



Obituary: Kenneth Barclay Armitage (1925–2022)

Dr. Kenneth B. Armitage (Fig. 1), internationally recognized behavioral and physiological ecologist, passed away on 6 January 2022 at his home in Lawrence, Kansas at the age of 96 and surrounded by family. He was a legend in the field of behavioral ecology having executed one of the longest running studies to date, a 40+ year comprehensive study of yellow-bellied marmot (*Marmota flaviventer*) ecology. Ken will be widely remembered for his extensive scholarly contributions and work as a dedicated educator of undergraduates and graduate students throughout his lengthy career. He is survived by his beloved wife, Katie, their children Karole, Keith (Maria), and Kevin, and four granddaughters—Emeline, Julia, Sophie, and Rita.

Ken was born 18 April 1925 in Steubenville, Ohio, the only child of Albert Kenneth and Virginia Huntington (nee Barclay) Armitage. His interest in the natural world developed at an early age, and he spent much of his free time watching birds and collecting insects and flowers. He was an active Boy Scout, a YMCA Nature Counselor for several summers, and leader of community bird walks in his hometown. He graduated with honors from Steubenville High School in 1943 and shortly thereafter enlisted in the United States Army (Fig. 2). Ken was assigned to the Army Air Corps for flight training but was transferred to the infantry when the need for flight personnel decreased. He was assigned to the 14th Armored Division and reached Europe in early 1945, in time to participate in the advance of Patton's Third Army across southern Germany. Following victory in Europe, he was initially slated for the 45th Infantry Division, scheduled to begin training for the invasion of Japan, but at the last minute he was ordered to join a division returning home. In January 1946, he was issued an honorable discharge. A half century later when observing Sand Hill Cranes during the migration along the Nebraska Platte River, he would authoritatively voice "Down landing gear!" every time the cranes came in to land... perhaps a throwback to his time in the military.

Through the support of the G.I. Bill, Ken attended Bethany College, West Virginia from fall 1946 to spring 1949, majoring in biology. He was active on campus forming the Outdoor Club and in leading an effort to integrate the student body, and his activism was recognized by his induction into the campus leadership honor society. Ken graduated summa cum laude and received the Hoagland Award as the outstanding senior graduate. Ken's academic work was also recognized by his induction into Beta Beta Beta (biological honor society).

In the summer of 1949, Ken worked as a Ranger Naturalist at Old Faithful in Yellowstone National Park, a job he did each



Fig. 1.—Dr. Kenneth B. Armitage (1925–2022) at the University of Kansas, Lawrence in 1988. Photograph courtesy of University of Kansas Archives.

summer through 1954. Ken's time in Yellowstone was instrumental in shaping both his career and personal paths. His interests in biology were fueled by the wealth of natural systems in Yellowstone, and he ultimately chose to study the aquatic ecology of the Firehole River for his dissertation research; the Firehole River is unusual in that it is warmed by effluent from Yellowstone's famous hot springs. It was at Yellowstone where Ken first noticed and was intrigued by marmots, a group which would become the focus of much of his life's work. Yellowstone was also where, during the summer of 1949, Ken met Katie Lou Hart, then a student from Baylor University. Ken and Katie married in 1953 and enjoyed 68 years of marriage before Ken's passing.

In the fall of 1949, Ken began his pursuit of a doctorate degree at the University of Wisconsin studying limnology under the mentorship of Arthur Hassler, one of the pioneers of limnology. Ken's research of the Firehole River was supported by an NSF pre-doctoral fellowship and a Knapp House Fellowship, and was published in *Ecology*. He was inducted into Sigma Xi, the scientific research honor society, in 1952. While still a graduate student, Ken recognized his love of teaching, and he taught at the University of Wisconsin Freshmen–Sophomore Centers in

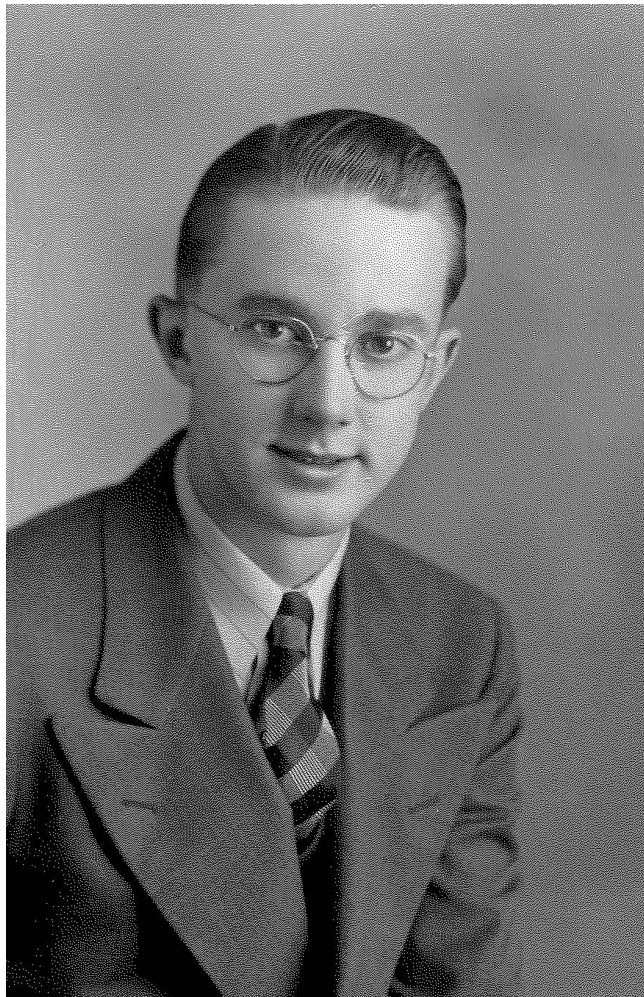


Fig. 2.—Kenneth B. Armitage at high school graduation at the age of 18. Photograph courtesy of the Armitage family.

Green Bay and Wausau for two years after the completion of his doctorate.

Ken joined the Department of Zoology at the University of Kansas in fall 1956 as an aquatic biologist. He earned the rank of full professor in 1966, and was awarded the Baumgartner Distinguished Professor of Systematics and Ecology in 1987. Upon his retirement in 1996, he remained active as a Professor Emeritus in the department. During Ken's 40-year tenure at KU, he was extremely dedicated to serving not only his students but also many aspects of the institution. Ken believed strongly in the importance of quality education for undergraduate students and to this end, he served as Chair of the Biology Department (for undergraduates) from 1968–1975 and taught undergraduate, introductory biology courses for most of his career at KU. Further, Ken was one of the founders of the undergraduate Environmental Studies Program and served on the Environmental Studies Committee from 1973–1982, serving as Chair from 1976–1982. He went on to serve as Chair of the Department of Systematics and Ecology from 1982–1988.

Ken was fully committed to the importance of a rigorous, broad-based general biology course for undergraduates. He

believed that introductory biology was critically important to undergraduate education and personally gave the lectures for several years and worked closely with other faculty to develop the course. To accompany the lectures, he and the Director of the laboratories, George Pisani, wrote and published a laboratory manual of topics complementing the lectures and relevant to the times. Their manual, *Laboratory Topics in General Biology*, was used by several colleges and universities throughout the country (Armitage and Pisani 1991). In recognition of Ken's commitment to excellence in teaching undergraduate biology, the University of Kansas now recognizes an outstanding teaching assistant with the Kenneth B. Armitage Award for Excellence in Teaching Principles of Biology.

Many of Ken's graduate students were teaching assistants, which afforded them the opportunity to learn directly from their mentor to value and prioritize their teaching efforts. He often attributed his passion for student-centered efforts to his own undergraduate experience at a small liberal arts college. Ken's competence and skill in the classroom was never more apparent than when he asked two of his graduate students (co-authors here) to cover his introductory biology lectures at a time when he was hospitalized. He assured them that they were up to the task of teaching a large lecture for undergraduates and that it would be simple. "Just follow my notes and the slides are already in the carousel," Ken said. They agreed, only to quickly realize that his notes were merely cues to what he planned to spontaneously share; notes that were likely very clear to him but extremely challenging to interpret. This experience illustrated Ken's depth of knowledge and ability to offer a quality course largely from memory. Needless to say, we delivered "adequate" lectures but only after hours of preparation.

When Ken began his career at KU, his research focused on aquatic ecology, and he published more than 35 papers on this topic, many with students. In recognition of his research and the discovery of ice-covered warm-water lakes in Antarctic in 1961, he received the Antarctic Medal for Research in Antarctica in 1968. At some point along the way, his research interests shifted to physiological and behavioral ecology questions, and the marmots of Yellowstone that he observed years earlier surfaced as optimal study subjects to address these questions. Ken's first publications on marmots were based on the Yellowstone population, which required a long hike to access, but he quickly shifted his focus in 1962 to the yellow-bellied marmots of the East River Valley in Colorado at the Rocky Mountain Biological Laboratory (RMBL, fondly pronounced "Rumble"). Ken loved to tell the story of how he arrived at RMBL. He claimed that he shifted his work to RMBL due to a conversation he had with Paul Ehrlich who informed him that he should consider work at RMBL as no long hikes were needed to access the marmot colonies but rather he could drive right to them in his car! Ken was certainly not opposed to physical activity but less hiking meant more time for collecting data. Any observant researcher who visited RMBL between 1962 and the early 2000s no doubt saw Ken sitting in his car for hours on end observing marmots through a spotting scope while taking copious notes in a small notebook (Fig. 3). But he was

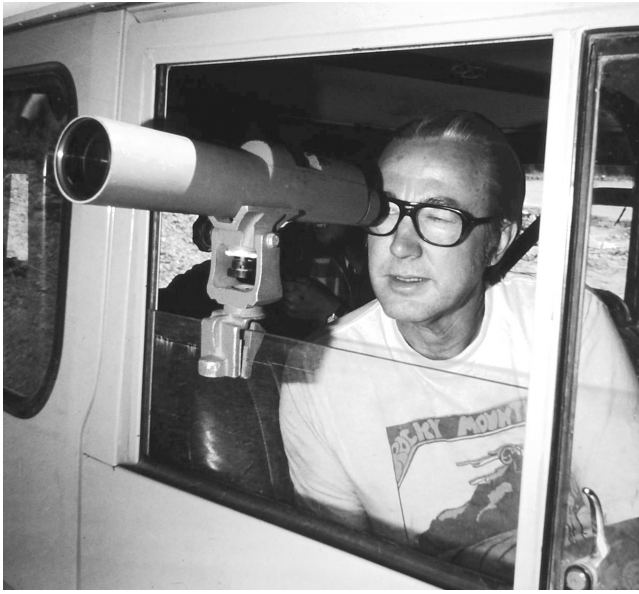


Fig. 3.—Kenneth B. Armitage in the field, studying yellow-bellied marmot behavior, in the Upper East River Valley, Colorado near the Rocky Mountain Biological Laboratory in the early 1980s. Photograph courtesy of the Rocky Mountain Biological Laboratory.

more than a well-known researcher; he was a prominent citizen of the RMBL community. He served 17 years on the RMBL Board of Trustees, including multiple terms on the Executive Council and as Vice President. And he served as President of the Board during the mid-1980s, successfully guiding the lab through a period of major challenges, including the potential encroachment by a nearby ski resort and the transition in lab administration from a part-time director recruited locally to a full-time director recruited nationally.

During his decades at RMBL, Ken compiled some of the most detailed, long-term behavioral observations of any mammalian species and mentored the work of multiple graduate students collectively known as “The Marmoteers.” Those who worked with Ken each summer at RMBL will likely say that they never worked harder or had more fun at the same time (Fig. 4). Ken worked long hours, was a perfectionist who paid great attention to detail and scientific rigor, and he expected nothing less of his students. Even so, Ken’s passion for his work, his excitement for the work and discoveries of his students, his never-ending sense of humor, and his kindness and understanding in the midst of the vagaries of field research made us all strive to be our best and do our best work. A long-standing joke among The Marmoteers was that Ken, with a wry smile, would often ask any student who was about to head out into the field to trap a marmot in a particularly dangerous location, “Are your field notes up to date?” This was Ken’s playful way to say, be careful out there. When Ken was not in the field observing marmots, he was in the lab talking about the marmots he observed, as if they were members of his family. He could recount each animal’s activities and genealogy as if it was his own. He so identified with marmots that his RMBL cabin was called “The Marmitage.” One of the historical KU mammalogy traditions

is that researchers should have eaten their study animal. Once, when asked by a particularly keen graduate student whether he’d ever eaten marmot, Ken jerked back and replied “Why no! That would be cannibalism.” Memories of these moments will forever bring smiles to the hearts of Marmoteers.

Ken continued to conduct research at RMBL until the early 2000s; thus, his research program on marmots spanned four full decades and is renowned as one of the most comprehensive investigations of a mammalian species to date. He authored or co-authored 252 publications in his long career, three-fourths of these centered on marmot ecology. Many (80!) were published after Ken’s retirement from KU in 1996. His research addressed nearly every aspect of marmot ecology, and he was a pioneer in recognizing the importance of individual fitness in understanding behavior as well as the role of physiological constraints on behavior. It was Ken’s versatility and flexibility that drove him to continue asking and seeking answers to new questions. This kept his work relevant and foundational to our understanding of the behavioral and physiological principles that shape social mammals. In fact, Ken’s work was supported from 1962 to 1995 by continuous funding from the National Science Foundation; a testament to its relevance and import. Ken highlighted his life’s work on marmots in a book entitled, “*Marmot Biology: Sociality, Individual Fitness, and Population Dynamics*,” published by Cambridge University Press in 2014 (Armitage 2014). Dedicated to the very end, Ken continued working on manuscripts well into his 96th year and it was only at the age of 95 that Ken announced to his family that he planned to stop updating his curriculum vitae for the Department.

While working at RMBL, Ken would host marmot researchers from around the world who came to learn about his study, and later in life, Ken travelled to visit marmot researchers around the world including those in Canada, France, Italy, Switzerland, Ukraine, Kyrgyzstan, Kazakhstan, and Russia. Ken delivered over 14 invited, international lectures and he was a sought after expert who provided advice to several marmot conservation projects, including one that led to the successful recovery of Vancouver Island marmots (*Marmota vancouverensis*) from the brink of extinction. Ken is also one of few mammalogists with an IMDb (Internet Movie Database) entry for a short film “*The Study of Groundhogs: A Real Life Look at Marmots*” included by Sony Pictures on the 15th anniversary edition of *Groundhog Day*, the 1993 classic Hollywood feature film starring Bill Murray and Andie MacDowell.

“If it works, there is no need for a new one,” was a standard that Ken lived by. This standard of course applied to the lab and the physiology equipment that his undergraduate and graduate students worked with. The lab was loaded with very old equipment—including an old Underwood typewriter long after all students were skilled computer users. He was proud when a historical society borrowed one of the lab refrigerators for a historical exhibit that they were doing on the 1950s. He was even more pleased when they returned it with a new paint job so it could go back into service in his lab!

Despite his considerable success as an administrator and scientist, Ken probably would have ranked working with



Fig. 4.—Kenneth B. Armitage and Alison K. Brody collecting data on yellow-bellied marmots in 1984 in the Upper East River Valley, Colorado near the Rocky Mountain Biological Laboratory in the early 1980s. Photograph courtesy of the Rocky Mountain Biological Laboratory.

students his greatest pleasure and achievement as an academic. He directed the doctoral programs of 26 students, including Eisa M. Abdellatif (1985), Ernest E. Angino (1961), Erika L. Barthelmess (1997), Arthur L. Buikema, Jr. (1965), Lei Chi-Hsiang (1979), Jerry F. Downhower (1964), W. Sue Fairbanks (1992), Barbara A. Frase (1983), Kent D. Hall (1969), Patricia Johnstone (1971), Delbert L. Kilgore, Jr. (1972), John L. Koprowski (1991), Jaye C. Melcher (1987), Sherwick Min (1995), Kathleen R. Nuckolls (2010), Martha Roelofs Pippitt (1975), Linda S. Rayor (1988), Carmen M. Salsbury (1993), Bhagwan P. Saxena (1971), Orlando A. Schwartz (1979), Gerald E. Svendsen (1972), Dirk H. Van Vuren (1990), John M. Ward, Jr. (1980), Norman J. Willems (1971), and Brett C. Woods (2001). Ken also was the advisor of 27 master's students, including Eisa M. Abdellatif (1981), Douglas C. Andersen (1975, co-chair with R. S. Hoffmann), Miles C. Barnhart (1978), Alison K. Brody (1984), Julie Campbell (1992), Janice C. Daniel (1998), Scott H. Jamieson (1985), Dennis W. Johns

(1978), Ahmad Kamal (1966), Delbert L. Kilgore, Jr. (1967), Leonard J. Olund (1960), Marjorie L. Reika, Trudy Rising (1968), Carol A. Sherr (1970), M. Siefken (1967), and Jerry C. Tash (1959). Fourteen undergraduate students participated in research with Ken and his graduate students and four of those graduated with Honors from KU, recognizing the quality of their undergraduate research projects. Ken worked with a number of post-doctoral researchers over the years and one, Daniel T. Blumstein, continued working with Ken in his later years and ultimately took over the long-term marmot study at RMBL after Ken's retirement. Ken's mentorship included a concerted investment in the careers of female and minority students, clearly making the point that everyone has equal potential and the right to be a scientist.

The majority of Ken's later graduate students studied mammals, with 17 studying marmots. Many of his graduate students went on to have successful careers in academia at top public and private institutions, which is an indicator of the

quality guidance, training, and education students received under Ken's watch. He took great pleasure in interacting with his students and he treated all with the respect of colleagues. While his advising style could be characterized as relatively "hands off", he was readily available and always willing to assist any of his students along the way. He was a notoriously difficult editor of written work which, although painful at times, elevated our skills tremendously. Most of all, Ken inspired by example. He cared deeply about his marmots for sure but he cared equally about the success and happiness of his students. Ken's kindness and support helped to create a cohesive, collaborative, and compassionate atmosphere in which his graduate students truly thrived.

Ken received numerous honors during his impressive career. Some of the more notable awards include being recognized as a Fellow by the Animal Behavior Society and the American Association for the Advancement of Science, receiving an Education Service Award from the University of Kansas (1979), being inducted into the University of Kansas Chapter of Phi Beta Kappa (1991), and receiving a Distinguished Achievement Award from his alma mater, Bethany College (1989). Ken would likely say that his most cherished honor was receiving the C. Hart Merriam Award for Mammalian Research from the American Society of Mammalogists (ASM) (1997). The Merriam Award is given in recognition of outstanding research in mammalogy and many of us still remember the outstanding presentation on his marmot research he gave in 1998. He was again recognized by the ASM (2009) as an Honorary Member for his distinguished service to the science of mammalogy; it is the Society's highest honor. In 2014, he received a Lifetime Achievement Award from RMBL in recognition of his years of service in promoting and protecting the laboratory and surrounding environs. Throughout the latter half of Ken's career, he also greatly valued the work and relationships he shared with many colleagues studying marmots in Europe and the former Soviet Union.

At the institutional level, Ken dedicated much of his efforts toward supporting KU's field facilities and encouraging research to be undertaken there. Ken served as a leader on the field facilities committee from its inception through its many iterations for 25 years and was Chair or Director for 20 of those years. Under Ken's leadership, the KU Field Station evolved from small and regionally focused to an active always busy facility where world-class research could be, and is, undertaken. He obtained an NSF grant to construct an office and laboratories for fieldwork at the field station and later led a collaborative effort to obtain a second NSF grant to upgrade the facility with state-of-the-art internet connections, excellent laboratories, a modern classroom, and cabins for researchers. The Field Station now consists of over 3,500 acres and provides infrastructure for field-based research and education as well as a network of nature preserves for research, public outreach, and conservation. In honor of Ken's dedication to field research and student education, the University dedicated the new field facility headquarters the Kenneth and Katie Armitage Education Center in 2008 (Fig. 5). Each year, the KU ecologists



Fig. 5.—Ken and Katie Armitage at the dedication of the Armitage Education Center at the University of Kansas Field Station on 19 April 2008. Photograph courtesy of Scott W. Campbell.

choose a nationally known scientist to come to the University as the Armitage Ecology speaker. These individuals give two talks—the first talk is given to the Department of Ecology and Evolutionary Biology on main campus and the second is presented at the KU Field Station in the Armitage building. Additionally, an annual award in honor of Ken is provided to support research conducted by an undergraduate or graduate student at the KU Field Station—The Kenneth B. Armitage Award.

Ken represented KU as a member of the Organization of Biological Field Stations and served as the vice president and president of this organization from 1986–1989. He also served on numerous other university committees, including serving as a member of the steering committee for the University Campus Heritage Plan after his retirement (2006–2008). His work on the campus heritage plan was motivated by his love of history, a passion that he shared with his wife Katie. Ken was also a member of the Historic Mount Oread Friends organization and served as president from 2004–2011. Any catch-up conversation with Ken included a fond recollection of Katie and Ken's most recent forays together to explore some portion of the Oregon Trail or the history of Jayhawkers in Lawrence during the Civil War years.

Groundhog Day (February 2nd) will never be the same without the annual celebratory e-mail sent from Ken, and some of us remember fondly annual groundhog day parties at his home. Those of us who were fortunate to know him will forever remember his sharp intellect, heavy handed and spot on editing of manuscripts, his endless array of puns, sarcasm, and self-deprecating humor, and his tremendous kindness. Those wishing to celebrate Ken are encouraged to donate to the Kansas University Endowment Association (P.O. Box 928, Lawrence, KS 66044-0928) in the name of the University of Kansas Field Station or the Armitage Speaker Fund.

ACKNOWLEDGMENTS

We sincerely thank the Armitage family—Katie, Karole, Keith, and Kevin—for their support throughout this effort, for previewing earlier versions of this manuscript, and for sharing family photographs. Helen M. Alexander and Giedra M. Campbell provided editorial comments on the manuscript. Scott W. Campbell provided the photograph of Ken and Katie at the dedication of the Kenneth & Katie Armitage Education Center at the University of Kansas Field Station used as [Figure 5](#), and the Rocky Mountain Biological Laboratory, Gothic, Colorado provided the images used as [Figures 3](#) and [4](#). Deb Bennett assisted in crafting the images used here. Their efforts and attention to the details significantly contribute to our memorial for Ken.

SUPPLEMENTARY DATA

Supplementary data are available at *Journal of Mammalogy* online.

Supplementary Data SD1.—Bibliography of the published works of Dr. Kenneth B. Armitage (1952–2020)

LITERATURE CITED

- Armitage K.B. 2014. *Marmot Biology: sociality, individual fitness, and population dynamics*. Cambridge University Press, Cambridge, UK.
- Armitage K.B., Pisani G.R. 1991. *Laboratory topics in general biology*. Kendall/Hunt Publishing Company, Dubuque, Iowa, USA.
- CARMEN M. SALSURY
*Department of Biological Sciences, Butler University,
Indianapolis, IN 46208 USA*
- DIRK H. VAN VUREN
*Department of Wildlife, Fish, and Conservation Biology,
University of California, Davis, CA 95616 USA & The Rocky
Mountain Biological Laboratory, Crested Butte, CO 81224
USA*
- W. SUE FAIRBANKS
*Department of Natural Resource Ecology and Management,
Oklahoma State University, Stillwater, OK 74078 USA*
- ERIKA L. BARTHELMESS
*Biology Department, St. Lawrence University, Canton, NY
13617 USA*
- DANIEL T. BLUMSTEIN^{ORCID}
*Department of Ecology and Evolutionary Biology, University
of California, Los Angeles, CA 90095 USA & The Rocky
Mountain Biological Laboratory, Crested Butte, CO 81224
USA*
- JOHN L. KOPROWSKI
*Haub School of Environment and Natural Resources,
University of Wyoming, Laramie, WY 82072 USA*
- ROBERT M. TIMM^{ORCID}
*Natural History Museum and Department of Ecology and
Evolutionary Biology, University of Kansas, Lawrence, KS
66045 USA*
**Correspondent: btimm@ku.edu*
- Submitted 19 May 2022. Accepted 11 June 2022.*
- Associate Editor was Burton Lim.*