Minnesota was accepted and I began to work and save in order to begin classes in the fall of 1954.

That summer, one of my best friends, Michael Hagen was going to Sweden to visit his aunt who worked in the American Embassy in Stockholm. I had saved about $500 to spend on my first year at the U. of M. But the chance to go to Sweden with Mike was a strong temptation because four years earlier we had traveled to Chicago, spending two weeks visiting museums, parks, zoos, while staying with another aunt of Mike's. So it was a dilemma, should I spend my college money to go to Sweden, or keep the money in the bank and start college in the fall. Education seemed most logical, but not the most fun, so I stayed home weeding the flower beds and mowing the lawns at Hogland's Greenhouse and Flower Shop for $0.75 an hour. That fall I started at the University of Minnesota with about $750 in the bank.

My most memorable introduction to my freshman class was when we were gathered together during freshman orientation in Northrup Auditorium. The Dean, and associate-assistant deans of the College of Arts and Sciences were there up on the stage, with a class of 4000 freshman students in the audience. One of the most vociferous of the Deans proceeded to ask us to look at the person sitting in front of us, to the right, to the left, and behind us. Then he said very clearly, remember this because "Only one of those four people you just saw will be

here in four years from now for graduation". The University was struggling with a mandate that they must accept all high school graduates in the top half of their graduating class. This overpopulated the classes at U. of M. We were told to expect a strict bell curve in grading with 1/3 D's and F's in each class the first two years. The business of freshman and sophomore classes was not only to teach, but also to reduce the number of students, as a C average was necessary to remain at the University. I took all general classes necessary for completing the requirements in areas such as of English, Social Studies/History, Public Health, Physical Education, Science, and Language. I also took a few elective classes such as How to Study, Business Accounting (which I nearly failed and can say it was my nadir in academics) and Band. The Football Marching Band was my identity and my group of friends on campus.

My undergraduate years were at time of learning, in academics, about people and myself. I particularity enjoyed music, new concepts in science (a general science class that lasted all year including Astronomy, Chemistry, Physics, Geology, and Biology) and some ideas in sociology, history, public health, and languages. There was so much to learn that I had little time to reflect or understand. That came when I took a general Botany class the summer between my sophomore and junior years. I took the class in the mornings and worked at Hogland's Greenhouse in the afternoons. All day I learned about plants because what I studied in morning lecture and lab was extended to the afternoon by observation. Professor John Hall lectured and Joe Novak taught the lab the first half of the summer while Professor Owenby lectured and Mr. Hsu taught the lab the second part of the summer. That fall, John Hall, at the suggestion of Joe Novak asked me to work part time in his research lab. While this was for only about 10 hours a week at 0.99 ¢ per hour, it was great to be involved in a lab. I cut and peeled coal balls, learned to make slides of particular things in them, and also learned a new peel technique using acetate sheets and acetone rather than the old colodin liquid I had started with. Later, I learned to prepare pollen slides from sediment. John Hall was a major influence in my life and certainty I would never have become involved in Paleobotany without his influence. This was in 1956-57.

During my freshman and sophomore years I lacked a major, nor did I have any ideas for a major. Perhaps in reality I had too many ideas but no direction. I took several measurement tools (e.g. strong interest test) and the results showed too many interests. During the late winter in Minnesota it is often cold and I had noticed the ice on Hennepin Avenue, which ran through campus, was disappearing. Like a flash from heaven I knew what I wanted to do. It became crystal clear in that moment while contemplating the conversion of solid ice into a gas bypassing the liquid phase, was what I enjoyed thinking about. It came to me that it was natural history and all aspects of nature around me that I enjoyed, such as the plants and cave crickets I kept in my room, the bees I kept in the back yard and



6. David Dilcher, ready for graduation from the University of Minnesota, 1958.

all aspects of science. Then I talked to some counselors and learned they had a Natural History major in the College of Education. This program fit me perfectly because it involved Botany, Zoology, Astronomy, Physics, Chemistry, and Geology. I started this program that summer by taking General Botany and loved it and all the science classes in the program. My major concentration of classes was in Botany and Zoology so I anticipated becoming a High School Biology Teacher and perhaps also teaching some 7th, 8th or 9th grade general science classes. My grandfather, grandmother, aunts and cousins were teachers, so this was something I thought I could do and make a living doing. The time that I enjoyed the most as an undergraduate began when I started taking science classes and meeting fellow students with similar interests. I also enjoyed my involvement with the band and continued this activity. Also, I became active in the undergraduate Biology Club and enjoyed that very much. Charlie Krebs, Dan Jansen, Ed Haskins and Bob Hodson were my classmates. Some were active in the biology club, or joined me on field trips and in botany classes. They all became University Professors.

The spring of my senior year I interviewed for a couple of teaching jobs but had not received any offers when Professor John Hall asked me what my plans were for the next year. He never mentioned that he had included me in a NSF grant request as a research assistant. He said to go with him up to the Botany Office and get the forms to apply to Graduate School and for a Graduate Teaching Assistantship. By the middle of that summer, I had an offer of a Teaching Assistantship in the Botany Department and John Hall had not heard from NSF about his grant, so I accepted the T.A. position in the Department. Later that summer, he heard he had received the grant and hired Norman Norton in that position. In the summer of 1958, I graduated with a BS in Natural Science Education from the College of Education at the University of Minnesota.

Learning to be professional

The fall of 1958 I began a Masters of Science program at the University of Minnesota with a major in Botany and minors in Geology and Zoology. This was a dividing point for me. It was a time when I decided within myself to become a serious student, that is to learn all I could and to work for top grades, in most classes. I still worked on projects in the Paleobotany laboratory and took several pollen classes with Professor Orval Dhal. I had a real interest in Eocene age pollen. The enjoyment of learning and the sense of discovery that I felt during the last two years as an undergraduate only increased as I studied such subjects as Extra Nuclear Cytology and then Nuclear Cytology. This was an exciting time because of new discoveries such as the DNA molecule, the bilayer structure of the membranes, and the ultrastructure of the chloroplasts, mitochondria and nucleus. It was all new data, of stories unfinished or not yet applied to experimental biology. Experiments were yet to be developed to test the hypotheses of the nature of how the cell functioned.

The Master's degree at the University of Minnesota could be completed by two different options. One option was to write an in depth thesis on one topic while the other option allowed me to write three "stared" papers. These papers were to be in depth and cover a variety of research topics, and this is the option I selected and used for my Master's Project. These three papers were done in my second year, on material that I collected while on a trip with my good friend Robert C. Hodson early in the summer of 1959. We drove a Ford Station Wagon from Minnesota to Maine, Florida, and back to Minnesota. Along the way we stopped at many universities and natural history sites. John Hall had written to Mr. Langford at the Field Museum asking about places we might stop to collect fossil plants. He wrote back giving directions to clay pits in Holly Springs, Mississippi, and Puryear, Tennessee. Bob Hodson, later a Professor of Plant Physiology at the University of Delaware, and I stopped at both these localities and collected beautiful angiosperm leaves. The material we found at Puryear clay pit was particularly well preserved in a tan clay with the leaf fossils often partially oxidized and splitting along the mesophyll with the upper and lower leaf epidermis/cuticle still preserved on part



7. David collecting fossil plants at Puryear, TN clay pit, 1959.

and counterpart. This was from the middle Eocene Claiborne Formation and has developed into a major part of my research life and that of my students and their students.

I wrote all three papers on fossils from Puryear clay pit. One dealt with pollen that I prepared from the tan clay sediment, the other two dealt with cuticular analysis of the leaves that we collected at Puryear. This work stimulated an interest and excitement in the discovery and exploration of ancient life, especially the potential for learning about plant life in the middle Eocene of southeastern North America. During this time I noticed that academically I did as well, if not better than most of my colleagues in Graduate School. They were all headed towards completing their Ph.D. degrees, something that I had never considered. At that time there was no history of anyone in my extended family completing a Ph.D. So I asked John Hall what he thought. He suggested that I apply to the University of Kansas where Bob Baxter was the paleobotanist and McGregor was the Botany Department Chairman. Bob Baxter worked mainly on coal balls from the Carboniferous of Kansas which were full of *Cordaites* and *Calamites*. I had met both Baxter and McGregor at Henry Andrews's house in the fall of 1959 during the Missouri Botanical Garden Symposium. Hall said Andrews would be good to work with but that he would be gone to India for a sabbatical the next year. He also suggested the University of Illinois where Wilson N. Stewart was Chairman of Botany, Cornell University, where Harlan Banks was chairman of Botany, and Harvard University, where Elso Barghoorn was the paleobotanist. However, unknown to me, Barghoorn had taken a leave of absence (because of his son's unexpected death) and was not in his lab. Yale University was also suggested, where a young, but good paleobotanist named Ted Delevoryas worked. The summer before, when Bob Hodson and I traveled down the east coast we had stopped at Yale and visited Ted Delevoryas in his research lab and also met his first graduate student, Don Eggert. So I applied at all these schools except the University of Illinois because it was another Big 10 University in the mid-west, just like the University of Minnesota where I already had spent six years. I was accepted by all the graduate programs except Harvard and I wonder if Barghoorn's absence when my application was being reviewed played a role in this.

I accepted a fellowship offer from Yale University to work with Delevoryas. I organized a room in the graduate dormitory and planned to move in August 1960 when in June I received a letter from Delevoryas informing me he was leaving Yale University and moving to the University of Illinois. He said Dr. Ian Sussex would replace him in plant anatomy but there would be no paleobotany program. He invited me to apply to the University of Illinois which I did, as I already had their application forms. I was accepted so I declined at Yale, and moved to Champaign-Urbana, Illinois in August of 1960.

The paleobotany lab at the University of Illinois was an exciting and active place to be in 1960-62. Stewart was chair of the Department, Ted Delevoryas was active with his *Cycadeiodes* and also some coal ball research, Don Eggert came there to be post doc with Stewart, Peggy Cain-Bulback arrived as I did, by way of canceling at Yale, Jean Langenheim was there with her husband in Geology, and Tom Taylor arrived to work on pollen with Robert Kosanke of the Illinois Natural History Survey. We held weekly evening seminars at Stewart's house, and joining us were Zane Corruthers, the plant anatomist, and Dale Smith the taxonomist. The first year at Illinois I began research on fossil angiosperm leaves from Puryear.

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