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CELEBRATING WOMEN IN PALEOBOTANY: A TRIBUTE TO EDITH L. TAYLOR—INTRODUCTION AND DEDICATION

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> Plants and animals now living on the face of the earth are the descendants of those that flourished in earlier times. In order to properly understand the present distribution, one must know something of their ancestry and their own history. (Winifred Goldring 1929, p. 58)

Paleobotany, the study of fossil plants, is, like all facets of science, continuously progressed by "standing on the shoulders of giants." As a discipline, paleobotany is fortunate to have had a number of women among the giants in our field. The incredible stories and contributions of these women could fill several volumes, but here are some notable and formidable figures from around the world. British scientist Marie C. Stopes (1880–1958) is best known for her advocacy for women's reproductive rights and her highly controversial position on eugenics, but a significant part of her life was also dedicated to paleobotanical research. She received her doctorate from the University of Munich in 1904 (the first woman to do so) for her work on cycad reproduction, she was elected fellow of the Linnean Society of London, and she contributed to our understanding of Paleozoic and Mesozoic plants (e.g., Stopes 1905, 1906, 1907). Winifred Goldring (1888–1971), the first woman in the United States to be appointed as a state paleontologist (New York), specialized in Devonian invertebrates and plants. She was a gifted visionary who created the first prehistoric museum diorama that allowed visitors to walk through and experience an extinct ecosystem with a life-size reconstruction of the famous Devonian Gilboa fossil forest (Fisher 1974). Australian paleobotanist Isabel C. Cookson (1893–1973) published on a wide range of fossil plants, including reports on paleopalynology and some of the earliest vascular plants from the Silurian–Devonian, Oligocene coal-forming floras (e.g., Cookson 1935; Cookson and Cranwell 1967). With limited funding opportunities for field research and international travel, Cookson generated her own funds with profits gained by learning how to invest in the stock market (Dettmann 1993). South African pioneering paleobotanist Edna P. Plumstead's (1903–1989) research on the fructifications of *Glossopteris* provided compelling evidence for the existence of the former supercontinent Gondwana and the theory of continental drift, for which she was an avid supporter long before the theory was

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generally accepted in the scientific community (Maguire 1990; Frankel 2012). Another Gondwanan paleobotanist was the Brazilian Diana Mussa (1932–2007), a world authority on South American Paleozoic floras who not only described more than 30 genera of fossil wood but also dedicated a portion of her life to humanitarian efforts in Amazonia (Bernardes-de-Oliveira 2007). Shyamala "Shya" Chitaley (1918–2013) was a trailblazing Indian American paleobotanist and lifelong promoter and researcher of Indian fossil floras. After a long and successful career in India, she moved to the United States at 60 and became the first paleobotanist at the Cleveland Museum of Natural History, where her tireless scholarship helped solidify the museum as one of the premier research institutes for fossil plants (Segall 2013). The remarkable Russian paleobotanist Marie F. Neuburg (1894–1962) was an expert on fossils from Angaraland, and her contributions enhanced our understanding of fossil bryophytes (e.g., Neuburg 1956, 1960). She upheld the highest standards for herself and her colleagues by never letting restrictions or regulations impede her research, and she frequently stated, "We must fight for our right to work!" (Meyen 2009). The Belgian paleobotanist Suzanne Leclercq (1901–1994) was the first woman from the University of Liège to obtain the prestigious "*agrégé* diploma of higher education" with the highest distinction, and she was a member of the Royal Academies for Science and the Arts of Belgium. She substantially increased our understanding of Devonian floras and structurally preserved Paleozoic plants from Europe; her skill set was highly sought-after, and she made numerous trips to English museums to study their collections (Fairon-Demaret and Streel 1999). Another European researcher with significant contributions to paleobotany was the German paleobotanist Renate R. Remy (1927–2015), who started as a volunteer at the Geological Survey at Berlin but advanced to publish more than 50 papers and two books, many of which fundamentally increased our understanding of early terrestrial ecosystems in the late Paleozoic (Mohr and Vogt 2001). This global sampling of female paleobotanists is far from an exhaustive list of outstanding female scholars. In addition to their productive research, they were pioneers, trailblazers, sources for inspiration for future generations, and lifelong advocates for women in science.

Dr. Edith L. Taylor, to whom this volume is dedicated, has built on the foundation of her predecessors and has continuously promoted and advocated for women in science throughout her career. Known as "Edie" by her friends and colleagues, she is a remarkable scientist with a prolific career. Edie has coauthored more than 200 publications and nine books and edited volumes—including *Paleobotany* and *Fossil Fungi*, two of the authoritative textbooks in the field (for a complete bibliography, see the supplemental information, available online). Edie earned a master's degree (1978) and her PhD (1983) in botany from the Ohio State University. Her early work focused on the evolution of phloem, with emphasis on Carboniferous permineralized plants, an enthusiasm that has continued throughout her career. Edie has described the detailed anatomy of this tissue in several emblematic fossil plants, such as *Callistophyton*, *Medullosa*, and *Psaronius* (Smoot and Taylor 1982; Smoot 1984*a*, 1984*b*). Beginning in the 1980s, she, along with her husband and lifelong colleague, Thomas N. Taylor, expanded her research expertise to fossil floras in Antarctica. Over several field expeditions to the continent, her extensive collecting and research have contributed to the discovery of several new localities and the description of numerous fossil plants from the Permian and Triassic of the Transantarctic Mountains (e.g., Smoot et al. 1985; Smoot and Taylor 1987; Taylor and Taylor 1990). Her work highlights Antarctica's importance for understanding plant evolution and the continent's potential in reconstructing high-latitude paleoenvironments. In 1992, she was the lead author of a paper in *Science* ("The Present Is Not the Key to the Past: A Polar Forest from the Permian of Antarctica") that illustrated how the presence of Permian fossil forests contradicted contemporaneous paleoclimatic reconstructions for Antarctica and advocated for the necessity of paleontological evidence to help calibrate climate models (Taylor et al. 1992). Edie has received more than 40 years of continuous National Science Foundation funding for her research at the Ohio State University (until 1995) and the University of Kansas (1995–2020). During that time, she participated in fieldwork on five continents, including numerous field seasons in Antarctica. Edie has also advised nine graduate students and 16 postdoctoral researchers (including all of the editors of this volume) and collaborated with prominent paleobotanists and geologists from all over the world.

Augmenting her research and scholarship, Edie's dedication and advocacy for women in science developed early on and continued throughout her career. We choose here to highlight only some of her accomplishments and contributions related to women in science and as a woman in science, as the full list would fill a volume unto itself. From the beginning of her career, her interest in women in paleobotany could be acknowledged from the specific epithet from her first publication, titled "*Etapteris leclercqii* sp. n., a Zygopterid Fern from the Pennsylvanian of North America"; *E. leclercqii* was named in honor of a pioneering woman in science, Suzanne Leclerq (Smoot and Taylor 1978). In the same year, she was awarded the Isabel Cookson Award for the best student paper in the Paleobotanical Section of the Botanical Society of America. During the final year of her PhD studies, she received a prestigious Dissertation Fellow award from the American Association of University Women and was celebrated and recognized as the "Outstanding Young Woman of the Year" in the state of Michigan. At the 10th Annual Women's Studies Conference in Rochester, Indiana, Edie contributed a paper on Marie Stopes to explore the complexities of her life as a scientist (Smoot and Dickie 1984). Throughout her career, she has participated in many regional and national initiatives to encourage women of all ages and backgrounds to pursue a career in science. While at the University of Kansas, she taught a seminar on women in science and maintained a database of bibliographic references on the subject to educate students on the contributions of women in science throughout history. She has also developed academic materials and participated in several national outreach programs such as the Expanding Your Horizons in Science and Mathematics program for middle school girls.

In honor of Edie's contribution to paleobotany and her advocacy for the place of women in science, the present volume contains 10 original research articles led by women representing various countries and career stages, including contributions from some of Edie's own students and postdocs. The articles are presented here in stratigraphical order, covering more than

350 million years of plant evolution from the Devonian to the present, illustrating the breadth of research in paleobotany today and including the description of new fossils, clarification of issues of evolution and paleodiversity, and reconstruction of past environments and climates, as well as interactions. This research also demonstrates the importance of both classical methods and promising new approaches. We are aware that the present volume portrays only a small number of underrepresented individuals and groups that have contributed to paleobotany. In paleobotany and in all areas of science, there are still a lot of advances to make before the discipline becomes fully integrated, inclusive, and rich in diversity. We hope that this issue will encourage further initiatives to increase the visibility of all (paleo)botanists and their scientific contributions. We, along with the global paleobotanical community, jubilantly dedicate this volume to our mentor and friend Edith L. Taylor. May her career and advocacy for women be a continual inspiration for future generations of scientists, as they were for us—thank you, Edie.

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