



Dorothy L. Cheney
1950–2018

BIOGRAPHICAL *Memoirs*

A Biographical Memoir by
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DOROTHY LEAVITT CHENEY

August 24, 1950–November 9, 2018

Elected to the NAS, 2015

Dorothy Leavitt Cheney was a leading figure in the field of animal behavior and made important contributions to our understanding of animal communication, cognition, and behavior. Her greatest scientific contribution was to ground the study of primate vocal communication and cognition in the lives of the animals themselves in their natural habitats. In two long-term studies of wild primates, conducted with her husband and collaborator, Robert M. Seyfarth, Cheney cataloged the vocalizations that the animals made, and thought about the problems that the animals might need to solve in order to survive and reproduce successfully. Dorothy and Robert realized that communication and cognition were intimately connected, and their work on primate vocalizations graded seamlessly into broader investigations of what animals know about their world. In pursuing these questions, they conducted detailed observations of behavior and performed playback experiments to rigorously test hypotheses about the function of the animals' vocalizations and assess the extent of their social and ecological knowledge.



Dorothy Cheney

By Joan Silk

Cheney earned a baccalaureate in political science from Wellesley College in 1968, and originally intended to study law. However, after being introduced to primate field work while spending her junior year at the London School of Economics, her plans changed. She became a graduate student of noted British animal behaviorist and ethologist Robert Hinde, receiving her Ph.D. from Cambridge University in 1977. She then received an NSF post-doctoral fellowship at Rockefeller University, later becoming an assistant professor. In 1981 she became an assistant professor in anthropology at UCLA, followed by a 1985 move to the University of Pennsylvania Department of Anthropology. From 1991 to her retirement in 2016 she was in the Biology Department.

Dorothy Leavitt Cheney was born on August 24, 1950, in Boston, Massachusetts, to Edward and Sally Leavitt Cheney. Dorothy's father was an officer in the U.S. Foreign Service, and his family accompanied him on postings to what was then called Malaya (now Malaysia), the Netherlands, India, and Nicaragua. Dorothy attended local primary schools in each of the countries she lived in, and returned to the United States for secondary school. This cosmopolitan childhood may have been good training for her future career as a primatologist. Moving to different countries and returning home periodically, Dorothy must often have felt like an outsider, forced to infer the unwritten rules that governed social life by observing the behavior of others.

"This was my epiphany. Did careers really exist where you could imitate monkey calls and be taken seriously?"

Dorothy enrolled in Wellesley College, where she majored in political science. She met her future husband, Robert M. Seyfarth, while she was an undergraduate at Wellesley and he was an undergraduate at Harvard. They married in 1971. She spent her junior year at the London School of Economics, while Robert began a graduate program in the Sub-Department of Animal Behavior at

Cambridge University. Dorothy had been planning to attend law school, but a chance event altered her destiny. As she once wrote:

My introduction to research in primate behavior—and a defining moment in my eventual choice of career—involved an encounter at a meeting of the Fauna and Flora Preservation Society in London...Robert and I had agreed to rendezvous at the meeting before going out to dinner. Any remaining ambitions I had entertained about eventually going to law school disappeared as soon as I entered the auditorium. The screen at the other end of the room was playing a grainy film of a West African Syke's monkey silently opening and closing its mouth. At the podium stood a small bearded man solemnly intoning, "Boom! Boom! Boom!" No one in the audience was laughing. This was my epiphany. Did careers really exist where you could imitate monkey calls and be taken seriously?

Dorothy returned to Wellesley to complete her undergraduate degree while Robert tried to locate a field site where he could conduct his dissertation research. Plans to study baboons at the Gombe Stream Reserve fell through, and Robert eventually settled on a plan to work in South Africa. Charmed by the idea of imitating monkey vocalizations

and attracted to the idea of adventure of Africa, Dorothy agreed to accompany him. They spent 18 months documenting the behavior of a small group of chacma baboons in Mt. Zebra National Park. The work was arduous and often frustrating. The baboons were not habituated to the near presence of humans, so they had to observe them through binoculars from 50 yards away. Isolated from colleagues and advisors, they pored over noted animal behaviorist Jeanne Altmann's classic paper on research methods, drew up check sheets, and talked endlessly about what they were seeing. They were captivated by patterns that were emerging from their data. As Robert told me,

In the absence of computers, we had designed our own check sheet for focal animal sampling that incorporated a timeline, durations for behaviors like grooming, and a separate notation for ad lib data. Then, to move all of our monthly data into summary sheets we went to a local art studio and bought paper that can only be described as matrix wallpaper, cross-lined and about 4' x 4'. These sheets we spread out on the floor of our farmhouse and studied them to look for patterns. This was enormous fun.

Dorothy abandoned her plans for law school, and Robert Hinde, then a Royal Society Research Professor at Cambridge and also Robert's advisor, agreed to take her on as a Ph.D. student. So, Robert and Dorothy sold their trusty Land Rover—a decision Dorothy perpetually regretted—and returned to England to write their dissertations. They divided up the data they had collected together: she focused on the behavior of infants and juveniles, and he focused on the behavior of adult males and females. They began to analyze their data and write up their findings.

The 1970s were a transformative period in animal behavior. Up to this time, animal behavior was a largely descriptive science, strongly influenced by pioneering ethologists such as Konrad Lorenz and Niko Tinbergen. Robert and Dorothy's advisor, Professor Hinde, had been trained in this tradition. But in 1975 Jerram Brown's book, *The Evolution of Behavior*, and E. O. Wilson's book, *Sociobiology: The New Synthesis*, were published. These two books introduced many animal behaviorists to the theoretical work of W. D. Hamilton, Robert Trivers, and John Maynard Smith and shifted the emphasis from describing behavior to explaining how behavior enhanced fitness.

There was initially considerable tension between these perspectives. Some ethologists complained that sociobiological studies relied on teleological reasoning, produced

untestable hypotheses, and ignored important questions about development and mechanisms. Sociobiologists complained that ethological explanations of behavior often relied on untenable explanations, such as group selection, and ignored the evolutionary processes that shaped variation. In retrospect it is surprising that there was so much controversy about this, because Tinbergen had clearly laid the groundwork for integrating these perspectives in his 1963 paper, “On aims and methods in Ethology:”

Huxley likes to speak of ‘the three major problems of Biology’: that of causation, that of survival value, and that of evolution—to which I should like to add a fourth, that of ontogeny. There is, of course, overlap between the fields covered by these questions, yet I believe with Huxley that it is useful both to distinguish between them and to insist that a comprehensive, coherent science of Ethology has to give equal attention to each of them and to their integration.

However, at the time when Dorothy and Robert were writing their dissertations there was lively debate about these issues in the lunchroom at Madingley, a small village outside of Cambridge where Hinde’s lab was located. Dorothy and Robert were part of a talented cohort of graduate students and young academics, including Tim Cluton-Brock, Sandy Harcourt, Kelly Stewart, Richard Wrangham, Carol Berman, Jeremy Cherfas, Dafila Scott, and Nick Humphrey. Craig Packer and Anne Pusey were also frequent visitors to Madingley.

Robert and Dorothy had been friends of Bob Trivers at Harvard and were strongly influenced by his work. But as graduate students they were also influenced by Hinde’s emphasis on the proximate dynamics of social relationships. Dorothy integrated both of these perspectives in the papers that she wrote for her dissertation. For example, in one paper she showed that maternal support enabled immature vervet monkeys to acquire ranks similar to their mothers’ ranks, and formulated a verbal model that linked developmental changes in alliance formation to the costs and benefits of forming alliances with particular partners.

After they received their Ph.D.s, Dorothy and Robert became post-doctoral fellows with Peter Marler at the Rockefeller University Field Research Center in Millbrook, New York. Robert and Dorothy enjoyed the rural setting and the intellectual stimulation of the field center. Bill Searcy, one of their fellow post-docs, recalls this period warmly:

At the time, post-docs were the predominant life stage at the field center, too common to be greatly valued individually, but able because of their numbers to form a self contained society of like-aged individuals with overlapping scientific interests. I think many would agree, looking back, that the result was the most stimulating intellectual atmosphere that we would experience in our entire careers. Dorothy and Robert, naturally, were integral to creating this intellectual milieu, as they were to creating the social life that ran in parallel. (Searcy, 2019).

Marler was known for his work on animal communication, and he encouraged Robert and Dorothy to develop a project on vervets in Kenya's Amboseli National Park. Remarkably, they hit the scientific lotto with their first field experiment. Tom Struh-saker, who had studied vervets in Amboseli in the 1960s, had observed that the vervets produced distinctly different calls when they saw leopards, eagles, and snakes, and that each of these calls elicited a different response from animals that heard them. For example, when the monkeys heard a leopard alarm call they climbed up into trees, and when they heard a raptor alarm call they peered up into the sky or ran into bushes.

The impact of these findings, which they published in *Science* in 1980, reverberated far beyond primatology. The work generated great interest among philosophers, linguists, and cognitive scientists and remains their most highly cited research paper.

Their responses might mean that the calls served as arbitrary referents to particular predators or they might reflect the emotional states of the callers when they encountered different predators. To distinguish between these possibilities, Robert and Dorothy conducted a set of "playback" experiments. First, they tape-recorded alarm calls that vervets made when they encountered eagles, snakes, and leopards. Then, they simulated a predator alarm, by playing the recorded alarm calls back to the monkeys when no predator was actually present. The vervets responded to the recorded calls in the same way that they responded to real predators. The results demonstrated that the monkeys were able to extract meaning from the calls themselves, which were taken as arbitrary acoustic signals. The impact of these findings, which they published in *Science* in 1980, reverberated far beyond primatology. The work generated great interest among philosophers, linguists, and cognitive scientists and remains their most highly cited research paper.

With this experiment Dorothy and Robert liberated the study of animal communication and cognition from the laboratory. In the 1970s there was considerable interest in the cognitive and linguistic abilities of chimpanzees who were taught to use sign language or symbols to communicate. For example, David Premack taught chimpanzees to use arbitrary symbols to represent objects, and explored their reasoning abilities. I was present at a meeting in the early 1980s when Dorothy politely suggested to a renowned expert on ape language that it might be more fruitful to think about how animals used their communicative and cognitive abilities to solve problems they faced in their everyday lives than to study their ability to solve abstract logical problems. The speaker was outraged, and Dorothy was shaken but undeterred in her conviction that the most important insights about animal cognition would come from studies conducted under ecologically relevant conditions.

Dorothy and Robert became increasingly interested in using playback experiments to probe monkeys' understanding of their world. They found that the vervets knew a lot about their own relationships to other vervets. For example, the vervets gave acoustically distinct grunts when they approached higher-ranking group members or lower-ranking group members or observed other vervet groups. In one experiment, they played the screams of infants to females to find out whether females could recognize their own infants' calls. Mothers responded more strongly to the screams of their own infants than to the screams of other infants, as they had expected. However, the reactions of other females were even more interesting: when bystanders heard an infant scream, they looked toward the infant's mother. This must mean that they also knew something about the nature of the relationship between the distressed infant and its mother. This was the first evidence of knowledge of third-party relationships in nonhuman animal species.

Dorothy and Robert learned that vervets' intelligence seemed particularly attuned to social problems rather than ecological ones. For example, the monkeys reacted strongly when a neighboring male called from the "wrong" territory, but seemed unmoved when they heard hippos or water birds calling from "wrong" habitat. Although they gave alarm calls about leopards and pythons, they did not react to the sight of an ungulate carcass cached in the branches of a tree or to a python track undulating along the ground.

Dorothy and Robert remained at Rockefeller for five years, going back and forth between Millbrook and Amboseli. But the post-doc life stage cannot continue forever, and they both looked for more permanent academic jobs. Finding two academic posts at the same institution is always a challenge, and several academic couples whom they knew had

pioneered the strategy of sharing a single academic position. So, in 1981 they negotiated a shared position in the Department of Anthropology at the University of California, Los Angeles. Sharing a position had both advantages and disadvantages. On the one hand, both Robert and Dorothy had faculty positions, and each of them had a half-time teaching load. On the other hand, they shared a single salary in a city with a high cost of living. Although they were able to write grants to cover a second salary, this added an element of uncertainty to their lives. Their daughter, Caroline “Keena,” was born in 1984.

That same year David Hamburg invited Dorothy and Robert to spend a year at the Stanford Center for Advanced Study in the Behavioral Sciences in Palo Alto, California, working with a group to produce a book that would summarize current knowledge about primate behavior and ecology. The group, which also included Barbara Smuts, Richard Wrangham, and Tom Struhsaker, solicited and carefully edited chapters from dozens of contributors. *Primate Societies*, which was published in 1987, served as the standard reference in the field for many decades, and there was a dog-eared copy on the bookshelf of every working primatologist.

In 1985 Dorothy and Robert moved to the University of Pennsylvania, where they both remained until their retirement in 2016. Dorothy initially held a position in Anthropology, but soon shifted to the Department of Biology, and Robert held a position in Psychology. Their second child, Lucy, was born in 1986, and they returned to Amboseli for an extended field season with both children in tow.

The Amboseli project came to an end in the late 1980s, as their study population was unable to survive the combined impacts of habitat loss and intense leopard predation. Lynn Isbell, who was acting as their field project manager during this period, recalls, “She [Dorothy] told me she had begun to dread my monthly phone calls from Nairobi because they were invariably full of doom and gloom as I gave her details of the next batch of individuals to go missing.” (Isbell, 2019).

Although they regretted the necessity of their departure from Amboseli, their enforced hiatus from fieldwork gave them time for a longer writing project. Their timing was good, because in an influential 1976 essay, entitled *The Social Function of Intellect*, Nick Humphreys had hypothesized that the challenges of living in social groups created selective pressures that favored the evolution of larger brains and more sophisticated cognitive abilities in primates. Then, Andy Whiten and Dick Byrne canvassed primatologists for examples of deception, a cognitively complex form of behavior (Whiten and

Byrne, 1988). This was soon followed by an edited volume, *Machiavellian Intelligence* (Byrne and Whiten, 1989), which included consideration of innovation, mind reading and theory of mind, conceptions of kinship, and the selective pressures that favored cognitive skills.

Dorothy and Robert then jointly authored *How Monkeys See the World: Inside the Mind of Another Species*, which was the perfect sequel to this body of work. They combined a detailed description of their field experiments and observational research with a comprehensive synthesis of the current state of knowledge about communication and cognition among primates. The book was both authoritative and accessible. It received glowing reviews in a very wide range of venues. Andrew Whiten, summarized the opinions of many readers when he wrote, "...the result is an object lesson in how deep questions about minds possibly quite different than our own can be imaginatively and rigorously addressed."

Despite this success, Dorothy and Robert missed being in the field, and they began to look for a new field site. They were invited to take over William J. Hamilton's study of chacma baboons in the Moremi Reserve of the Okavango Delta, Botswana. They began their work in Moremi in the summer of 1992, accompanied by their daughters, then aged 5 and 7.

Robert and Dorothy also invited me and my family—which included my husband, Rob, and our 5-year-old son, Sam—to join them for the year. It was a good balance of talents and experience. Robert and Dorothy were experts on running field experiments, and I had experience programming digital data collection devices, and all three of us had studied baboons before. Although Rob's expertise in cultural evolution was not particularly relevant to our project, he knew how electricity worked and entertained the children with epic adventure stories. The children, often led by Keena, found endless ways to amuse themselves—staging centipede races, playing miniature golf with marula fruit, and using themselves as bait to catch leeches in the lagoon. We took turns home-schooling the children and doing research, and we all reveled in the beauty and wildness of the Okavango Delta.

One of our first goals was to catalog the baboons' vocal repertoire and document the behavioral context in which vocalizations were used. We began conducting focal samples, shadowing the baboons with a tape recorder and directional microphone. I was interested in the question of reconciliation, so we also conducted "post-conflict" samples on females after aggressive events. Early on, Dorothy noticed that aggressors often approached and grunted to their former victims after aggressive incidents had ended. Dorothy suspected that these grunts played an important role in reconciling conflicts.

To test this conjecture, Robert, Dorothy, and I designed a playback experiment. We played the scream of a female to a lower ranking female in three different conditions: (1) after a fight in which the same two females had fought and separated without grunting, (2) after a fight in which the dominant female had grunted to her former opponent after the conflict, (3) after the two females had not fought at all. If grunts are effective in reconciling former opponents, then females should respond more strongly in the first condition than in the other two conditions. And, that is what they did. Grunts seemed to be effective in restoring females' relationship to the "baseline" condition. This was the first in a series of studies suggesting that grunts function as signals of benign intent and play an important role in reducing uncertainty about the likely outcome of social interactions.

During that year we also began to get a sense of the challenges that the baboons faced. Females maneuvered for social opportunities in a world rigidly structured by dominance rank and kinship. Rival males had protracted conflicts, often involving long chases and bouts of loud wahoo calls—leaving them panting and exhausted. The stakes of these contests were high for males and females alike. The top-ranking male monopolized access to sexually receptive females, and new alpha males sometimes committed infanticide. There were also predators. One night when the baboons slept near camp, we were awakened by a cacophony of alarm calls. When we investigated the next morning, an adult female named Sugar was missing from the group. Our research assistant, Mongabe Kgosiekae, who was an expert tracker found a trail of leopard footprints and drag marks in the sand. All that was left of Sugar was a few tufts of hair and an upper jaw.

All of this provided the context for a rich body of research by Dorothy and Robert over the next 16 years that focused on how the baboons communicated, what they knew about their social world, and how they navigated the challenges that they faced from competitors, predators, and infanticidal males. They did this work with the help of a host of post-doctoral researchers who came to work with them, including Jacinta Beehner, Thore Bergman, Cathy Crockford, Anne Engh, Julia Fischer, Liza Moscovice, Dawn Kitchen, Ryne Palombit, Drew Rendall, and Roman Wittig. Normally, the post-docs spent about 18 months in Moremi conducting fieldwork and then returned to Penn to write up the results of their work.

Dorothy and Robert were initially disappointed that the baboons' vocal repertoire was more limited than that of the vervets they had studied in Amboseli. But they found that there were subtle differences in the acoustic features of calls given in different contexts,

and these acoustic differences were meaningful to the baboons. For example, work conducted with Julia Fischer showed that male baboons give loud wahoos when they sight mammalian predators and when they are involved in dominance contests with other males. Similarly, females use barks when they encounter predators and when they become separated from the group. In each case the calls sound very similar, but differ in some of their acoustic features. Work conducted with Dawn Kitchen and Julia Fischer also showed that males' wahoo calls provided reliable information about the callers' competitive ability.

Infanticide provided the foundation for a series of playback experiments conducted with Ryne Palombit. It was well known that lactating female baboons often form strong ties to particular adult males, and these relationships (often called "friendships") were originally thought to be a form of male mating effort as females were thought to selectively mate with males who had befriended them and defended them from harassment. The playback experiments in Moremi showed that males selectively responded to the distress calls of their female friends, but their responsiveness evaporated if the infant died. Their results suggested that these relationships might represent a form of male mating effort in populations with high mating skew and high rates of infanticide. This hypothesis was later supported by paternity analyses, conducted in collaboration with Liza Moscovice and Anthony Di Fiore, which showed that lactating females' "friends" were often the sires of their infants.

Dorothy and Robert followed up these experiments several years later with investigations of females' physiological responses to events that might increase the risk of infanticide, including instability in the dominance hierarchy and the arrival of new males into the group. For this work, they measured levels of glucocorticoids extracted from feces, which the baboons willingly contributed. Research conducted with Anne Engh, Jacinta Beehner, and Thore Bergman showed that lactating females experience greater increases in fecal glucocorticoids than cycling or pregnant females when there is instability in the male dominance hierarchy or new males enter the group and take over the top-ranking position, but these effects are dampened among lactating females who have established close ties to males.

Robert and Dorothy were also interested in the cognitive abilities that baboons relied on to navigate their social world. Like vervets, baboons know something about others' kinship and rank relationships. And, in a clever experiment conducted with Thore Bergman and Jacinta Beehner, they showed that baboons are able to categorize others

by both of these characteristics simultaneously. Bergman and Beehner took advantage of the fact that baboons form stable matrilineal dominance hierarchies in which mothers rank above their daughters and daughters are ranked in inverse order of their ages. Rank reversals *within* matrilines do not affect the rank order of females outside the family, but rank reversals between *matrilines* can alter the ranks of a many females. So, they designed a playback experiment in which they simulated rank reversals between two females in the same lineage and rank reversals between two females in different lineages. They also conducted control trials in which no rank reversals occurred. As they predicted, the baboons were much more attentive to playbacks that simulated rank reversals between lineages than they were to rank reversals within lineages. These experiments suggested that the baboons categorized individuals according to their dominance rank and their membership in particular matrilineal units.

Investigations of females' stress responses also provided insight about the value of females' social ties. During the year that Anne Engh was in the field, predation rates were particularly high. This enabled them to assess females' responses to the loss of close companions. Not surprisingly, all members of the group were stressed after predator attacks. However, the impact was more pronounced for females who lost a close relative than for others. Females' responded to their losses by expanding their social networks.

The baboons' responses to losses prompted Dorothy and Robert to think about the value of females' social bonds. Work from Amboseli that I had done with Jeanne Altmann and Susan Alberts had shown that females who were more socially integrated had higher fitness than females who were less integrated, and they wondered whether the same patterns might exist in Moremi. Dorothy and Robert asked me whether I'd like to analyze long-term data from Moremi to answer this question. Fortunately, all of the post-docs who worked in Moremi from 2001 to 2007 had collected information using the same data collection procedure that we had used in the first year of the project. They generously allowed us to combine these data into a single data set, which we used to describe the nature of females' social bonds and evaluate the impact of females' social ties on their reproductive performance. We found that females formed strong, equitable, tolerant, and stable ties to selected partners, particularly their mothers and daughters. We also found that females that had strong social bonds reproduced more successfully than females with weaker ties, and they also lived longer. Taken together, these analyses suggested that social bonds have adaptive value for female baboons.

Dorothy and Robert continued their work in Moremi until 2007, arriving each summer to see the baboons, conduct another set of experiments with their post-docs, do a bit of fishing, and watch the fish eagles rear another clutch. Their daughters accompanied them, transitioning between the suburbs of Philadelphia and the wilds of Botswana, an experience that Keena writes about in her forthcoming book, *Wild Life*. However, pressure from government officials to move their camp outside the boundaries of the Moremi Reserve and the increasing difficulty of obtaining research funding persuaded Dorothy and Robert that it was time to end this chapter of their research career.

As fieldwork in Moremi was winding down, they wrote *Baboon Metaphysics: The Evolution of a Social Mind*. The title is a nod to Charles Darwin, who had announced triumphantly in one of his notebooks, “Origin of man now proved.—Metaphysics must flourish.—He who understands baboon would do more towards metaphysics than Locke.” In *Baboon Metaphysics*, Dorothy and Robert described what they learned about baboon cognition and communication and brought readers up to date with developments in research on social cognition and the origins of language. They argued that we can gain important insights about the origins of language by studying the way that natural selection has shaped the baboons’ minds.

Baboons, they said, have mental representation of other individuals, their social relationships, and their motives, desires, and intentions. Their social knowledge constitutes a “language of thought,” and the properties of this language of thought overlap in important ways with the cognitive underpinnings of human language. Just as human babies are thinking about the world before they can express their thoughts with language, baboons are thinking about the world but do not express their thoughts with words. They proposed that “Several features thought to be unique to language—for example, discrete combinatorics and the encoding of propositional information—were not introduced by language. They arose, instead, because understanding social life and predicting others’ behavior requires a particular style of thinking” (page 252).

Dorothy was elected to the National Academy of Sciences in 2015. She was also elected to the American Academy of Arts and Sciences (1999) and received the Distinguished Primatologist Award from the American Society of Primatologists (2016) and the Distinguished Animal Behaviorist Award from the Animal Behavior Society (2016), and an honorary doctorate from the University of Neuchâtel, Switzerland (2013).

Dorothy was diagnosed with breast cancer in 2012. Radiation and chemotherapy were initially successful in shrinking the tumors, but after several years, tumors began to grow in her lungs. Later they spread to her brain. As Dorothy's illness progressed and prospect of recovery dimmed, her thoughts returned to Baboon Camp, a place where she had been most content, surrounded by her family and colleagues who became close friends, and the baboons she had come to love. She wrote in an unpublished memoir,

I find selfish diversion and some peace of mind in thinking back to Baboon Camp, especially when anxiety, frustration, and anger take over my brain at night. The memory of the smell of the earth after the rain, the silence that greets you as you first step off the boat into camp, the shadows cast by the full moon on the path to the tent, and the catch in your throat at the sound of a broken branch all remain very real, and when a smell, a sound, or a flash of light in the corner of your eye evokes one of these memories years later, it's more real than the present. Robert and I have sometimes been able to recapture a glimmer of Baboon Camp in the U.S.: sitting on the front porch during a thunderstorm, or talking with friends on the terrace around the remnants of a meal and wine, long after it has grown too dark to see the bats. And that contentment is more than the sum of its parts, more present sometimes than even the constant doctors' appointments and the weekly chemotherapy sessions.

Dorothy Cheney died on November 9, 2018, at the age of 68.

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