
MEMORIAL

NORMAN GARY LANE:
PRESIDENT OF THE PALEONTOLOGICAL SOCIETY (1987–1988) AND
FOUNDER OF “FRIENDS OF THE ECHINODERMS” (1967)



FIGURE 1—Norman Gary Lane (1930–2006).

NORMAN GARY LANE (1930–2006), president of the Paleontological Society (1987–88) and founder of “Friends of the Echinoderms” (1967), contributed to the lives of each of the authors of this essay. He was an excellent paleontologist, a very fine person, and our friend. He influenced each of us, in ways large and small, and through his wisdom, insight, and sheer human decency he helped each of us to become better scientists, better teachers, and better human beings. We are proud to number ourselves among a great many for whom Gary Lane was a role model.

INTRODUCTION

Gary Lane (Fig. 1) was born in French Lick, Indiana, on February 19, 1930. In his early childhood the family moved to Sidell, Illinois, where for many years his father owned and operated the

small-town newspaper that served the local farming community. Following graduation from high school, Gary attended Oberlin College in northeastern Ohio—at that time and for many decades earlier regarded as among the most outstanding of all liberal arts colleges—from which he received his Bachelor’s degree in Geology in 1952. Even in his student days Gary delighted in carrying out geologic field work. This, coupled with the accessibility of the kindly (if demanding) faculty of the Oberlin Geology Department, kindled Gary’s interest in fossils and the history of life, just as it spurred on two of his classmates, E. G. Driscoll and J. A. Fagerstrom, each of whom, like Gary, were later to become professors of paleontology.

Gary obtained his graduate education at the University of Kansas, where he studied with the distinguished paleontologist Raymond C. Moore (lead author of the famous Moore-Lalicker-

Fischer textbook, the “Bible of Invertebrate Paleontology” in the 1950s and ’60s). His Masters thesis (1954) was a study of the Lower Permian Grenola Limestone in Kansas. Though Gary’s initial inclination was to work on Triassic cyclical sedimentation for his doctoral studies, R. C. Moore had other plans, strongly urging Gary to investigate crinoids (fossil sea-lilies), work that led to his 1958 doctoral dissertation: “The Monobathrid Camerate Crinoid Family: Batocrinidae.” From this start, Gary developed a lifelong scientific interest in the study of crinoids, the most diverse and abundant group of echinoderms known from Paleozoic strata. While at the University of Kansas, Gary worked both for the Kansas Geological Survey and the Canadian Geological Survey, and in 1955–1956 he was a Fulbright Scholar at the University of Tasmania.

Soon after receipt of his doctorate, Gary and his new bride, née Mary Rooney, moved to the west coast where he joined the faculty of the Department of Geology at the University of California, Los Angeles. Gary was a core member of UCLA’s highly regarded department, rising through the ranks to become Professor of Paleontology. In 1973, enamored by the richly fossiliferous strata of the mid-continent and the opportunities they presented for his research, he returned to his home state as Professor in the Department of Geology at Indiana University. Though he formally retired in 1994, he remained highly active as a Professor Emeritus, teaching in the Honors Program, pursuing his research, and writing about the history of paleontology.

THE UCLA YEARS

Gary Lane was, in the noblest sense of the term, a *professor*. Kind, unassuming, deeply knowledgeable yet full of fun, he was a superb teacher, both in the classroom and in the field. For some of the co-authors of this essay he served as an undergraduate or graduate advisor, for others, a departmental colleague, and throughout our various interactions he taught each of us lessons about paleontology, about the natural world, and about life in academia that have played an important role in our personal development. The following are three perspectives from Gary’s 15 years at UCLA.

An undergraduate student’s perspective (Ron Parsley).—“I first encountered Gary Lane in the spring of 1958, when I was a callow third-year student majoring in Geology at UCLA and he showed up in the department the semester before he was to begin his formal teaching duties. That semester, before he had officially come on board, he took a section of about 15 students in our large field geology course (102B) on a class exercise to map, in detail, Tick Canyon, a site well known to southern California geology undergrads of that era. During the course of this demanding exercise I discovered what an excellent teacher Gary was; all of us in his section benefited greatly from his help. From this association arose a lifelong friendship. Most importantly for me, he was the driving force that encouraged me to study invertebrate paleontology at the University of Cincinnati, at that time probably one of the best places in the country to do graduate research on primitive echinoderms.”

A graduate student’s perspective (Gary Webster).—“Gary was a great person to work under. He was always nudging you in an unobtrusive manner to do the best possible and gently pushing you to broaden yourself, to move in directions that would help you do a better job. He was never too busy to answer your questions or to help you find support for your research. He delighted in your new discoveries as much as his own. Although crinoids were his personal favorite, he was a paleontologist with broad interests and a solid knowledge of the entire field of paleontology and all it encompasses. He kept up with new developments in paleontology as well as other areas of geology and incorporated these into his lectures and working with his graduate students.”

A faculty colleague’s perspective (Clarence Hall).—“Gary and I taught a paleontology class together for several years, prior to the time that Gary, Bill Schopf, and I taught the class together—at UCLA, the ‘Golden Years of Paleontology.’ On one of many class field trips to Gary’s favorite haunt, Arrow Canyon in south-western Nevada, with its rich fossil beds of the Bird Spring Formation and post-trip frivolity at the nearby Petersen’s Hot Springs, Gary asked the nearly 100 students some probing questions. ‘How many of you have been out of Los Angeles before this trip?’ ‘How many of you have been out of the State of California prior to this trip?’ More than half of the group had never before been out of Los Angeles. More than 80% had never been outside the state.

Of course, that was when Gary was at UCLA, now some 35 years ago, and things have changed. But the responses to Gary’s polling were typical of the times, and Gary considered the results to be an all-too-telling testament of the parochial naiveté of UCLA undergraduates. So very few students had ever been close to nature, even fewer had first-hand knowledge of the diversity of the physical and biologic world, and virtually all regarded asphalt-paved southern California to be the model for the world, the ‘center of their universe.’

Spurred by this experience, Gary and I came up with the notion of offering a 10-week-long field course. The instructors for the course would come from the Botany, Zoology, and Geology departments and the course would be entirely field based (including lectures and labs, with exams also in the field). As it turned out, the faculties of the Botany and Zoology departments were not much interested in such a course—too much work. It looked like Gary’s idea of enticing students into the field for first-hand observations of nature would die aborning. To his credit, Gary was not dissuaded by the lack of enthusiasm of the life sciences faculty, suggesting instead that he and I enroll in a plant taxonomy course then offered by Professor Mildred Mathias (Botany 124), and that once we were proficient in identifying plants native to southern California we could then ourselves offer a natural history course sponsored by the Geology Department. To me, this seemed a huge undertaking, but Gary persuaded me to take the class with him in preparation for the field-intensive course we hoped to offer. Soon, thanks to Mildred Mathias, we were primed to offer our class. But an opportunity of a different kind then came—Indiana University invited Gary to return to his roots, presenting him an opportunity to be near the sites of fossil-rich crinoid beds central to his research. Gary left UCLA, to our great loss and to the great gain of IU.

Despite his departure, the natural history course that he and I envisioned came to fruition; I have offered it on and off for more than 32 years (currently, as Earth & Space Sciences 20). He, in turn, once ensconced at IU, set up the same sort of course. Our idea panned out, probably more than either of us had initially imagined. Yet over all of these past years, I have personally considered the UCLA part of this venture to be Gary Lane’s course, not mine. It was, after all, his idea; in his own quiet way, it is he who started it. Indeed, in his own quiet way, time and time again he helped not only me, but my faculty colleagues and the students in our department. Always, he was looking for ways to make things better for students—to help them to be more inquisitive, more scholarly, and more satisfied with themselves. And always, in his quiet way, he tried to buoy up the spirits of the department. Though most now have forgotten, it was Gary Lane who started our departmental tradition of Santa’s visit at Christmas time. He mobilized “elves” (mostly staff, a few students, and even fewer faculty) to prepare humorous gifts for members of the departmental family.

At UCLA, Gary Lane is remembered fondly and with great

respect. His 15 years with us were the Golden Years of Paleontology—The Gary Lane Years!”

Postscript to the UCLA Years (Bill Schopf).—“Gary and I shared only the last six of his 15 years at UCLA, yet during that time he gave me the greatest gift of all—he taught me how to teach. When I arrived in 1968, full of myself as a freshly minted Harvard Ph.D., Gary and Clarence Hall allowed me to join them as the third co-teacher of their Freshman-Sophomore history of life course, with me handling paleobotany. In those days, UCLA had not yet established a system for student evaluation of courses and professors (now, of course, universally required), but I soon discovered that Gary and Clarence had just such a system already in place. Toward the end of my first term of teaching in their class, a dittoed (pre-Xerox!) multi-paged evaluation form was distributed to the hundred or so students: ‘Which lecture did you most/least like?’ ‘Did you learn anything of value?’ ‘How can this professor do a better job?’ A few weeks later, I was let in on the results. About half the students claimed that I was the most wonderful upbeat prof they had ever seen—scintillating, rigorous, the best thing since sliced bread! (OK by me—I was a Harvard guy!) But the other half regarded me as an unmitigated disaster, a far-too-technical polysyllabic sure-of-himself fancy pants with the communication skills of a gnat. I was ashamed. In my first effort at UCLA, I had failed in the view of at least half of the students in the course. Still, I had some pretty good mentors, Gary and Clarence both, so I watched those guys—their gentleness and kindness to students, their ability to see the world through the eyes of the undergraduates in their courses, and (most importantly to me) their understanding that it is the students who matter, not themselves. Gary took me under his wing—possibly because of our shared Oberlin background—and showed me how to teach. Thanks to him, to Clarence, and to their course, I later became the first in our department to receive UCLA’s Distinguished Teacher Award.”

THE IU YEARS

When Gary Lane came to Indiana University in 1973 he made a strong paleontology program even stronger, ushering in the “Golden Years of Paleontology at IU.” Over the following two decades, he attracted a long line of outstanding graduate students to work with him and made a lasting impact on his new department and university. Bob Dodd fondly recalls Gary’s contributions to Indiana University: “Gary recognized the potential of the grad students working with him and ignited a spark in them that continues to burn to this day. Many of the present leaders in crinoid research were Gary’s students, two of them going on to receive the Schuchert Award, the prestigious young scientist award of the Paleontological Society. In addition to his graduate students, Gary was an inspiration to hundreds of others—geology majors, majors in other disciplines, IU Honors students, and non-degree students who took his classes for the sheer joy of learning—and he inspired his colleagues as well, with his encouragement, good judgment, and especially by his example.

Gary’s arrival at IU in the early 1970s changed the face of paleontology at IU, in part due to some traditions brought with him from UCLA that he then established at IU. One of these was a weekly brown-bag lunch for the paleontology students and faculty (Don Hattin, Bob Shaver, Carl Rexroad, Alan Horowitz, Bob Dodd, and Mike Savarese). Over time, this expanded to include many of the sedimentary geology students and paleobotanists from the Biology Department (David Dilcher, Steve Manchester and, for a time, Greg Retallack). The only catch to attending these luncheons was that the names of all attendees were placed in a box and each week a name was drawn. The ‘winner,’ the person whose name was drawn, was required to give a short talk on his

or her research (or any other topic that the selectee thought appropriate) at the following week’s get-together. (According to Gary, the rule at UCLA was that a student or faculty member thus selected had to give a talk immediately, at the same session, but to quell an impending rebellion by the IU students, we gave a week’s grace.)

Another program Gary brought from UCLA was his natural history course. This he conducted through the Honors Division at IU and was limited to a small number of especially excellent students, few of whom had any previous background in geology or natural history. Always, the highpoints of these classes were their field trips, especially an overnight trip to a nearby state forest. Gary showed these students the natural world, and he surely inspired a great many of them with a love of nature. But Gary’s penchant for such outings was not limited to his Honors students. He dearly loved taking students and faculty on geology/paleontology/natural history field trips, and enjoyed it so much that he would sometimes volunteer to help another faculty member by taking care of the logistics for the overnight camping portion of the trips planned for their class. Such generosity was enormously appreciated by his colleagues. On such occasions, he would bring his legendary giant wok and all of the ingredients for a fantastic stir-fry dinner. The students were each assigned a task in the preparation of the feast, and they would take turns stirring the meat and vegetables as they cooked. After a sumptuous meal, students and faculty would sit around the campfire and trade stories of past adventures, usually finishing the evening with a round of singing. Despite his undergraduate years at Oberlin, Gary was not a particularly accomplished singer, but after a good meal and a few beers he could usually be enticed to lead us all in a roaring rendition of ‘The Gay Caballero.’

Gary served as Chair of the Geology Department from 1984 to 1987. During his stewardship, the department reached its maximum size of 27 faculty and hired its first woman faculty member. In 1985, the department awarded the second highest total number of degrees in its history. These were good years for the department, in no small measure due to Gary Lane’s leadership. Everyone respected Gary (whether they agreed with him or not), and he had an uncanny knack of being able to persuade faculty of differing outlooks and personalities, some difficult, to work together for the common good. Though he was highly effective, he served as chair out of a sense of duty and was never really comfortable in that position, so he was pleased to relinquish the post at the end of his term and return to his true great loves: teaching and research.

When Gary was nearing retirement, the faculty planned the traditional gala party with faculty and spouses plus outside guests, speeches, and so forth. We thought that Gary would well enjoy such a send-off, but for him, and what he meant to us, it just did not seem the right ticket. So, the paleontology grad students and faculty decided to have a surprise giant wok party for Gary. His wife, Mary, arranged for us to spirit his huge wok out of their house without Gary knowing and helped us to invite the IU geology family to a picnic grounds a few miles out of town. To entice Gary to be involved (he, of course, knew nothing of our plans), we set up a special field trip for paleontology students and faculty, and spent the afternoon with Gary touring some of our favorite fossil localities around Lake Monroe. Our idea was to end the afternoon by heading off to the picnic grounds, where the surprise party would be ready. Our plan worked like a charm, except that at the end of the day Gary decided that we just *had* to go to one more locality that was many miles from the waiting crowd at the picnic ground. In the end, we had to practically drag Gary off the outcrop and get back to our originally planned route (at which time he probably got the idea that there was more to this ‘field trip’ than fossil hunting).

Of course, Gary Lane's work at IU did not stop with his retirement. In addition to continuing his research, much of it with Bill Ausich and George Sevastopolo (see Bibliography, below), he wrote a history of the IU Geology Department and from time to time taught non-credit continuing education classes. He continued to take people of all backgrounds into the field to infect them with his enthusiasm for geology and natural history, and in his later years he did a lot of hiking (especially in the spring, when the wildflowers were at their peak) and became much interested in finding old home sites and other evidences of the history of human habitation in the southern Indiana forests.

Some of my most pleasurable times in the IU Geology Department were spent with Gary in the field, in those noon brown-bag seminars, and traveling with him to field conferences and conventions. We will always look back with fond memories and pride to the Gary Lane Era at Indiana University."

FIELD WORK

Like Clarence Hall and Bob Dodd, Gary Webster fondly recalls his experience with Gary Lane in the field: "Gary thoroughly enjoyed field work—he was a great enthusiast for going into a new area to see what could be found. We spent many evenings around a campfire arguing over the best ways to collect fossils or discussing the many problems to be resolved in paleontology and stratigraphy, friendly conversations from which I learned a lot and that helped put our joint studies in perspective. Working in southwestern Nevada, it was Gary who discovered the now well-documented crinoid fauna of the Mississippian Anchor Limestone. Only two days later, together we discovered the rich crinoid fauna of the Permian Battleship Wash Formation. Recognizing the significance of this Permian find, we then spent several weekends intensively mining the site, from Gary's lab at UCLA heading out to Nevada each Friday afternoon and returning late Sunday evening after two very full days of collecting. This work led to two major papers that describe the largest Permian crinoid fauna now known from North America. Later, we jointly collected the Anchor crinoid fauna as well, work that resulted in another major publication. Both of these discoveries were made after Gary had spent a number of years analyzing the Upper Paleozoic stratigraphy of southern Nevada in the hope of making just such finds—despite the fact that only an occasional crinoid specimen had previously turned up. Such perseverance was typical of Gary Lane and a prime reason why he was recognized as the leading crinoid specialist in the world for the last two-and-a-half decades of his life."

Bill Ausich has similar memories of Gary in the field, and like Clarence Hall adds insight into Gary Lane's love of nature: "To many of Gary Lane's generation, success came through reductionist science. But this was never Gary's program. He was a naturalist in the grandest sense, a true interdisciplinary scientist. In my years at Indiana University, he taught me a tremendous amount about crinoid paleontology, his specialty and now mine, but I learned even more about natural history. Trekking through the woods with Gary Lane was much more than a mere stroll to an outcrop. Heading off with him, at any time of year, was a joy as he would stop to unearth morel mushrooms or pause to figure out whether a birdsong came from a mockingbird or the original, and he often took the time to teach me how to identify may apples, jack-in-the-pulpits, plants of the mint family (square stems), and the source of animal trackways in the snow. Thanks to him, my eyes no longer simply focus on the rocks around and the trail ahead, but scan for butterflies, flowers, and birds as well. (Though the benefits of this eye-opening approach to nature are obvious, it can also have a downside. One time, as we tramped through the woods of northern Kentucky toward an outcrop of the Borden Formation, Gary, several paces behind me, abruptly

stopped and gasped—I turned and looked back to see a copperhead coiled on the trail between us!")"

For all who knew him well, both at UCLA and IU—his faculty colleagues, his family, and his extended family of geology undergraduate and graduate students and the IU Honors students who studied under his tutelage—some of the fondest memories are of times spent with him in the field, learning about fossils and rocks and the natural world, and reveling in the camaraderie. None will soon forget the evenings around a campfire in the desert Southwest or in Indiana's hickory-oak forests; Gary's steaming, pungent, filled-to-overflowing giant wok; or his favorite campfire song, "The Gay Caballero"—a whimsical if mildly racy ditty that, with him in the lead, everyone in the entourage would bellow forth with gusto and great glee whenever an appropriate opportunity arose.

SCIENTIFIC CONTRIBUTIONS

During his career, Gary Lane became a leading international authority on fossil crinoids, but he was an expert also on paleontology in general and on the history of geologic and paleontologic science. He authored two books, more than 12 monographs, and numerous scientific papers on crinoids, and was one of the primary contributing authors to the volume on Crinoidea in the *Treatise on Invertebrate Paleontology* (see Bibliography, below). His work on crinoids spanned the Ordovician to the Permian and extended from the mid-continent (Indiana, Illinois, Iowa, Kansas, Kentucky, Tennessee, Missouri) to the West (Nevada, Utah) and included Brazil, Tunisia, Ireland, England, and China. His most significant contributions to the understanding of fossil crinoids included studies of the prominent Mississippian family Batocrinidae and of Permian crinoids from Nevada, work on microcrinoids that significantly advanced our knowledge of these enigmatic forms, investigations of Devonian crinoids from England, and breakthrough work on Devonian crinoids from China. Less recognized, perhaps, was his pioneering work in paleoecology, in which he set forward some of the fundamental ideas that have proved critical to understanding the structure of Paleozoic benthic communities, insight well illustrated by his community-based analysis of the Crawfordsville (Indiana) Lagerstätte. His innovative ideas about various aspects of the paleobiology of Paleozoic crinoids—from the nature of their connective soft tissues to their feeding habits and strategies for predation—resulted in a number of important contributions and inspired two generations of workers to investigate the biology and evolutionary ecology of fossil crinoids, not just their preserved morphology. Gary also had a long-term interest in the history of his science, over a span of some 50 years writing papers on the evolution of crinoid studies, crinoid folklore, and on the geologists and naturalists who at New Harmony, Indiana, established a pioneering community of intellectuals.

CONTRIBUTIONS TO THE PROFESSION

From a glance at Gary Lane's bibliography, it is clear that he made fundamental advances to our understanding of the systematics, paleobiology, and evolutionary paleoecology of Paleozoic crinoids. Less evident from such a listing is the impact that he had on the research programs of others in his field, and the ways in which he helped our profession.

It is notable that among Gary Lane's most influential contributions to the study of crinoids is work published without him as an author or, indeed, not yet published at all—concepts and ideas that have inspired at least two generations of students and colleagues. What was the respiration capacity of Paleozoic crinoids? What were the articulation movements along a biserial camerate arm? How does crinoid arm branching compare to the branching

of a tree? What was the adaptive significance of balance in Paleozoic crinoids? What were the larval-adult orientations in fossil and living crinoids? Gary's notion of "planting seeds and nurturing the saplings"—then stepping aside to watch them grow—inspired work on the delineation of the organ systems and feeding ecology of Paleozoic crinoids, the ecologic history and impact of predation on Phanerozoic benthic communities, the evolutionary paleoecology of both crinoids and blastoids, and the ecology of living crinoids and freshwater Paleozoic faunas. Gary's students were crinoid collectors through and through, but he was far broader, interested also in fossil shark teeth, brachiopods, encrusting foraminifera, and more. A world-class expert on crinoids, his low-key yet eclectic "out-of-the box" approach to paleontology guided his students and colleagues toward fruitful innovative research and helped his science in ways that are impossible to properly record.

Finally, it would be remiss to not here credit Gary Lane for having established the "Friends of the Echinoderms." Ron Parsley tells the story: "After my graduation from UCLA, Gary and I kept in touch through the 1960s. When Gary organized the first get-together of 'Friends of the Echinoderms' at the 1967 Geological Society of America meeting in San Francisco, I was pleased that he invited me to attend along with most of the other echinoderm workers at the convention. Following Gary's lead, this annual informal gathering of echinoderm-interested zoologists, paleontologists, geologists and stratigraphers expanded over the years. Gary continued to organize these confabs well into the 1970s, when I then was asked to take charge. For many years thereafter, and always well in advance of the forthcoming GSA meeting, Gary continued to help by sending me updated mailing lists of scientists I should invite to our annual get-together. He continued to act as the 'godfather' of this undertaking right up to the 2005 meeting in Salt Lake City, and through the years continued to suggest ways that our get-togethers could be improved. Though once a staple of GSA meetings, many such special interest 'friends' groups have faded away, but 'Friends of the Echinoderms'—now nearly four decades old—is still going strong, packing the appointed hotel room like a sardine can. He was always thinking of ways to put people together so they could exchange ideas and viewpoints about our science. Our annual 'friends' meeting is a lasting legacy to Gary Lane's distinguished career."

LEGACY

An acknowledged world-class scientist and for many years America's leading expert on fossil crinoids, Gary Lane's legacy is far more than just his science. Throughout his career, both at UCLA and Indiana University, Gary Lane was an outstanding and popular professor, an admired role model and recipient of teaching awards who worked hands-on with undergraduate and graduate students alike. He had an infectious love of learning, not just about fossil crinoids but about geology, paleontology, natural history, and the historical development of science. A consummate interdisciplinary scientist, Gary had broad integrative knowledge of the natural world. Hidden beneath his quiet and unassuming way, he was a serious and creative deep thinker who succeeded, masterfully, by the dint of good hard work. He cared, deeply, about his science, his profession, and his students, colleagues, family, and many friends. Gary Lane inspired all who knew him, not least of whom were the large number of students in his courses, both at UCLA and IU, who were fortunate to benefit not only from his knowledge of science but from his insight about people and the nature of life.

Gary was a devoted husband and father. He and his wonderfully generous wife, Mary, were parents to one son and two daughters, all of whom have all gone on to successful careers.

The Lane home was always open to his students. Many meals were shared, and the Lane students—his extended family—learned much around his family dinner table.

Gary Lane died in Bloomington, Indiana, on 14 January 2006. He made his mark. He contributed to us all. We are thankful for being his friends.

HONORS AND AWARDS

N. Gary Lane received numerous professional awards and honors, including a Fulbright Fellowship to Tasmania (1955–1956); a Fulbright Fellowship to Trinity College, Dublin, Ireland (1971–1972); the SEPM Outstanding Paper Award for the *Journal of Paleontology* (1979); the Erasmus Haworth Distinguished Alumni Award of the University of Kansas (1979); and the R. C. Moore Medal from SEPM (Society for Sedimentary Geology) (1995). He was Co-Editor of the *Journal of Paleontology* (1969–1971); Associate Editor of *Paleobiology* (1977–1979); and Chair of the Department of Geological Sciences at Indiana University (1984–1987). In 1987–1988, he served as President of the Paleontological Society. At the 2005 Annual Meeting of the Geological Society of America (Salt Lake City, Utah), a symposium was held to honor his career.

SELECTED BIBLIOGRAPHY OF NORMAN GARY LANE

Book.—

LANE, N. G. 1978. *Life of the Past*. Merrill Publishing, Columbus, Ohio, 321 p. [1986, 2nd Edition; 1991, 3rd Edition; 1999, Ausich and Lane, 4th Edition]

Journal articles and book chapters.—

- LANE, N. G. 1963. Two new Mississippian camerate (Batocrinidae) crinoid genera. *Journal of Paleontology*, 37:691–702.
- LANE, N. G. 1963. Meristic variation in the dorsal cup of monobathrid camerate crinoids. *Journal of Paleontology*, 37:917–930.
- LANE, N. G. 1963. The Berkeley crinoid collection from Crawfordsville, Indiana. *Journal of Paleontology*, 37:1001–1008.
- VANSANT, J. F., AND N. G. LANE. 1964. Crawfordsville (Indiana) Crinoid Studies. University of Kansas Contributions to Paleontology, Echinodermata, Article 7:136 p.
- LANE, N. G. 1966. New Harmony and pioneer geology. *Geotimes*, 11(2): 18–20.
- LANE, N. G., AND G. F. WEBSTER. 1966. New Permian Crinoid Fauna from Southern Nevada. University of California Publications in Geological Sciences, 63, 60 p.
- LARSON, A. R., AND N. G. LANE. 1966. Repetitive bedding in Triassic sediments in Clark County, Nevada; Symposium on cyclic sedimentation. *Kansas State Geological Survey Bulletin*, 1:265–274.
- WEBSTER, G. D., AND N. G. LANE. 1967. Additional Permian Crinoids from Southern Nevada. University of Kansas Paleontological Contributions, Paper 27, 32 p.
- LANE, N. G. 1970. Lower and Middle Ordovician Crinoids from West-central Utah. *Brigham Young University Research Studies, Geology Series*, 17:3–17.
- WEBSTER, G. D., AND N. G. LANE. Carboniferous echinoderms from the southwestern United States. *Journal of Paleontology*, 44:276–296.
- LANE, N. G. 1972. Synecology of Middle Mississippian (Carboniferous) crinoid communities in Indiana. Abstracts 24th International Geological Congress, 7:89–94.
- LANE, N. G. 1973. Paleontology and Paleoecology of the Crawfordsville Fossil Site (Upper Osagian, Indiana). University of California Publications in Geological Sciences, 99, 141 p.
- LANE, N. G., AND A. BREIMER. 1974. Arm types and feeding habits of Paleozoic crinoids. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series B: Palaeontology, Geology, Physics and Chemistry*, 77:32–39.
- LANE, N. G., AND D. B. MACURDA JR. 1975. New evidence for muscular articulations in Paleozoic crinoids. *Paleobiology*, 1:59–62.
- LANE, N. G. 1975. The anal sac of *Aesicrinus*, a Pennsylvanian inadunate crinoid. *Journal of Paleontology*, 49:638–645.
- MEYER, D. L., AND N. G. LANE. 1976. The feeding behaviour of some

- Paleozoic crinoids and Recent basketstars. *Journal of Paleontology*, 50: 473–480.
- UBAGHS, G., R. C. MOORE, H. W. RASMUSSEN, N. G. LANE, A. BREIMER, H. L. STRIMPLE, J. C. BROWER, R. M. JEFFORDS, J. SPRINKLE, R. E. PEAK, D. B. MACURDA JR, D. L. MEYER, M. ROUX, H. SIEVERTS-DORECK, R. O. FAY, AND R. A. ROBISON. 1978. Echinodermata 2, p. T1–T1027. In R. C. Moore and C. Teichert (eds.), *Treatise on Invertebrate Paleontology*. Pt. G. Vols. 1–3. Geological Society of America and University of Kansas Press, Lawrence.
- LANE, N. G. 1979. The paleontologist as a teacher of natural history. *Journal of Geological Education*, 27:30–31.
- LANE, N. G. 1979. Upper Permian crinoids from Djebel Tebaga, Tunisia. *Journal of Paleontology*, 53:121–132.
- AUSICH, W. I., T. W. KAMMER, AND N. G. LANE. 1979. Fossil communities of the Borden (Mississippian) delta in Indiana and northern Kentucky. *Journal of Paleontology*, 53:1182–1196.
- LANE, N. G., AND G. D. SEVASTOPULO. 1981. Functional morphology of a microcrinoid: *Kallimorphocrinus punctatus* n. sp. *Journal of Paleontology*, 55:13–28.
- SEVASTOPULO, G. D., AND N. G. LANE. 1981. Silurian microcrinoids from western Tennessee. *Journal of Paleontology*, 55:1171–1175.
- LANE, N. G., AND G. D. SEVASTOPULO. 1982. Microcrinoids from the Middle Pennsylvanian of Indiana. *Journal of Paleontology*, 56:103–115.
- LANE, N. G., AND G. D. SEVASTOPULO. 1982. Growth and systematic revision of *Kallimorphocrinus astrus*, a Pennsylvanian microcrinoid. *Journal of Paleontology*, 56:244–259.
- AUSICH, W. I., AND N. G. LANE. 1982. Crinoids from the Edwardsville Formation (Lower Mississippian) of southern Indiana. *Journal of Paleontology*, 56:1343–1361.
- LANE, N. G., AND J. R. DUBAR. 1983. Progradation of the Borden Delta: New evidence from crinoids. *Journal of Paleontology*, 57:112–123.
- KAMMER, T. M., W. I. AUSICH, AND N. G. LANE. 1983. Paleontology and stratigraphy of the Borden Delta of southern Indiana and northern Kentucky (Field trip 2), p. 37–71. In R. H. Shaver and J. A. Sunderman (eds.), *Field Trips in Midwestern Geology*. Volume 1. Indiana Geological Survey, Bloomington.
- LANE, N. G. 1984. Predation and survival among inadunate crinoids. *Paleobiology*, 10:453–458.
- REXROAD, C. B., AND N. G. LANE. 1984. Spickert Knob Formation (new), Borden Group in Indiana. *Indiana Geological Survey Occasional Paper*, 43, 4 p.
- LANE, N. G., G. D. SEVASTOPULO, AND H. L. STRIMPLE. 1985. *Amphipsalidocrinus*, a monocyclic camerate microcrinoid. *Journal of Paleontology*, 59:79–84.
- LANE, N. G., AND G. D. SEVASTOPULO. 1985. Redescription of *Allagecrinus americanus* Rowley, 1895, a Late Devonian microcrinoid. *Journal of Paleontology*, 59:438–445.
- LANE, N. G., AND G. D. SEVASTOPULO. 1986. Micromorph crinoid fauna of the McCraney Limestone (Mississippian, Kinderhookian) of western Illinois. *Journal of Paleontology*, 60:736–743.
- LANE, N. G. 1987. Early stratigraphic practices by David Dale Owen in the midwestern United States; A field guide and recollections; the David Dale Owen years to the present; a sesquicentennial commemoration of service by the Geological Survey. *Indiana Geological Survey Special Report*, 44:23–30.
- LANE, N. G. 1987. The Richard Owen Geological Survey of Indiana 1859–1860. *Proceedings of the Indiana Academy of Science*, 96:353–359.
- LANE, N. G., AND G. D. SEVASTOPULO. 1987. Stratigraphic distribution of Mississippian camerate crinoid genera from North America and Western Europe; Selected studies in Carboniferous paleontology and biostratigraphy. *Courier Forschungsinstitut Senckenberg*, 98:199–206.
- WEBSTER, G. D., AND N. G. LANE. 1987. Crinoids from the Anchor Limestone (Lower Mississippian) of the Monte Cristo Group, Southern Nevada. *University of Kansas Paleontological Contributions*, Paper 119, 55 p.
- PETZOLD, D. D., AND N. G. LANE. 1988. Stratigraphic distribution and paleoecology of Pennsylvanian conchostracans (Crustacea: Branchiopoda) on the east side of the Illinois Basin. *Journal of Paleontology*, 62:799–808.
- SEVASTOPULO, G. D., AND N. G. LANE. 1988. Ontogeny and phylogeny of disparid crinoids, p. 245–255. In A. B. Smith and C. R. C. Paul (eds.), *Echinoderm Phylogeny and Evolutionary Biology*, *Current Geological Concepts*. Clarendon Press, Oxford, UK.
- LANE, N. G. 1989. Paleontology: The academy and the marketplace. *Journal of Paleontology*, 63:259–260.
- LANE, N. G. 1990. A census of past and present life. *Journal of Geological Education*, 38:119–122.
- LANE, N. G., AND G. D. SEVASTOPULO. 1990. Biogeography of Lower Carboniferous crinoids; Palaeozoic palaeogeography and biogeography. *Geological Society of London Memoir*, 12:333–338.
- LANE, N. G., J. A. WATERS, C. G. MAPLES, S. A. MARCUS, AND Z. T. LIAO. 1996. A camerate-rich Late Carboniferous (Moscovian) crinoid fauna from volcanic conglomerate, Xinjiang, People's Republic of China. *Journal of Paleontology*, 70:117–128.
- SAVARESE, M., J. R. DODD, AND N. G. LANE. 1996. Taphonomic and sedimentologic implications of crinoid intraskeletal porosity. *Lethaia*, 29:141–156.
- LANE, N. G., J. A. WATERS, AND C. G. MAPLES. 1997. Echinoderm faunas of the Hongguleleng Formation, Late Devonian (Famennian), Xinjiang-Uygur Autonomous Region, People's Republic of China. *Paleontological Society Memoir*, 47, 43 p.
- LANE, N. G., C. G. MAPLES, AND J. A. WATERS. 2001. Revision of Late Devonian (Famennian) and some Early Carboniferous (Tournaisian) crinoids and blastoids from the type Devonian area of North Devon. *Paleontology*, 44:1043–1080.
- WATERS, J. A., Z. T. LIAO, L. J. LIU, N. G. LANE, C. G. MAPLES, AND S. MARCUS. 2003. Redescription of Devonian and Carboniferous (Pennsylvanian) blastoids from western Yunnan, China. *Journal of Paleontology*, 77:1129–1132.
- WATERS, J. A., C. G. MAPLES, N. G. LANE, S. MARCUS, Z. T. LIAO, L. J. LIU, H. F. HOU, AND J. X. WANG. 2003. A quadrupling of Famennian pelmatozoan diversity: New Late Devonian blastoids and crinoids from Northwest China. *Journal of Paleontology*, 77:922–948.
- AUSICH, W. I., AND N. G. LANE. 2005. Isolated ideas; crinoid literature of the sixteenth century. *Earth Sciences History*, 24:81–92.

J. WILLIAM SCHOPF
Department of Earth and
Space Sciences
University of California
Los Angeles 90095
<schopf@ess.ucla.edu>

WILLIAM I. AUSICH
Department of Geological Sciences
The Ohio State University
Columbus 43210

J. ROBERT DODD
Department of Geological Sciences
Indiana University
Bloomington 47405

CLARENCE A. HALL
Department of Earth and
Space Sciences
University of California
Los Angeles 90095

RONALD L. PARSLEY
Department of Earth and
Environmental Sciences
Tulane University
New Orleans, Louisiana 70118

GARY D. WEBSTER
Department of Geology
Washington State University
Pullman 99164