

MEMORIAL LECTURE

2013 AMCA MEMORIAL LECTURE HONOREE: THOMAS DESMOND MULHERN 1908–1993¹ TOMMY MULHERN AND THE LOST CRUSADE

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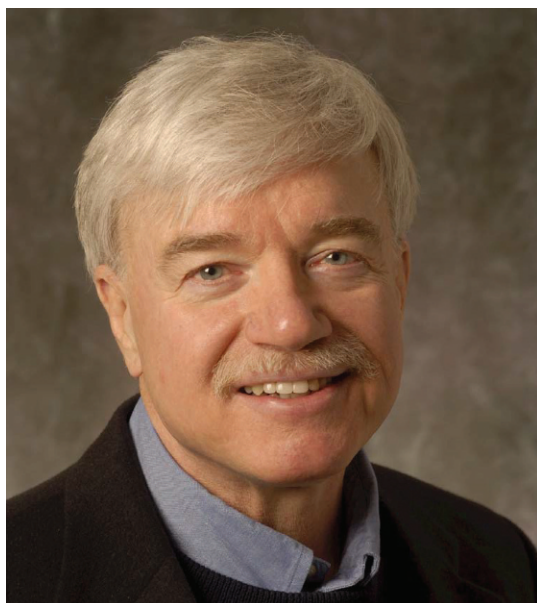
Let's start with a little quiz. Name this country: richest in the world, largest military power, world-class standard of living, world center of influence and innovation. And the answer, of course, is England ... in 1912. This is a classic example of a paradigm shift, that is, a fundamental change from one way of thinking to another, a change in viewpoint. But I see that a few of you may have missed it. Fortunately, there is a bonus question, so you still have a shot at winning an invaluable No-Prize.

Name this state: best funded for mosquito research and control, largest mosquito control workforce, world-class mosquito research, world center for mosquito control influence and innovation. And the answer, of course, is New Jersey ... in 1949. And today you ask? Florida maybe, or California, but not New Jersey. What happened?! This morning, I will show that Tommy Mulhern was the fulcrum for an abrupt paradigm shift in 1949 in what Gordon Patterson has termed *The Mosquito Crusades* (Rutgers University Press, 2009). It is a story filled with lessons about innovation, leadership, commitment, values, service, and even passion—one man's passion for this association.

To understand this paradigm shift we must return to the "Golden Age of Mosquito Control."

American universities have long been the nerve center for the intellectual and technological advances that made this country great. During the 1st half of the last century, the center for mosquito control innovation was Rutgers University. Guided by 5 men—Smith, Headlee, Ginsberg, Granett, and Mulhern—Rutgers and New Jersey led the world from the dawn of mosquito control more than a century ago, until the end of the Golden Age in 1949 (Fig. 1).

The Golden Age started in 1896 when Rutgers Professor John B. Smith turned his attention to mosquitoes. It is Smith who kicked open the door for mosquito control in the USA. Smith resembled



Professor Randy Gaugler

Galileo and his telescope: wherever he looked he made a discovery. He conducted pioneering studies on mosquito larvicides and natural repellents, made the 1st powered spray application in 1907, and was a leading figure in mosquito identification and taxonomy. Extensive studies on mosquito-eating fish made him an early advocate for biological control. His massive abatement program against salt marsh mosquitoes resulted in 5 million feet of hand-dug ditches by 1912. And he conducted outreach programs to encourage the public to eliminate backyard mosquito habitats.

Smith's background as a lawyer equipped him for his most important role: mosquito control crusader and advocate. The New Jersey mosquito laws were a direct consequence of Smith's basic research on mosquito dispersal. Smith's seminal paper on the mosquitoes of New Jersey (1904 Report of the New Jersey Agricultural Experiment Station) established with an evidence-based approach to New Jersey policy makers that

¹ This Memorial Lecture was presented at the 79th Annual Meeting of the American Mosquito Control Association in Atlantic City, NJ, February 24–28, 2013.



Fig. 1. The “Golden Age” of mosquito control, 1896–1949.

mosquitoes were a state as well as a local problem. Because of Smith, New Jersey became the model for all who aspired to build mosquito control programs.

We can only imagine what this man might have accomplished had he been granted a greater lifespan, rather than dying in 1912 at age 53 when he was at the peak of his powers, just 9 days before New Jersey Governor Woodrow Wilson signed the landmark mosquito laws that Smith had authored. Smith is richly deserving of the title “Father of the American Mosquito Control Movement.”

“Between the idea.../And the act/Falls the shadow.” Here T. S. Eliot notes that a void often arises between vision and creation. New ideas are only part of innovation. Someone capable of executing that vision is also required. Without Thomas J. Headlee, Smith might have been a mere footnote in the chronicles of the mosquito crusades.

Headlee was appointed Head of the Rutgers Department of Entomology and leader of the mosquito program within months of Smith’s passing. He led the department and the program for the next 3 decades. Headlee transformed New Jersey into the cradle of the mosquito crusade. Gifted with superb leadership abilities and using

Smith’s template, Headlee immediately implemented the concept of local mosquito control units. The following year, 1913, he established the New Jersey Mosquito Extermination Association, the evolutionary antecedent for the American Mosquito Control Association (AMCA). These twin concepts, local mosquito control units and state associations, become widely emulated nationally and internationally and are New Jersey’s most enduring legacy.

Headlee was a man with an eye for talent, and he used it to build the world’s foremost mosquito research program. Among the stars hired by Headlee, Joseph M. Ginsburg stands out. Professor Ginsburg devised the 1st modern mosquito larvicide in the late 1920s, the “New Jersey Larvicide” (1930 *Proc NJ Mosq Exterm Assoc*, pp. 57–73), a pyrethrum-based compound that quickly replaced the existing standards: kerosene and arsenic! Next he developed the 1st adulticide, “Flit,” which became famous worldwide. Standard Oil and others made a fortune from Flit. Rutgers and Ginsburg? Not so much. Ginsburg is credited with the 1st spray from an aircraft for mosquito control in 1930 and the 1st space treatment at Newark Stadium in 1935, and he



Fig. 2. Thomas Desmond “Tommy” Mulhern. (A) 1926, (B) ca. 1949, (C) ca. 1984.

made seminal advances in the development of spreaders and other adjuvants. Long before Rachel Carson’s *Silent Spring* made headlines, Ginsburg was studying and calling attention to the impact of chemical insecticides on aquatic nontargets.

Then, as today, one of the world’s most respected scientific journals was *Science*. Ginsburg published an astonishing 5 papers in the journal. His last *Science* paper was published in 1948, although he did not retire until 1960 when he was replaced by future AMCA president Donald Sutherland. He may well have been mosquito control’s chief innovator in the 1930s and 1940s, and surely he is among our field’s most overlooked figures.

Another Rutgers innovator and a student of Ginsburg, Philip Granett, devised the earliest synthetic repellents in the 1930s, including “Stay-Way” lotion. This was followed by “Rutgers 6-12”—which went into 150 million bottles of repellent distributed to troops in World War II and was still standard issue in the Vietnam War. Its composition and synthesis were military secrets. Industry made millions from Rutgers 6-12. Rutgers and Granett? Not so much. Professor Granett contributed to protecting countless deployed warfighters from vector-borne diseases, but his greatest contribution to mosquito control may have been elevating the study of repellents from an observational to an experimental science; the methods he established still form the basis for repellent research and development (1940 *J Econ Entomol* 33:563–565). Granett’s work received significant national attention, and he was featured in *Life* magazine, a prominent photographic periodical that chronicled the 20th century. (Ask your parents!)

And, the man we honor today: Thomas “Tommy” Desmond Mulhern (Fig. 2), whose extraordinary journey in mosquito control spanned a continent and 6 decades. His legacy in mosquito control is unequalled.

Tommy Mulhern was born in Brooklyn, NY, on June 15, 1908. He grew up at Fort Hancock, NJ, a coastal area with extensive salt marshes and mosquito problems that could only be described as biblical: clouds of mosquitoes were so thick along the Jersey Shore that it was said you “couldn’t tell Tom from Dick or Harry.” Bed nets were standard issue because the state was rife with malaria.

Our story begins in 1925, when Tommy took a summer job as an Inspector for the Monmouth County Mosquito Extermination Commission, his 1st of 3 summers with the Commission. For transportation, the Commission provided him with a bike. His insecticide? Kerosene. His application equipment? A garden watering can. So outfitted, he was charged with the well-being of Rumson, a community heavily infested with millionaires who demand relief from the mosquito scourge. Tommy spread kerosene wherever he detected larval habitat. He had nothing in his meager arsenal, however, to combat the biting adults—hence the expression: “once they’re on the wing, you can’t do a thing.”

In 1926 Tommy Mulhern graduated from Middletown High in Leonardo, NJ, where he earned the Good Citizenship Award. He enrolled at Rutgers University that fall in mechanical engineering and, thanks to Monmouth County, soon caught Headlee’s eye. Headlee, in another brilliant hire, adds Tommy to the Rutgers Department of Entomology in 1928 as a drainage engineer. To sweeten the pot, Headlee replaced Tommy’s bicycle with a Ford model T convertible as his 1st in a long string of state cars. He also soon became Headlee’s administrative assistant, which had an incalculable impact on the trajectory of his career. Talk about “standing on the shoulders of giants!”

Ever wonder why mosquito control in the USA started in New Jersey? Two words: *Aedes sollicitans* (Walker). Most of the state was overrun with this salt marsh menace. The focus

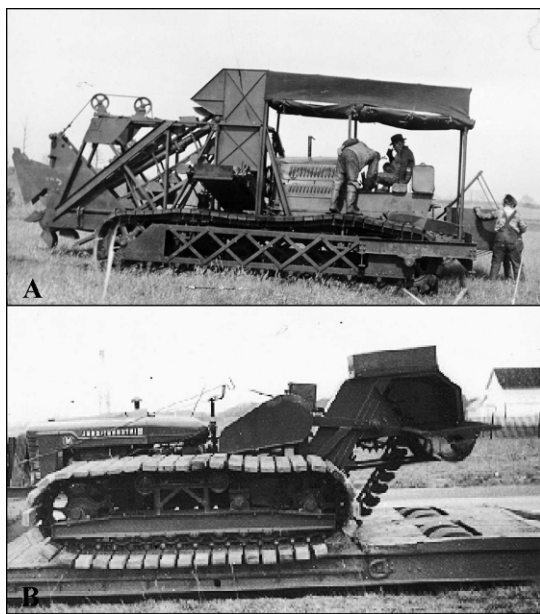


Fig. 3. The evolution of mosquito ditchers: (A) Big Bertha, 1928, with Thomas J. Headlee at the controls. (B) Mulhern's design, ca. 1946.

of the Rutgers mosquito program when Tommy signed on was reducing *Ae. sollicitans* habitat by ditching salt marshes. It was a brutal business. Smith's 5 million feet of mosquito ditches were hand dug and hard won. Headlee needed mechanized ditchers.

The pride of New Jersey ditchers in 1928 was "Big Bertha," a 30-ft, 20-ton leviathan (Fig. 3A)—all to dig a 10×24 inch ditch, and at a glacial pace. On Tommy's 1st day at Rutgers, Headlee charged him with rescuing the machine, which was buried so deeply in a marsh that Tommy had to disassemble the ditcher and carry the parts to higher ground for reassembly. Nevertheless, the record shows that Tommy showed up for work again the next morning. Headlee knew Big Bertha was impractical. The machine was too awkward, too slow, too costly, and too heavy. In addition, transporting a machine this massive from place to place as the work demanded was difficult and expensive. Headlee needed an engineer. Headlee needed Tommy Mulhern.

Fortunately, Rutgers had assembled a state-of-the-art machine shop, and this became Tommy's candy store. All his life, he loved to tinker with mechanical things. He was the kind of kid that would take his mother's toaster apart to see what made it tick, and then put it together again. (I was the same, except for the part about putting it together again.) Tommy got busy building new machines with an eye toward faster, cheaper, lighter. In less than 3 years, he shrank the ditchers

down to less than half their previous size, cost, and weight. His final design in the 1940s was a shotgun marriage of a farm tractor and a dozer outfitted with oak treads (Fig. 3B). The hybrid was not only economical but could excavate 1,500 feet of mosquito ditch in an hour. And the machine was so light that it could operate without the use of mats. Earlier, men would exhaust themselves leap-frogging mats across the marsh to keep their machines from becoming mired in the mud. Tommy's designs contributed to ditching most of the New Jersey and much of the eastern US coastline.

Tommy also supervised building a massive system of dikes and tide gates to reduce tidal flooding of low-lying areas and thereby minimize mosquito habitat. He contributed several innovations including a "subterranean inverted siphon" drainage outlet (1944 *Mosquito News* 4:122–129). Drifting beach sand often blocked conventional open ditches, whereas his design was self-cleaning: water flow from the marsh and out the pipe prevented sand from clogging the outlet. And because it was buried below ground, the system was protected from the storms that periodically destroyed other tidal drainage systems. His design is still in use today.

Tommy labored his entire career to advance spray technologies. As an early example, he designed a truck-mounted platform in the 1930s for the applicator to stand on while oiling catch basins, an extra-long handle to reach the target, and a spray compressor that ran off the truck engine. Not impressed? A decade earlier Tommy did the same job with a bike and watering can. In the early 1940s Tommy was beginning to hit his full stride when he began truly groundbreaking work on thermal fogging. Particularly novel was a study in which he strapped a spray tank onto the front bumper of his state car and ran the spray lines through the engine and out the exhaust, creating an aerosolized spray plume for adult control. I believe the idea was to do your abatement work during the morning commute. Tommy was fearless; he was always eager to experiment. He was not afraid to fail because he understood that you cannot innovate otherwise. By 1949, Tommy's last year in New Jersey, he had perfected his final gift to New Jersey mosquito control: an aerial delivery system that launched a state-wide spray effort the same year, a program currently in its 6th decade. There is little question that Tommy is the Father of the New Jersey State Air Spray Program, which treats thousands of acres each season.

Tommy understood that in New Jersey he did not have just 15 stakeholders, that is, the 15 county superintendents, but 4 million, and he reached out to state residents in new and creative ways. For example, Tommy persuaded New Jersey Bell to include a mosquito control



Fig. 4. Tommy Mulhern dipping for *Culex* in a Union County, NJ, catch basin, ca. 1942.

educational leaflet with phone bills: 750,000 were mailed out in 1947. And Tommy took the opportunity in the leaflet to tout Granett's Rutgers 6-12 repellent. Nice!

Surveillance is a key service activity. Tommy conducted surveys upon request, especially to identify sources of mosquito outbreaks. Here he is shown in a rare image sampling a catch basin for *Culex* (Fig. 4)—rare because Tommy was almost always behind the camera. But he was not simply performing surveys, because he saw his

most significant service role as education. When in the field, he took every opportunity to work one-on-one with mosquito control workers to help them acquire the skills they needed to do their jobs more effectively.

The area of research Tommy is best remembered for is pioneering adult surveillance methodology, particularly his invention of the New Jersey Light Trap. Tommy's trap (Fig. 5A) became the "gold standard" for adult surveillance for the rest of the century and is still in use all over the world. New Jersey alone deploys a statewide network of 80 New Jersey Light Traps for adult surveillance every season, enabling mosquito control workers to compare adult prevalence against historical means and make data-based management decisions. Manufacturers of Tommy's trap sold thousands of units and made serious money over the next 70 years. Rutgers and Tommy? Not so much.

He never stopped tinkering with mosquito traps, relentlessly tweaking them, modifying them, improving them (Fig. 5B). Never. But his genius was less in the design of effective traps than in his resolute advocacy for using them to monitor mosquito populations. Today we all understand the importance of surveillance, but don't think there wasn't intense resistance to this idea at the time. There was! Tommy was the tip of the spear in overcoming that resistance. I don't



Fig. 5. Tommy Mulhern examining a mosquito trap collection (A) in New Jersey ca. 1940 and (B) at his residence in Fresno, CA, 1970.

know who the “Father” of mosquito surveillance is, but a solid case could be made for Tommy Mulhern.

Tommy was exempt from military service during World War II due to age and children. But he did not stand idle. He contributed his special expertise to the war effort by partnering with Ginsburg to team teach a Sanitary Entomology course, the 1st of its kind, to Army Medical Corps personnel who were rushed to the Pacific to combat vector-borne diseases. And, at the request of the military, he participated in secret tests assessing DDT.

The year 1935 was noteworthy in New Jersey because it was the year of the last outbreak of locally acquired malaria. People today look at you as if you are insane if you tell them New Jersey had malaria within living memory. Tropical disease, right? The year is also notable for when the cornerstone for AMCA was laid in Trenton, NJ, in a January meeting called by Headlee. New Jersey mosquito control leaders met with their colleagues from nearby states to form the Eastern Association of Mosquito Control Workers (EAMCW). Of the 25 Charter Members, 15 were from New Jersey, including 3 from Rutgers: Headlee, Mulhern, and Ginsburg. Headlee was elected president and earned the accolade “Founding Father of the American Mosquito Control Association,” whereas Tommy was the association’s 1st Secretary-Treasurer, running all association business for the next 17 years.

In 1940 EAMCW authorized publication of an in-house bulletin, *Mosquito News*. This was a bold step, because the bulletin ate fully one-half of the association’s entire annual operating budget. That’s right, \$72! Tommy was an influential figure in the launch, and he was named to the inaugural editorial board. The 1st issue was published in 1941 in New Brunswick, NJ, and Tommy’s fingerprints were all over it. *Mosquito News*, later renamed the *Journal of the American Mosquito Control Association (JAMCA)*, was destined to become the global face of mosquito control.

Tommy contributed to the new journal’s success in every conceivable way—not only by his long service on the editorial board, but through sustained publication, contributing articles on research, literature reviews, association business, obituaries, history, editorials, etc. No one ever published more or with greater diversity. But it was the strong operational flavor he added to *Mosquito News* that was central to the journal’s early acceptance among local mosquito control workers. *Mosquito News* increasingly assumed Tommy’s identity, with a foot in both the academic and operational worlds. The December 1985 issue of the *JAMCA* was dedicated to Tommy in recognition of his immense role in the journal’s success (Fig. 6).

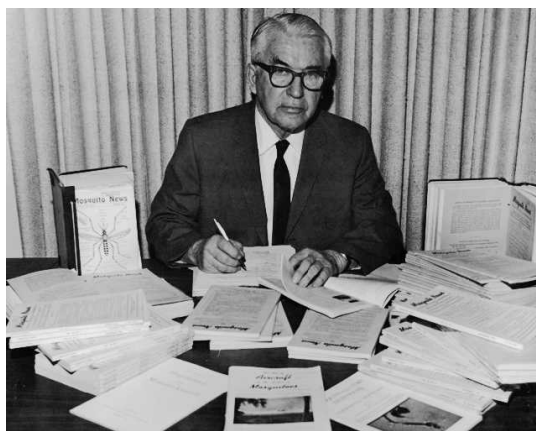


Fig. 6. Tommy Mulhern, 1985, with issues of his beloved *Mosquito News*. Volume 1, Issue 1, is at his right elbow.

A proposal was made in 1939 for the EAMCW to expand into a national organization. The idea was controversial, and three different factions quickly emerge: those like Headlee and Mulhern who champion a nation-wide organization, those wishing to merge with the American Association of Economic Entomologists (which became the Entomological Society of America in 1953), and those against any change that might dilute New Jersey’s dominate role. With Headlee in declining health and unable to exert his influence and guidance, the debate became rancorous. In 1942 New York State Entomologist Robert Glasgow wrote Tommy a lengthy letter venting his frustration over the “distrust” and “provincial loyalty” that had become obstacles to change. Glasgow asked Tommy to fill the leadership void left by Headlee and to bring his own powers of persuasion to bear. Tommy became the peacemaker, listening to people, and nudging them toward a consensus. He reconciled the differences, and in 1944 EAMCW was rebranded as the American Mosquito Control Association. He never relinquished his leadership role, devoting his professional life to the association and its journal.

Without Tommy Mulhern, AMCA may have never formed. This was one reason why AMCA presented him with an anniversary clock in 1953 in recognition of his distinguished service (Fig. 7). The Mulhern family still treasures the clock, a precious artifact reaching back to the earliest days of the association.

Smith, Headlee, Ginsburg, Granett, and Mulhern were pioneers in source reduction, insecticide development, surveillance, spray technology, biological control, trap technology, repellents, and much else. These Jersey Giants made New Jersey the World’s Toolbox for mosquito control from 1896 until the end of the Golden Age ... in 1949.



Fig. 7. Tommy Mulhern, 1953, with clock presented by AMCA in recognition of his extraordinary service.

The 1st crack in the wall came in 1944 when Headlee, who had led the Rutgers program and department so ably for 32 years, retired due to poor health and was replaced by Bailey B. Pepper. But this was more than just a change in faces ... it was a change in vision.

Headlee had shared Smith's vision that "research must guide the mosquito movement." They saw the program as an idea factory, a tool factory, not just for New Jersey but for the world mosquito community. Pepper, however, had a narrower vision that placed service above all else. Under Pepper, the program became far less an arm of the university than an arm of the state—an organization that did not understand either research or creativity. Research was marginalized. Publication was devalued. Innovation melted away.

Moreover, Pepper was highly autocratic, a leadership style inconsistent with the research philosophy of Smith and Headlee or of Rutgers today, all of whom understood that the key product of a university is innovation and innovators. Pepper shaped a scientific culture over his quarter century leading the program that discouraged risk taking, and when risk taking is repressed, creativity is invariably a casualty.

There was growing friction between Pepper and Mulhern based on different visions and personalities—friction amplified by Tommy being without question the most influential person in mosquito control at the time. Tommy was no fool; he saw a purge was coming and sought support from New Jersey's mosquito control superintendents. But none were so bold as to cross Pepper in those bygone days when the entomology head controlled every superintendent's budget. In 1948

Pepper appointed Manley Jobbins to lead the mosquito program. Mr. Jobbins was a soft-spoken, gentle man who fit Pepper's vision well and was no threat to Pepper.

Tommy was, of course, wounded by his demotion; but he never resented it, at least not for long as this simply was not in his nature. Tommy felt that resentment was like drinking poison and then waiting for the other guy to die. Nevertheless, the California Department of Health smelled blood in the water and snapped Tommy up like he was the last cold beer in hell. In November 1949, Tommy packed his car and young family and began the Long March west, pulling a 25-ft trailer. Ask grandpa what coast-to-coast travel was like before there was an interstate highway system. New Brunswick to Fresno became a 3,200-mile, 16-day odyssey.

Tommy's move to California completed the paradigm shift from Smith and Headlee's vision to Pepper's. Local, not global. A strong, not a light hand. Service, not research. Headlee had wanted innovators. Pepper wanted people who played well with others and were unlikely to challenge him or his new vision.

Opportunity. Yes, the train has left the station. No, there won't be another one for 60 years.

Pepper's programmatic shift to service had long-term implications in view of events transpiring outside New Jersey at the time. Federal government investments in research during World War II had led to fabulous technological advances in radar, antibiotics, jets, plastics, nuclear power, pesticides, etc.—advances that launched entire new industries. So in (wait-for-it!) ... 1949 (you can't make this stuff up!) the US Congress massively increased research funding, creating the National Science Foundation and other funding conduits for universities. Others were thrilled to hop onto a gravy train that the Rutgers mosquito program missed.

The impact of Tommy Mulhern leaving New Jersey cannot be stated better or more clearly than in the following passage from Gordon Patterson's book *The Mosquito Crusades*: "Mulhern's move marked a transition in the history of the mosquito movement. During the first half of the 20th century, New Jersey served as the movement's focal point. In 1949, California and Florida emerge as the new powers."

Gordon was being kind—Rutgers and New Jersey fell off a cliff in 1949. The Rutgers University mosquito program fell almost overnight from a world to a regional power—much like England 100 years ago. Today, 64 years after Tommy left for California, the Rutgers Center for Vector Biology is climbing back up that cliff. The 30 presentations the Center will deliver at this meeting, covering basic to applied to operational research as well as our outreach activities, will permit you to judge for yourself how far back up we may have come.

Tommy spends the rest of his career in California. So does AMCA as the association's business office, based at Rutgers and administered by Tommy since 1935, relocates with him. Tommy maintains his central mission of trouble shooting for mosquito abatement districts statewide. He continues to work closely with districts to advance mosquito control technology by "transforming research into practice." But his responsibility as technical consultant is now far more challenging, as "the Golden State" is nearly 20 times larger than "the Garden State."

A key motive for California luring Tommy away from New Jersey was to use his New Jersey experience to grow California mosquito control. Tommy was a driving force in the formation of many if not most California mosquito abatement districts. The prospect of having this kind of impact must have played a role in persuading Tommy to leave a state where mosquito control was already mature.

Tommy no sooner unpacked his bags than the Central Valley was hit with major western equine and St. Louis encephalitis outbreaks. There were hundreds of cases, 50 deaths, and many survivors suffered permanent neurological impairment. Tommy was right in the middle of it all. Tommy and California responded by establishing a state viral surveillance program, coming on-line well before similar efforts elsewhere. Perhaps now you understand what Gordon Patterson was saying about the torch passing from New Jersey.

But viral surveillance was only one component of the broad-based approach Tommy coordinated and mobilized. At the core was a dynamic, cutting-edge Action Plan activated in 1953 that focused on threat assessment, once again cutting-edge and well ahead of its time. Tommy placed special emphasis on pretreatment inspections to avoid areas where natural enemies were already doing a good job, permitting sharper targeting and reduced chemical use.

Tommy also maintained his service role by conducting surveys upon request in those localities lacking an abatement unit. He identified mosquitoes when requested, but as always, he saw interactions with local mosquito abatement personnel as teaching moments. Increasingly, Job One became education, that is, training. But the one-on-one training Tommy specialized in for New Jersey was less practical in a state the size of California, so Tommy developed early short courses covering mosquito biology, identification, spray technology, and myriad associated topics. He also was instrumental in the launch of the vector control operator's certification program and served as editor and principal author for California's 1st training manuals in 1973.

Tommy was still an engineer at his core but with diminished emphasis on ditching and far more emphasis on spray dispersal technology. He

continued where he left off in New Jersey, with studies on swath width, nozzles, formulations, droplet spectra, calibration, and meteorological limitations. In time, he became a major player in the evolution of aerial application, especially from helicopters. But always in partnership. For example, he worked extensively with Captain George Stains, US Navy, on the development of the 1st nonthermal aerosol machines (i.e., cold foggers), a partnership that was prelude to Stains creating Navy Pesticide Aerial Unit 9. They also collaborated to run the 1st high-altitude/low-volume sprays experiments. Tommy had played a lead role in coordinating state and local emergency control programs responding to arboviral outbreaks in 1952, 1958, and 1969, so he was acutely aware of the need for a tool for large-scale emergency treatments. The technologies of the 1960s gave a mere 60-ft swath width so only 150 acres could be treated in an hour of flight time. Working with UC-Davis Ag Engineering they achieved a one-mile swath, just as Tommy had predicted. Tommy's career was built on advancing mosquito control through collaboration. He understood that you can accomplish almost anything if you aren't concerned about who gets the credit.

Tommy's mosquito control expertise was universally recognized. Brick by brick he had built an international reputation. Consequently he had frequent opportunities to serve as a consultant, accepting assignments with the Navy, CDC, AID, WHO, PAHO, and other prestigious organizations to Egypt, Iran, Central and South America, Saudi Arabia, China, Switzerland, and many other countries. His influence and impact extended far beyond the borders of New Jersey or California.

We all have reason to be proud of Tommy, not just New Jersey and California. He was everyone's favorite son, as you would be hard pressed to find an association remotely connected to mosquito control of which he was not a member. He was even engaged at the local level, serving as a Trustee for the Fresno County district for 20 years. New Jersey and California both dedicated annual meetings to Tommy: New Jersey in 1994 and California in 2007 on the occasion of their 75th anniversary. Let's tally this all up: 2 state association dedications, a national meeting dedication, and a *JAMCA* issue dedication. Who among us can even aspire to such things?

It was Tommy's role in AMCA, however, where he had his greatest impact—as a founder, in winning support for a national organization, in helping to launch and sustain *Mosquito News*, in his decades of service. It is difficult to imagine any AMCA activity for which Tommy did not volunteer. He endures as an AMCA icon.

Tommy recognized the historical significance of what they were doing very early. The New



Fig. 8. Tommy Mulhern on the California ski slopes.

Jersey, California, and AMCA archives contain countless photos and records taken and carefully preserved by Tommy. We all owe Tommy a huge debt for being the mosquito community's unofficial archivist during those crucial early years.

How many are aware that it was Tommy who founded the *AMCA Newsletter* 40 years ago? Or that it was Tommy who had the foresight to incorporate AMCA as a nonprofit in 1948? And on and on and on.

Tommy filled every AMCA leadership post throughout the association's growth and development, an astounding total of 28 years in key leadership roles: Secretary-Treasurer (1935–1950), Executive Secretary (1950–1952), President (1968–1969), Executive Director (1974–1978 and 1980–1985). Did I mention Tommy's Good Citizenship Award in high school? Did Middletown High call that right or what?

It seems safe to say that Tommy is the most honored AMCA member ever. The association has placed at his feet every accolade at its disposal: Medal of Honor (1973), Honorary Member (1979), Executive Director Emeritus (1985), *JAMCA* dedication (1985), "AMCA's First 50 Years" dedication (1985), AMCA 50th Annual Meeting dedication (1985). And today, the final missing piece, the Memorial Lecture.

One of my favorite autobiographies opens with the simple sentence: "I was born in a house my



Fig. 9. Tommy and Helen Mulhern with sons Martin, John, and Tom Jr., New Year's card, 1957. Note the AMCA presentation clock on the fireplace mantle.

father built." The fathers that built *our* house were Smith, Headlee, and Mulhern. Smith's legislation established the need for NJMEA. Headlee created the EAMCW. And if today AMCA is the shining city on a hill we think it is, it's because Thomas Mulhern provided the leadership for the association to transition from a regional to a global association. No one served AMCA longer, better, in more roles, or was more faithful.

And what of Tommy Mulhern the man? Those who knew him invariably describe him as modest, tireless, possessing inexhaustible enthusiasm for whatever task was at hand, and someone who always gave his best. Despite a strong work ethic, he was not a unidimensional drone. He was an avid photographer his entire life, developing and printing his own photographs as early as the 1920s when doing so was not a simple matter. He loved to ski (Fig. 8). He was a boat enthusiast: power boats, sail boats, freshwater, saltwater. He not only collected and restored string and wind instruments, he taught himself to play many of them. He was a strong family man (Fig. 9), married 58 years, with 3 sons. His job demanded extensive travel, but he kept work and family in balance, seldom missing weekends home. His sons often accompanied him on summer mosquito surveys. Family vacations were usually merged with AMCA meetings. The family developed close relationships with mosquito workers from all over the world, many of whom were house guests and became household names. The mosquito community was in every way an extended family for the Mulherns.

At age 76, Tommy suffered a heart attack, which closed out his professional activities. When his beloved wife Helen died, Tommy moved to a retirement home, where he loved to tell mosquito control stories. It seems unlikely that he ever had to tell the same story twice. In 1993, the Mosquito Warrior who began his career in Jersey's salt marshes passed away quietly in California's Central Valley, a man rich in years, experience, and the love of his family. His journey was complete.

Tommy saw it all. From bicycles to helicopters. From kerosene to synthetic pyrethroids. From sprinkler cans to ULV sprayers. From bare arms to light traps. And from a small regional organization with an in-house "bulletin" to an association and journal of international stature. To have seen it all is remarkable, but to have contributed significantly and repeatedly to it all is extraordinary.

Tommy Mulhern was an Engineer, Scientist, Educator, Inventor—not that he invented many things outright, but he was masterful at putting needs and technology together. And he was an Institution Builder—*this* institution.

We shall not see his like again. A man of unmatched influence in mosquito control. A man deeply passionate about this Association. And a

man who was deeply wounded in midcareer, but who did not falter, did not stumble, did not pause, but simply pressed on ... to become a legend.

Wounds ... they heal. Scars ... they fade. But Glory ... *Glory is forever.*

Welcome home, Tommy. Welcome home to the state where it all began. Welcome home to the American Mosquito Control Association.

ACKNOWLEDGMENTS

Legends never die; the past is never gone. They are the great rock upon which we have built today. I thank AMCA for the opportunity to tell Tommy Mulhern's story within the context of mosquito control's Golden Age, Scott Crans from the Archives Committee for uncovering many exceptional images and useful literature, and Ary Farajollahi and Scott Crans for useful comments on an earlier draft. I am grateful to the association for permitting me to speak before Gordon—no one likes speaking *after* Gordon. And I am deeply appreciative to the Mulhern and Granett families for sharing cherished photographs and memories.