

MEMORIAL LECTURE

WILLIAM EMERY HAZELTINE II: REBEL WITH A CAUSE¹

BRUCE F. ELDRIDGE

Department of Entomology and Center for Vectorborne Diseases, University of California, Davis, CA 95616

Today we honor a man who made a difference. He was a medical entomologist who had a varied career in the field of mosquito biology and control, but he will forever be remembered as a man who fought in the trenches of the pesticide controversy from roughly 1960 until the end of his life, and who made the safe and efficient use of pesticides in public health a personal crusade. Some of you may wonder why I was selected to give this lecture. I certainly have very little background in the chemical control of mosquitoes. Actually, Bill and I had much in common. We were both born and raised in San Jose, California, and both graduated from San Jose State University and Purdue University. At Purdue, we had the same major professor, Leland Chandler. Because Bill was a few years older than me, we were never classmates. We first met when I arrived at Purdue in 1963, and Bill was in Lafayette, Indiana, to put the finishing touches on his Ph.D. dissertation.

The annual meeting of the Entomological Society of America was held in Philadelphia that year, and Leland Chandler, known to all as “Chan,” offered the two of us, plus another student, a ride from Lafayette to Philadelphia for the meeting. The trip started off quietly enough, until one of us brought up the subject of evolution. That launched a vigorous debate that lasted until we were to the Philadelphia city limits. The other student that rode along refused to ride back with us to Lafayette.

After I joined the University of California faculty in 1986, Bill and I had frequent interactions, and although I didn’t always agree with him, I grew to have considerable respect for his professional accomplishments and for his honesty and conviction. Mosquito abatement agencies in California benefited from his work, and so did members of the American Mosquito Control Association (AMCA).

I also valued Bill’s friendship. I think that to Bill, family and friends were at the top of his priorities.

Bill Hazeltine spent the majority of his professional career in the field of mosquito abatement in California. He was an advocate for the use of mosquito control to protect people from mosquitoes and the disease agents they transmit, and he believed chemical control to be a necessary part of the

means to accomplish this. He also considered himself an environmentalist, and billed himself as such on his business cards and on his signature block. He had a vast knowledge of pesticides and pesticide legislation, and a strong belief in the scientific basis for public policy issues related to the safe and effective use of pesticides. Because the federal Endangered Species Act influenced mosquito control, he became an authority on this as well.

Bill Hazeltine did not fit the mold of the typical successful scientist. He had a very successful career, but because he did not go out of his way to be agreeable, most of the accolades that less controversial scientists receive did not come his way. Bill was a rebel. He rocked the boat during the height of the ecological movement. At times he became the last person in the world people wanted to see enter a meeting of certain groups of scientists and administrators. He had an incredible sense of right and wrong, and was definitely the kind of person you wanted on your side. Bill had one characteristic that was particularly irritating to those who disagreed with his views. When he arrived at meetings, conferences, or other forums of debate, he invariably came thoroughly prepared with facts and data, and often brought with him large bundles of reprints of published papers and reports. His views carried with them considerable credibility because he thoroughly researched issues that impacted mosquito control.

When Bill retired, he left behind an extraordinary collection of books, pamphlets, papers, and articles. All were carefully sorted by subject and stored at the Butte County Mosquito and Vector Control District (MVCD). I recently looked at his collection of technical books on the shelves of the Butte County MVCD Board Room. Most mosquito control professionals would be envious.

William Emery Hazeltine II was born in San Jose, California, on September 4, 1926. His parents were Karl Snyder Hazeltine and Rachel Josephine Crawford (Fig. 1). Bill was the youngest of 6 children. Bill’s father was a graduate of the University of California, and served on the faculty of San Jose State University, where he taught agricultural and natural science subjects. Bill’s mother was a graduate of San Jose State, and also was a teacher. All Bill’s early years were spent in San Jose or at his parent’s summer home in Mount Hermon, in Santa Cruz County, California, except for two years when

¹ This Memorial Lecture was presented at the Annual Meeting of the American Mosquito Control Association in Vancouver, British Columbia, Canada on April 4, 2005.



Fig. 1. The Hazeltine family in 1926: (left to right) Rachel (with Bill), Ruth, Howard, Karl, Jr. (seated), Margaret, and Karl, Sr. (courtesy of Ruth Hazeltine Williams).

he was a baby and his father attended Cornell University to earn a Ph.D. Given the background of Bill's family, it is not surprising that he was a gifted writer.

Bill grew up in a home on 12th Street in San Jose, and lived there until after he graduated from

San Jose High School in 1943 (Fig. 2). At this time his father suffered a heart attack, and the family sold the San Jose home and moved to their summer home in Mount Hermon. After this, Karl commuted to San Jose and taught only part-time at San Jose State. I was not able to learn a lot about Bill's early

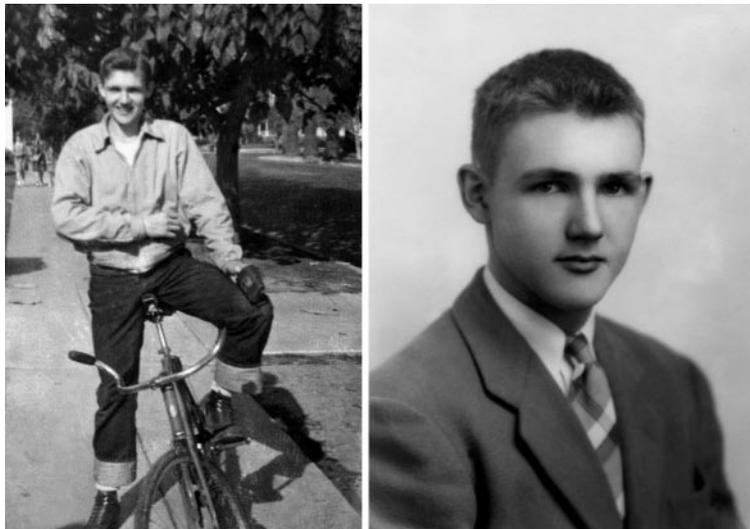


Fig. 2. Bill Hazeltine on his bicycle at age 16 (left), and his graduation photograph from San Jose High School (right) (courtesy of Ruth Hazeltine Williams).



Fig. 3. Bill Hazeltime in the U.S. Navy, 1944 (courtesy of Ruth Hazeltime Williams).

years in San Jose, but his sister told me that he was virtually raised by his older siblings, and that they adored him.

After graduation, Bill enlisted in the U.S. Navy. He served in the Navy for the duration of World War II, and after he was discharged he returned to San Jose to attend college (Fig. 3).

In 1946 Bill enrolled at San Jose State University. The Biology Department faculty included the entomologists Carl Duncan and James W. Tilden. In 1949, a young charismatic entomologist who had recently graduated from Ohio State University, J. Gordon Edwards, joined the San Jose State faculty. Although Bill and Gordon would have been there together for only one year, I suspect Bill must have taken classes from him and been influenced by him. Certainly, in later years they became close friends and collaborated on many efforts to fight for the continued use of public health pesticides. Bill graduated in 1950 with a bachelor's degree in biology, thus following in his father's footsteps. Unfortunately, his father did not live to see Bill graduate, because he suffered a fatal heart attack while working at his desk at San Jose State.

After graduation from San Jose State, Bill worked in Arizona for a time, and then went to work for Agricultural Specialties Company in Dal-

las, Texas. He moved from Texas back to California in the mid-1950s to attend the University of California at Berkeley, where he received an M.Sc. in entomology in 1956. Some of his classmates from that time have told me that Bill was not entirely happy with the social and educational climate at Berkeley. One story that persists from Bill's Berkeley days is that Bill's advisor, in preparing Bill for an oral examination, advised him to just say he didn't know if he was unsure of the answer to a question, and not to try and bluff his way through. After the examination was over, his advisor told Bill he had not done well, and that he would have done much better if he had not said he didn't know so many times.

After graduating from UCB, Bill entered Purdue University to begin a Ph.D. program in entomology under the guidance of Leland Chandler (for whom Bill's son, Leland Hazeltime, was named). Bill completed the requirements for the degree in 1962. His thesis (Hazeltime 1962) described a study of the genitalia of bumble bees. I doubt whether Bill chose Purdue because of his deep interest in the Bombinae, but rather because of Purdue's strong reputation at the time for insect control programs and research. However, Chandler was another strong and influential teacher, and most of his students studied bumble bees.

Bill received his degree the same year as did William S. Bowers, the well-known insect physiologist whose research contributed to the development of the synthesis of synthetic juvenile hormone (Bowers 1965). Knowing Bill Bowers as I do, I can only speculate as to the lively discussions and interactions that must have taken place between these two highly spirited individuals. When I arrived at Purdue, Bill Hazeltime had definitely left his mark. A legendary story about Bill's Purdue years that provides an insight into his personality involves the distinguished long-term departmental chair, John V. Osmun. Bill's office at Purdue was in a long narrow room that housed six to eight graduate students, and was known as the "bull pen." The story goes that on one occasion John stuck his head in the door of the bull pen and said "Give me a couple of graduate students," and then left to return to his office. Bill was right on his heels, and as John was closing his door, Bill jerked it open and said "Don't you ever come into our office and just yell for a couple of graduate students. If you want my help, just say, Bill, would you please come give me a hand with something?—Now, what was it you needed?"

In 1961, Bill returned to California to become Chemical Researcher, and later Manager, of the Lake County Mosquito Abatement District (Fig. 4). One of Bill's major challenges here was to develop means of controlling the infamous Clear Lake gnat (*Chaoborus astictopus*), a notorious pest and enemy of tourism in the area. Before Bill arrived, a control method had been developed involving the use of DDD (or DDE), a breakdown product of

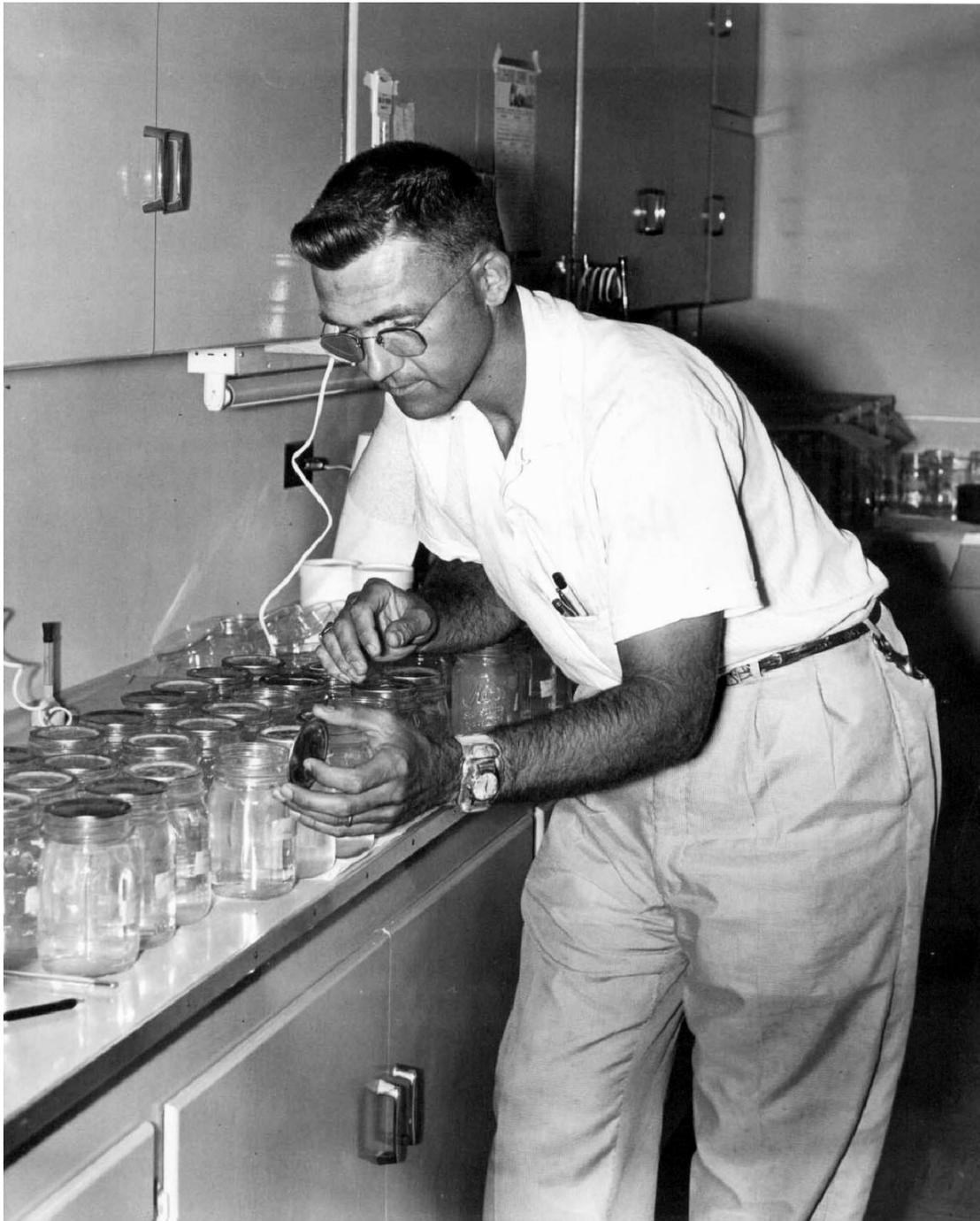


Fig. 4. Bill Hazeltine as a chemical researcher at the Lake County Mosquito Abatement District (California) in the early 1960s (courtesy of Lake County Vector Control District).

DDT, applied from boats to Clear Lake. Bill developed a more comprehensive program involving a variety of approaches. Bill described his philosophy of gnat control in one of his early technical papers (Hazeltine 1963). He considered chemical control

to be expensive and not long-lasting, and believed research should be promoted to search for biological and cultural controls that would provide longer-lasting effects.

Bill experimented with a number of chemicals to



Fig. 5. Bill Hazeltine as Manager of the Butte County Mosquito and Vector Control District (California) in the 1980s (courtesy of Butte County Mosquito and Vector Control District).

control the gnat, including various formulations of methyl parathion. He also developed sampling techniques for *Chaoborus* larvae and conducted studies on gnat biology.

In 1964, Bill left Lake County to take a job with Chemagro Corporation in Kansas City. He spent two years there, then again returned to California to take a position as Manager of the Butte County Mosquito Abatement District in Oroville (Fig. 5).

Bill served as Manager in Butte County for 26 years, retiring in 1992. Upon his arrival Bill involved himself in a variety of problems involving mosquitoes and other vectors. One early problem he addressed was the use by the city of Oroville of old placer mining pits for sewage-disposal settling ponds. He recognized right away that their use for this purpose would almost guarantee excessive mosquito breeding. He developed a plan for re-grading the pits, and adapted a surplus airplane engine as a powerful blower to force larvicidal oils into vegetation and rock crevices in the pits. It worked. Bill also initiated a long-term cooperative program with the California Department of Fish and Game (CDFG) for avoidance of mosquito problems on the Gray Lodge Wildlife Refuge. When Bill retired in 1992 he was given a tongue-in-cheek "Certificate of Merit" by CDFG for his "soft spoken manner and gentle relaxed approach."

Another difficult problem Bill faced was mosquito control in log ponds at lumber mills that once were common in Butte County. Bill developed a technique for injecting Dursban formulations into

the water used to spray the logs. Bill also spent considerable effort in adapting ultra-low-volume technology for aerial application in Butte County.

Bill's success at Butte County went far beyond his innovative methods of mosquito control. He became fully engaged in county politics and service and served on many boards and committees. At various times he was on the school board, the planning commission, and many advisory groups.

Bill was an effective manager and leader at Butte County. Those who took the trouble to get to know him developed a strong allegiance to him. Most appreciated his absolute honesty and fairness. Not only was Bill honest to a fault, he expected it of people who worked for him as well. He would forgive almost anything by members of his staff except dishonesty. He was also conservative in the use of resources. The vehicles owned by the Butte County Mosquito Abatement District were probably the last in the state to have automatic transmissions and air conditioning.

It was during his Butte County years that Bill became fully involved in pesticide legislation on both the local and national level.

After his retirement in 1992, Bill continued his activities associated with pesticide legislation and regulation (Fig. 6). He believed that the U.S. Environmental Protection Agency (EPA) made decisions on listing of rare and endangered species based in incomplete data on geographical ranges and abundance. He was resting from a day of collecting specimens of the Santa Cruz rain beetle



Fig. 6. Bill Hazeltine on a beetle collecting trip after his retirement in 1992 (courtesy of Butte County Mosquito and Vector Control District).

(*Pleocoma conjugens conjugens*) in the upper Carmel Valley of Monterey County on November 5, 1994, when he suffered a fatal heart attack.

Bill was a perpetual member of the Mosquito and Vector Control Association of California (MVCAC) Legislative Committee, serving from 1980 until his retirement in 1992. He served as the Chair of this committee only in his final year of active employment with Butte County MVCD. Bill served brief stints on other MVCAC committees, and he was at some time the Chair of the AMCA Legislative Committee. Bill also represented AMCA in Washington, DC, on various pesticide issues, and for this service he was awarded the AMCA Meritorious Service Award in 1993. Ironically, as far as I was able to determine, this was the only national society award Bill ever received. He was elected an Honorary Member of MVCAC in 1993.

Bill was also a member of the Entomological Society of America and the American Association for the Advancement of Science.

Bill Hazeltine was a multifaceted and complex

person. His general approach to the study of medical entomology is rare today. He was skilled in many areas, including morphology, taxonomy, and toxicology. Probably as an extension of his personality, and his strong views on the relationship between science and public policy, he developed an interest in the political aspects of environmental laws and regulations early in his career. Judging from photographs showing him engaged in public discussions, he appears to have honed his debating skills early.

Bill was an avid reader of publications that only some of us find interesting: *The Federal Register*, the *Congressional Record*, the *Code of Federal Regulations*, and the *California Health and Safety Code*.

In preparing for this lecture, I examined two large boxes of papers and letters given to David Brown by Bill after his retirement. I was hoping to find many letters involving Bill's activities in fighting for his beliefs about pesticide legislation and regulation. I was disappointed. There were many letters, but most were routine and polite exchanges

between Bill and industry representatives concerning chemicals and equipment, to government officials at all levels, and to academic researchers. Only a few of them approached contentiousness.

Among all of the often ridiculous things said about Bill by his harshest critics, I don't remember any of them saying that it was difficult to know where he stood on issues. His motives were often impugned, but it would have been impossible for anyone to claim that he had any kind of hidden agenda, because personally and publicly, his message never strayed from a few basic positions. In 1971, he published a paper that began with the sentence "I have a cause" (Hazeltine 1971). The paper contains a number of his positions on pesticide use and regulation; I have chosen four of them because I think they best summarize the guiding principles of Bill's professional career. The third position also offers an insight into Bill's personality.

1. Decisions on pesticide use should be made by competent people and based on good data.
2. Biological controls are good, and must be used, but chemicals are also necessary for an effective program.
3. When you discuss pesticides, do not stipulate to something just to get acceptance.
4. There is a real need for continuing education, which is a mark of professionalism.

One of the last articles written by Bill summarizes well his primary interest in pesticide-related legislation (Hazeltine 1993).

Bill had a comprehensive knowledge of the 1972 amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). He had a full appreciation of the potential impact of the federal Clean Water Act that wasn't fully realized by most until after his death. The Endangered Species Act had such a special hold on him that he devoted much of his postretirement time to collecting evidence from the field to refute what he considered to be poorly documented proposals for listing of species.

Anyone with an interest in the 1972 FIFRA amendments should know that Bill Hazeltine wrote a book on the subject (Hazeltine 1975a). I checked it out of the UC Davis library. Frankly, I expected to be only the first or second person to have done so. I was wrong. The checkout sheet is now on its second page. It is a very well written and authoritative book. It is also balanced and fair. I know of nothing else written that does a better job explaining the history, politics, and implications of the amendments. As I mentioned earlier, Bill was a gifted writer. I think anyone who looks at this book will agree.

Bill believed that the federal Clean Water Act contained many provisions that had features that impeded the use of public health pesticides. He wrote an article in 1976 that drew particular attention to the National Pollution Discharge Elimination System, or NPDES. The paper was based on a

talk he gave at the 44th annual conference of the California Mosquito Control Association. I didn't attend that meeting, but I wonder now in retrospect how many people paid close attention to his predictions. I suspect that later events throw that paper into a different light.

During the latter years of Bill's career, he developed a keen interest in the impact of the federal Endangered Species Act and its potential impact on mosquito control. Bill believed that decisions to list species were rarely based on reliable studies. Bill was an active participant in the often lengthy deliberations leading to the listing (or nonlisting) of various plants and animals.

As Bill scoured the *Federal Register* on an almost daily basis, probably few items attracted his attention more than proposed listings of threatened or endangered species of plants and animals. This was especially true if the listings involved species present in his mosquito control district. I can imagine his heightened attention in 1991 when he noted the proposed listing of Butte County meadowfoam, found in vernal pools and ephemeral drainages. Meadowfoam was eventually listed, and today this listing influences decisions on public works projects in Butte County.

Bill's final activities involved making collections of the Santa Cruz rain beetle (*Pleocoma conjugens conjugens*) in the upper Carmel Valley of California to prove that it did not have the restricted range as proposed. After Bill's death, this beetle was withdrawn from this list.

Some of Bill's studies were in the Zayante Sandhills Habitat, just a few miles from his boyhood summer home in Mount Hermon. If you will examine the U.S. Fish and Wildlife Web site describing this area you will find some of Bill's photographs posted.

As many people who knew Bill have told me, Bill was a complex person. The perceptions of people who crossed paths with him varied widely. To his brothers and sisters he was a much beloved and admired little brother. To his four sons he was a devoted and loving father, and a respected role model. To some with whom he locked horns over environmental policy, he was a stubborn and uncompromising advocate. To many of his fellow mosquito abatement district managers he was a person with strong convictions who could be counted on to fight for the cause of the safe and effective use of pesticides for the protection of the public from arthropodborne diseases. To most of his employees he was a thrifty and conservative manager of resources, but a compassionate and fair leader. To some government officials I'm sure he was regarded as a persistent and annoying burr under their saddle.

Although I spent many hours in conversation with Bill, mostly about mosquito biology and control, I can't pretend that I knew him well. My own perception of Bill was a man of strong convictions

about right and wrong, a person who was unflinchingly honest and fair. He was highly intelligent and extraordinarily hardworking, and absolutely devoted to the notion that proper decisions should be based on well-established facts, and not emotions.

Some perceptions of Bill clearly fall under the category of absurdity. The amount of radical nonsense concerning Bill's political views of pesticide use and regulations is best appreciated by doing a search of the Internet for "William Hazeltine." One example of the kind of "information" about Bill available from a Web site by "ecosyn" concluding that the attempt to identify a single William E. Hazeltine is clouded by a confusing variety of names associated with various "science frauds." This shameless document is full of clearly libelous statements, and is probably written by someone that knew little or nothing about him.

Another document posted suggests that Bill received millions of dollars from the tobacco industry in exchange for his protobacco statements. When I told Bill's son Lee about this, Lee replied "Gee that's interesting—I wish I'd known about that."

Bill probably received most of this attention because of his participation in organizations such as Terra and the International Society for Scientific Ecology. These organizations took stances on public policy that were consistent with Bill's views. It is very unfortunate that some people in our society with political agendas have so little to offer beyond character assassination and claims of guilt by association.

A statement from the Internet concerning the effects of DDT and cancer, and quoting Dr. William Hazeltine as one of America's greatest medical researchers, probably represents a perception from the opposite end of the spectrum. Bill would probably have blushed if he had read it.

Many people I spoke with about Bill seemed most impressed by his somewhat gruff exterior. Recently, I spoke with Eugene Kauffman about Bill. Gene was the Manager of the Sutter-Yuba Mosquito Abatement District, and he retired at about the same time as did Bill. In the course of our conversation, Gene made a very insightful observation. He said that to appreciate the many good things that were inside Bill, one had to get past his exterior. Unfortunately, he continued, a lot of people were unable to do this, and that he was grateful that he, Gene, was able to. I can only echo this observation.

I must also relate a story that concerns Gene and Bill. I have heard this story many times, but I was happy to have Gene confirm its accuracy. Bill was a stickler for maintenance of equipment, including his own. He was an avid fisherman, and always kept his boat and outboard motor in tip-top condition. At a summer outing of managers and staff of mosquito abatement districts of the Sacramento Valley region of MVCAC Gene and the late Ernie Lusk decided to try out Bill's boat one late afternoon without his permission. They made it out onto

a lake without incident, but as they were returning to shore they capsized the boat attempting to exit it. Neither had the nerve to confess this to Bill, and Bill did not discover the effects of the submersion of the boat and motor until he tried to start it the following morning. Bill apparently spent the rest of the outing trying to ferret out the guilty parties, but neither Gene nor the many observers would help incriminate the two guilty individuals. I suspect he knew who they were.

Finally, I would like to discuss briefly what Bill's career meant to the mosquito control effort. I have already mentioned his legislative activities made on behalf of AMCA. I'm told that many of his trips to Washington to interact with the EPA and various members of congress were at his own expense.

I also note, with considerable pride, the Pesticide Environmental Stewardship Program Champion Award for 2003 received by AMCA from the EPA. I think Bill, who sincerely considered himself an environmentalist, would be proud as well.

Bill furnished comments frequently on proposed actions by the EPA and the Army Corps of Engineers. Some of these comments have been saved, probably many others are now lost. He participated in many panel discussions for a wide variety of groups, and a few of these are published.

Bill was an expert on pesticide labels. He frequently helped develop them, and wrote the labels for some formulations of pyrethrum.

After Bill's death, I was contacted by his sons about the possibility of establishing a William Hazeltine Memorial Scholarship Fund at UC Davis. They believed this would represent an important contribution because of Bill's strong interest and support of medical entomology research, and because of Bill's admiration of UC programs in mosquito control. The fund has grown to the point where graduate student awards can now be funded just from the interest, and a number of students at UCD have benefited from the thoughtfulness of the Hazeltine family.

Here are some examples of Bill's activities, in his own words. This is an excerpt from a letter written April 24, 1979, from Bill to Mr. Ed Johnson, then with the Office of Pesticide Programs of the EPA:

Dear Ed: I have just finished reading the March 3, 1979 Preliminary Report to Congress on Ultra Low Volume (ULV) Pesticide Application. This draft was a real disappointment. It should be redone to at least make it consistent from page to page and to encourage better pesticide use practices. [Later on] Even more disturbing is the apparent lack of understanding of the whole concept of ULV by report writers, as evidenced by the numerous contradictions in the report.

Copies of this letter were sent to three members of Congress. I don't know why Bill was so reluctant to provide a frank assessment of the report.

Three articles published by Bill in the 1970s (Hazeltine 1971, 1975b, 1976) do a much better job of summarizing Bill's professional interests and ideas than I can possibly do here. His arguments are persuasive and visionary. Looking back at them 30 years later makes one wonder what kind of crystal ball he had. They suggest that Bill was a person clearly ahead of his time.

In closing, I hope I have done justice to the memory of a most interesting individual. Much of AMCA's current involvement with federal legislation affecting mosquito control in the USA stems from Bill's efforts in this area. Bill may have paid a stiff price for much of the work he did. As one might say today, he "took one for the team."

ACKNOWLEDGMENTS

In preparing this lecture, I had significant help from many people who played important parts in Bill's life. I am especially indebted to James Camy (Butte County Mosquito and Vector Control District), Elizabeth Cline (Fresno Westside Mosquito Abatement District), Arthur Colwell (Lake County Vector Control District), Charles Dill (Placer Mosquito Abatement District), Eugene Kauffman (Yuba City, California), Ruth Hazeltine Williams (Highland, California), Connie Hazeltine Scherer (Oroville, California), Craig Hazeltine (Scottsdale, Arizona), Leland Hazeltine (Woodland, California),

Daniel Moench (Butte County Mosquito and Vector Control District), Robert K. Washino (Davis, California), and Randall Williams (Lake County Vector Control District). I apologize to the people who furnished me with information, but are not listed. Please chalk it up to my failing memory.

REFERENCES CITED

- Bowers WS, Thompson MJ, Ubel EC. 1965. Juvenile and gonadotropic activity of 10,11-epoxyfarnesenic acid methyl ester. *Life Sci* 4:2323-2331.
- Hazeltine WE. 1962. The comparative morphology of the male and female genital segments of the Bombinae (Hymenoptera: Apidae). Ph.D. dissertation. Purdue University, Lafayette, Indiana.
- Hazeltine WE. 1963. Gnat control in mosquito abatement agencies. *Proc Calif Mosq Control Assoc* 31:39-41.
- Hazeltine WE. 1971. How do you answer the critics? *Proc Calif Mosq Control Assoc* 39:37-40.
- Hazeltine WE. 1975a. *The legislative history and meaning of the Federal Insecticide, Fungicide, and Rodenticide Act as Amended, 1972* Oroville, CA: William E Hazeltine.
- Hazeltine WE. 1975b. Responding to the US Environmental Protection Agency. *Proc Calif Mosq Control Assoc* 43:6-7.
- Hazeltine WE. 1976. The conflicts, case histories, solutions and ramifications of a permit system. *Proc Calif Mosq Control Assoc* 44:5-9.
- Hazeltine WE. 1993. Working for amendments of federal laws which impact mosquito control. *Proc Calif Mosq Vector Control Assoc* 61:95-97.