LES MARINGOUINS DU MECHE AND THE LEGACY OF TWO MEN

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ABSTRACT. E. S. Hathaway and his colleague, A. B. Ritter, were directly responsible for establishing organized mosquito control in Louisiana in the late 1950s and early 1960s. They jointly sought to educate governmental officials and Louisiana citizens that mosquitoes could be controlled if the efforts were based on scientific knowledge, trained personnel and appropriate funding. These men were instrumental also in establishing the Louisiana Mosquito Control Association and subsequently involved with the formation of the first 5 parish-wide mosquito control districts in Louisiana.

INTRODUCTION

It is appropriate that the American Mosquito Control Association has chosen to honor Dr. E. S. Hathaway (Fig. 1) and Mr. A. B. Ritter (Fig. 2) on the 13th anniversary of the AMCA Memorial Honoree Award. This is only the second time that the award has been given to more than one individual since its inception in 1979 (Chambers et al. 1985). It was in 1982 that W. C. Reeves presented the Memorial Lecture honoring Finlay, Reed, Gorgas and Soper (Reeves 1982). In addition, this is the first time that the award has been presented within the same locale as that in which the recipients made their significant contributions to professional mosquito control.

Today we honor 2 men who blended their interests, energies and remarkable talents into a focused effort of bringing professional mosquito control to the people of Louisiana. They were obviously unlike in physical stature, formal educational background and personality. However, when merged in a common goal they developed an unselfish, professional camaraderie and a unity of purpose in combating "les maringouins du meche," the mosquitoes of the marsh, notably *Aedes sollicitans* (Walker). Such was the professional relationship between Dr. Hathaway and Mr. Ritter. It took stubborn persistence and hard work to educate governmental officials and Louisiana citizens to understand that mosquitoes could be controlled based on scientific understanding of mosquito bionomics, involvement of trained personnel and availability of sufficient funds.

I want to introduce you to these men, up close and personal. This is a celebration of their lives given in service to the public's health, and we applaud their foresight, determination and professional accomplishments.

Allow me to digress a moment and focus on a subject that we inadvertently omit on such occasions. Far too often we verbally recognize posthumously the men and women who have made significant contributions to our profession. However, should someone wish to privately memorialize these persons with remembrances, how many of us know the burial sites of these individuals? Who knows where the more notable pioneer mosquito workers, such as Patrick Manson, Walter Reed or Ronald Ross are interred? What about the more contemporary workers who have been recognized by AMCA as Memorial Honorees (e.g., Don Rees, Maurice Provost, Thomas J. Headlee, Brian Hocking or John Belkin)?

Let the record show that both honorees are interred in New Orleans. As for Mr. Ritter, he died on February 18, 1968, at the Southern Baptist Hospital in New Orleans at the age of 63 after a short illness. He is entombed in the Hope Mausoleum at St. John's Cemetery. Dr. Hathaway lived to be 97 years old and was comparatively active until the time of his death on February 10, 1984. He is buried in the Garden of Memories Cemetery. However, the story does not end here. Their lives represent a series of events in the unbroken chronicle of our profession—a bold witness to the work and dreams of these honorees and other workers who have gone on before us.

E. S. HATHAWAY

This particular story begins in the 1880s. Edward Sturtevant Hathaway was born in Maryville, TN, on October 17, 1886, to William Evans Hathaway (a homeopathic physician) and Mar-

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[2] Thirteenth Annual AMCA Memorial Lecture delivered at the 57th annual meeting of the American Mosquito Control Association, New Orleans, Louisiana, on March 18, 1991.

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tha Ashley Hathaway. He was a descendent of Mayflower pilgrims, including a governor of the Plymouth colony. Interestingly, the French and English basis of his middle name, "Sturtevant," is loosely translated as "going forth with enthusiasm," which was characteristic of his personality and energetic work habit.

His family moved to Ohio, where he graduated from Woodward High School in Cincinnati and attended the University of Cincinnati, receiving an A.B. degree in 1909 majoring in the classics and sciences. Following graduation, academic vacancies in colleges were scarce. However, interim employment as an intrepid salesman of aluminum cookware helped meet living expenses. His experience as a salesman would pay subsequent dividends in years to come when he served as a fund raiser for research projects in the fledgling Louisiana Mosquito Control Association (LMCA).

He secured a natural science professorship at Tusculum College in Greeneville, Tennessee, in 1911. Hathaway took a leave of absence from Tusculum in 1917 and was commissioned in the infantry of the U.S. Army. During World War I, he was promoted to the rank of captain (Fig. 3). After serving 2 years in the military, he returned to Tusculum in 1919 to resume his teaching duties. During one eventful semester, a female student became frustrated with Hathaway's course and petitioned the college president to allow her to drop the class, although she needed it to graduate. He agreed to let her transfer to another acceptable course; however, Hathaway was triumphant eventually. This young professor ultimately won the heart of his former student, Miss Emma Gahagan. In 1919 they were married—a marriage that lasted almost 60 years.

Continuing his postgraduate studies on a part time basis at the University of Wisconsin (Madison), Hathaway obtained the M.S. degree in 1921 specializing in field zoology. Later he received a teaching fellowship at the University of Wisconsin to continue toward the Ph.D. in zoology, which he earned in 1925 focusing on ichthyology and herpetology.

Dr. Hathaway was hired that year as an associate professor at Tulane University in New Orleans, LA. Within 2 years he was promoted to departmental chairman and later was named to the W. R. Irby Chair in the Zoology Department. He was promoted again in 1947 to the Director of the Division of Biological Sciences at Tulane.

According to Dr. Rodney Jung, a New Orleans physician and a Hathaway student in the late 1930s, Hathaway possessed an intense dedica-

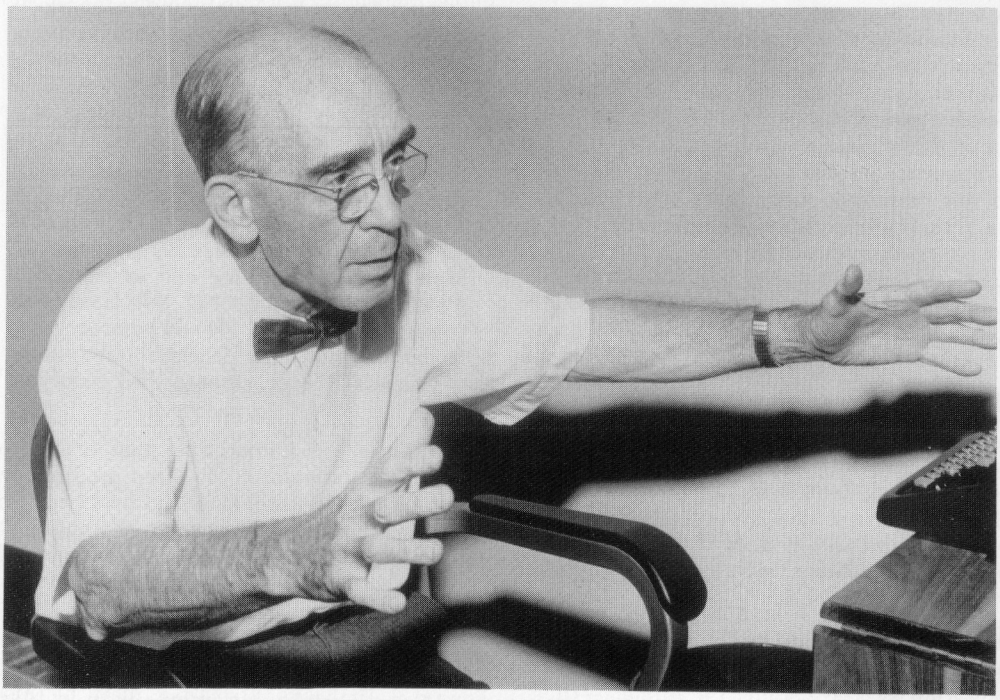

Fig. 1. Dr. Edward Sturtevant Hathaway (1886–1984) regarded as the "Father of Louisiana Mosquito Control" (Photograph courtesy of the *New Orleans Times-Picayune).*

Fig. 2. Mr. Anderson Basil Ritter (1904–1968) was a pioneer in organized mosquito control in Louisiana (Photograph courtesy of the *New Orleans Times-Picayune*).

tion to teaching and a zeal for knowledge. He had meticulous work and study habits and was an insatiable note taker. This academic taskmaster challenged his students with grueling subjective exams that mandated the answers to be limited to a certain number of words (usually 10). Such exams were not appreciated by the students; however, many graduates later expressed their gratitude for teaching them how to write concisely and factually.

He taught several demanding courses to premedical and other pre-professional students, including a mosquito biology and taxonomy course. At Hathaway's memorial service, one of his colleagues, Dr. Joseph Ewan, stated in the eulogy that Hathaway wanted his students to "question the universe, remembering Louis Agassiz's words: 'Study nature, not books.' " Another former student of Hathaway's, Frederick G. Deiler (a retired biologist and environmental services administrator with Freeport Sulphur Company in Louisiana) stated:

> One could not help but marvel at his dynamic demonstrations—his leaping demonstrations of a frog in the classroom—his imitation of the sounds of animals—the clicking of coins to demonstrate the sounds of crickets and frogs—his frolicking through the marsh—his boundless energy—his complete enthusiasm and delight at the myriads of environmental wonders during field trips.

Deiler further said:

> Dr. Hathaway stuttered, particularly when he became excited, but this affliction was not objectionable—instead it seemed to refortify and reemphasize his remarks. . . . Much of the upgrading and excellence of Tulane Medical School at this time is attributed to this man. He educated scores of students who later became outstanding physicians (Deiler, unpublished presentation).[4]

Hathaway was a charitable man (except for grades to his students). He often used his own car to take students on extended field trips (Fig. 4)—some trips as far away as Wyoming and Montana. He partially paid for the car using the U.S. Government bonus money given him and

[4] Deiler, F. G. 1978. A biographical sketch of Dr. Edward S. Hathaway. 21st Annu. Meet. La. Mosq. Control Assoc. in New Orleans. Archives of the La. Mosq. Control Assoc. 10 p.

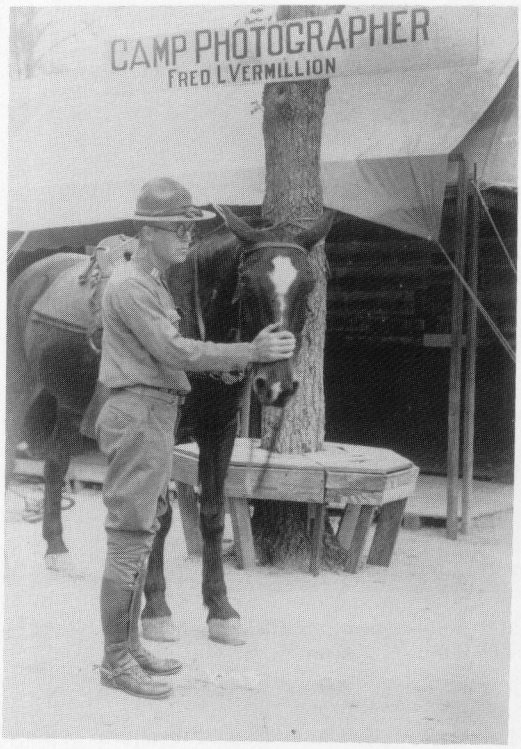

Fig. 3. Captain E. S. Hathaway (U.S. Army, infantry) posing with a friend in 1919 (Photograph courtesy of Marcia Hathaway Henderson).

other WWI veterans as late as 1936 and affectionately named the car "Bonita."

Hathaway certainly was not the tyrant that some of his students believed him to be, for he did have a sense of compassion. A few years after joining the Tulane faculty, Hathaway had a young, energetic student instructor assisting him in the cat anatomy class during 1928–29. I received recently a letter from this former instructor. He wrote: ". . . one of my responsibilities was to prepare the cats after they were brought in to me by the man who caught them, usually in the French Quarter late at night." It seems that a veteran female biochemistry professor, who had an office in the same building, had a cherished cat that unexpectedly came up missing. She probably suspected Hathaway's associates of clandestine activities. Hathaway was deeply concerned for her loss, being the gentleman that he was, and began to investigate the matter. However, the young instructor assured him that the cat had not been used as a laboratory specimen. He and Hathaway met with the biochemistry professor and attempted to assure her that her cat was not among the group of laboratory cats. He made no mention in the letter of their success in convincing her otherwise. In the years to come the young instructor was to gain distinction in his own right. He is the Chancellor of the Baylor College of Medicine in Houston, TX, and concurrently serves as the Chairman of the Department of Surgery—the distinguished heart surgeon, Dr. Michael DeBakey.

Hathaway did enjoy a high degree of respect among many of his students. During the 1940s an unofficial publication titled *The Worm Turns* was popularly distributed over the Tulane campus. In this publication a group of Tulane students candidly evaluated numerous faculty members according to their teaching abilities, personalities and overall worth to the university—as perceived by the students. They were quite candid and sometimes caustic in their remarks. As an example, one professor was characterized as ". . . the sloppiest man on the campus; a godsend to those whose IQ isn't quite up to par. (However) They don't believe his is either—but that's another story." The commentary on Dr. Hathaway was substantially more flattering. He was characterized as ". . . crazy about system, precision, and organization, a [expletive omitted] slave driver but a square guy and a good teacher." Admiringly, science majors and pre-medical students elected him as an honorary member of their biology fraternity, Beta Mu.

He also enjoyed people and music and often would have a "sing along" at his home in New Orleans when holidays would inspire social gatherings among faculty, staff and students. Often he would sing solos or play the violin or mandolin, sometimes accompanied on the piano by his daughter, Marcia. He loved word games and skits, and would incorporate them into the parties.

Dr. Hathaway had a wide interest in biological specimens and ecological systems. However, his strongest interest focused on marshland plant ecology and related mosquito biology.

PRIOR LOUISIANA MOSQUITO WORKERS

We must remember that the study of mosquitoes in Louisiana began long before Hathaway and Ritter. The formation of the State Board of Health in New Orleans during 1803 was due mainly to yellow fever epidemics. This organization is the nation's oldest state health agency. The last significant epidemic of yellow fever within the continental U.S. occurred in Louisiana during 1905. The last victims of this epidemic are buried at Tallulah (Madison Parish) in northeastern Louisiana (Col. T. E. McNeel,

Fig. 4. Dr. E. S. Hathaway (back to camera) and John Holmes (a student) on a field trip near Pearl River in southeastern Louisiana during 1932 (Photograph courtesy of Marcia Hathaway Henderson).

personal communication). There are reports that at the end of the epidemic, the last infected persons (the Sheldon family of Madison Parish) were given food and water by local citizens, surreptitiously placed in a sealed railroad boxcar and sent to Chattanooga, TN.

In the early 1900s, malaria also had a strong foothold in the southeastern states, and Louisiana was no exception. McNeel did extensive mosquito work in Louisiana during the 1920s and co-authored the 1939 publication *The Mosquitoes of the Southeastern States* with W. V. King and G. H. Bradley (King et al. 1939). According to McNeel, Madison Parish had the highest per capita purchase rate of "malarial cures" (quinine and chill tonic) of any parish or county in the entire country (McNeel 1975).

Other reliable accounts testified to the severe economic impact that malaria had on agriculture. Absenteeism due to malaria among agricultural workers caused upwards of 20% loss of cotton from being left in the fields. The local sawmill had to hire almost 2 men for every job to sustain operation. The epidemic and its economic impact prompted the Bureau of Entomology of the U.S. Department of Agriculture (USDA) to establish a research laboratory at Mound, LA, in 1913. The laboratory was physically located on a plantation jointly owned by Col. F. L. Maxwell and George S. Yerger. Dr. William P. Yerger, the resident physician, also assisted with the activities of the laboratory. Laboratory personnel studied mosquito biology and ecology and developed control tactics relating to *Anopheles quadrimaculatus* Say, the known malaria vector. The U.S. Public Health Service (USPHS) and the International Health Division of the Rockefeller Foundation joined in the study (McNeel 1975). Results from blood samples indicated that 80% of the farm workers tested positive for malarial infections.

Several outstanding contributions were achieved at the laboratory during its operation from 1913 until 1931, after which it was moved to Florida. The more significant achievements included: 1) the first experiments in fluctuating water levels to control *Anopheles* larvae, a practice used by the Tennessee Valley Authority; 2) the first aerially applied mosquito larviciding experiments; and 3) the use of an airplane to sample adult mosquitoes at selected altitudes. However, the most prominent contribution and widely acclaimed accomplishment was the previously mentioned publication by King et al. (1939). It was originally published in 1939 and slightly revised in 1944 by the same co-authors. In 1960, the publication was substantially updated and co-authored by King, Bradley, Smith and McDuffie (King et al. 1960). Bradley and McNeel would eventually attain the rank of colonel in the USPHS. Hathaway possessed several copies of both publications and used them extensively in his mosquito biology classes. He also developed a simplified taxonomic key for

his own use in the field and for his students in the classrooms relative to selected mosquito species based on the most obvious features.

In 1984, McNeel took Col. G. Roy Hayes (ret., USPHS) Paul Scheppf (ret., Louisiana Department of Health) and this author on a tour of the Maxwell/Yerger plantation where the original work was done. Many of the buildings are still present, although in noticeable disrepair. We also visited a cemetery in nearby Tallulah where Bradley is buried. McNeel passed away about 2 years ago and is buried also in the Tallulah cemetery. Near Bradley's and McNeel's graves are the graves of the previously mentioned victims of yellow fever.

Early mosquito workers in Louisiana also included Dr. George L. Beyer, a Tulane professor, who published numerous periodicals and a monograph on Louisiana mosquitoes (Beyer 1923). Other notables included Dr. O. L. Pothier, a pathologist at Charity Hospital in New Orleans who worked with Dr. Beyer. An early contemporary of Hathaway and Ritter was Percy Viosca, Jr., Chief Biologist for the Louisiana Wildlife and Fisheries Commission. To control marshland mosquitoes, it was Viosca's philosophy to "keep the dry lands dry and the wet lands wet" (Viosca 1925)—an opinion he explained at the 12th Annual Meeting of the New Jersey Mosquito Extermination Association in 1925. It was an opinion that Hathaway and Ritter were to share later in their careers. Although Viosca made a considerable effort to study marsh mosquitoes and formulated suggestions to control them, it was almost 40 years later that his suggestions were verified by Hathaway and his associates with experimental field tests in the Louisiana marshes.

A. B. RITTER

The complementary portion of this story involves Mr. A. B. Ritter. It was through his increased job responsibilities with the Louisiana Department of Health that he became involved with mosquito control activities, coupled with his association with State Public Health Entomologist E. B. Johnson. Johnson was a Department of Health supervisor located at Monroe (Ouachita Parish). He had gained extensive experience as a mosquito biologist while serving as the state public health officer from 1929 to 1959 and supervised the Malaria Control in War Areas (MCWA) activities in Louisiana during the early 1940s. According to Mrs. A. B. (Melba) Ritter, her husband became interested in mosquito control before he formally met Hathaway.

Anderson Basil Ritter was born in 1904 in Aberdeen, MS, but his family moved to Durant, located in central Mississippi, where he was reared and finished high school. Medical complications with his appendix and later with his tonsils substantially delayed his undergraduate career. At the age of 27 he graduated from Mississippi State University (MSU) in 1931 with a bachelor of science in bacteriology and chemistry. Although he did not participate in varsity athletics, as an alumnus he was an avid MSU sports fan.

Ritter also was a good marksman with the rifle, despite a minor lawnmower accident to 2 fingertips of his right hand as a young boy. This injury prevented him from entering military service.

Following graduation, he worked at several jobs, primarily with the U.S. Geodetic Survey. In 1935, he joined the U.S. Corps of Engineers located in New Orleans, where he met his future wife, Melba Platzer. They were married in 1938, and he continued to work for the Corps until he decided to go back to school at Tulane. He received a bachelor of engineering (civil engineering) in 1946 and a master of science in public health from Tulane in 1953.

His hobbies included bird watching, reading, collecting first edition books, genealogy and playing bridge. His talents as a bridge player earned him several tournament trophies.

Although Ritter and Hathaway were to develop a fraternal friendship, they were unlike in many respects. Ritter was tall at 6′2″ when compared with 5′5″ Hathaway. He approached life with a relaxed attitude—in marked contrast to Hathaway's energetic and enthusiastic behavior. Both he and Hathaway did share a common trait of being unpretentious in their conversations and were straight-forward in their actions with colleagues.

ESTABLISHMENT OF ORGANIZED MOSQUITO CONTROL PROGRAMS

Between 1931 and 1944, Hathaway devoted a considerable effort to studying the ecology of marshland plant communities and mosquitoes species. However, national priorities were being directed toward *Aedes aegypti* (Linn.) and *An. quadrimaculatus* by the 1940s. The Mosquito Control in War Areas program began in late 1941 and lasted until 1944. It was the genesis of the federal agency responsible for public health—Centers for Disease Control with headquarters in Atlanta, GA. The Extended Malarial Control Program was initiated and remained in effect from 1945 to 1946, with primary responsibilities of residual adulticide spraying and larviciding. From 1947 until 1954, the Malarial Eradication Program was in force with larvicid-

ing activities being focused in the communities along with residual spraying in rural areas. These programs were cooperative efforts between the various southern states and the USPHS.

Dr. Hathaway retired as an emeritus professor from Tulane in 1952 after 27 years of teaching and research only to take up a second career—establishing organized mosquito control programs in Louisiana in collaboration with A. B. Ritter. Hathaway was later heard to confess that he "was never one who could teach, do research and keep up with committee assignments simultaneously."

Several years prior to his retirement, a series of events initiated by angry citizens began to demonstrate a grassroots support for mosquito control. In the mid-1940s, the employees of Freeport Sulphur Company in Plaquemines Parish (a coastal southeastern parish) were expressing their discomfort caused by marsh mosquitoes. The company's management contracted with Hathaway to conduct a survey of mosquito larval habitats in and around Port Sulphur, LA. Assisted by Fred Andrews, a Tulane University student, Hathaway identified mosquitoes, described their larval habitats and pointed out that the problem was not confined to the Port Sulphur area. He advised that the parish government, assisted by Freeport Sulphur Company, begin efforts to resolve the problem. Fred Deiler, the company's biologist, would later assist Hathaway in resolving the salt marsh mosquito problem.

Angry citizens of Orleans Parish met with Mayor deLesseps S. Morrison in 1953 and complained about the ferocious marsh mosquitoes in their neighborhoods. They demanded that the nearby marshes and swamps be sprayed with DDT. That year the "Little Woods" swamp next to New Orleans East was sprayed by helicopter for mosquitoes; however, the effort was not successful. Another large population of marsh mosquitoes infested the New Orleans area again in 1955 causing Mayor Morrison to form the Metropolitan Mosquito Control Commission (MMCC) composed of interested citizens and mosquito control experts. It originally included Viosca, Ritter, Hathaway, Jung and Deiler, but was expanded later to include representatives of 6 parishes within the greater New Orleans metropolitan area.

The MMCC realized soon that individual parishes could not meet the mosquito control needs of the state, and subsequently appointed a steering committee to establish a statewide organization. Ritter was appointed as chairman, and the City of New Orleans supplied the steering committee with office space, clerical help and publication capabilities in lieu of money. Other parishes donated support funds. On December 2, 1957, the Louisiana Mosquito Control Association was incorporated in Pleasant Hall on the Baton Rouge campus of Louisiana State University. The original annual dues were set at $5.00 per member and remained so for 30 years.

Ritter wanted an enabling legislative act for Louisiana that permitted parishes to set up their own tax to support mosquito control districts. For advice he contacted Hayes, who co-authored an enabling act for mosquito control in Arkansas. Ritter prepared and promoted the initial draft of the document. The Louisiana legislature subsequently passed the bill and placed it on the 1958 ballot. It passed statewide elections by a favorable 52% vote (94% approval in Plaquemines Parish, 60% approval in Orleans Parish). However, it would be another 6 years before any parish actually implemented an organized mosquito control district.

In the meantime, Hathaway and Ritter traveled extensively in the state to educate governmental officials and local citizens that mosquito control was possible. One of their primary goals was to secure funds from parish governments and large cities to support mosquito research and publish pamphlets and bulletins about mosquito control. However, a substantial amount of their time, mainly Hathaway's, was devoted to maintaining contact with mosquito control specialists, city and parish officials and state legislators. Hathaway did so by writing reams of letters which were typed by his secretary, Marguerite Childs, on a manual typewriter.

From 1957 to 1968, monies to support field experiments on marshland mosquito control were collected from cities, state and parish governments, USDA grants and LMCA membership dues. However, the wide variance of yearly budgets (ranging from $15,000 to $74,000) was a constant dilemma for Hathaway and Ritter, because 60% of the LMCA's yearly budget came from inconsistent state funding. According to Hathaway, "Lack of financial stability is the greatest weakness in the LMCA's investigation."

The experience that Hathaway gained in the early years of a fledgling state organization was important to surrounding states, particularly Texas mosquito control workers, who were struggling to establish also a state organization. Years later in a historical paper given to the Texas Mosquito Control Association (TMCA), Dr. Don W. Micks[5] mentioned that the Gulf

[5] Retired from the Department of Preventive Medicine, Texas Medical Branch, Galveston, TX.

Coast Mosquito Control Association was founded in 1955, the forerunner of the TMCA organized in 1961. But it was Hathaway in 1958 who gave "much dialogue and exchange of ideas to help with the formation of TMCA."

Hathaway and Ritter recognized long before the actual incorporation of LMCA and the enabling act of 1958 that the citizens of Louisiana needed an example of successful marshland mosquito control before they would pass taxes to support mosquito control districts. In a report given to the charter members of the LMCA on December 2, 1957, Ritter stated:

> Some may wonder how long the pilot experiments will have to run before we can hope to start full-scale control operations: smart and lucky (3 to 5 years), smart and unlucky (5 to 10 years), neither smart nor lucky (problem will be awaiting our unborn sons to take over the job). The sooner we start, the sooner we may be able to join the procession of states making (a) wholehearted effort to mitigate the suffering of man and beast from the perennial torments of pest mosquitoes.

The LMCA Board of Directors, led by Hathaway, initiated a plan of field research to assess various methodologies for controlling marsh mosquitoes. In July 1958, the Board approved these pilot experiments, as referred to by Hathaway, and distributed a memorandum outlining a course of action titled "A Plan for a 5-Year Field Study of Methods for Control of Marsh Mosquitoes in Louisiana." Ditching and water impoundment were to be the focal points of the study to control mosquito larvae.

In a letter seeking support funds from the Rosemary Foundation dated August 1, 1958, Hathaway expressed his disappointment.

> So far there is not any college or university in Louisiana or any governmental or private agency who has done organized research on the control of marsh or swamp mosquitoes. There are several men in the state who did mosquito control work while in the armed forces. There is not one in Louisiana to whom we can turn for expert advice in laying down a pattern for our pilot experiments on control measures.

Although a teacher for 27 years, Hathaway never trained a student who entered exclusively the entomological field. Most of his students were pre-medical and other pre-professional students. However, the pilot experiments provided a secondary benefit of training young workers in mosquito management tactics (Hathaway 1958).

Prior to the inception of the pilot experiments in 1961 until their completion in 1967, Hathaway and Ritter sought the advice and assistance of mosquito control experts across the country: New Jersey, Illinois, Minnesota, Florida, Utah and California. Dr. A. J. Rogers and James S. Haeger of the Entomology Research Center in Vero Beach, FL, and Dr. Thomas F. Hall, Jr., of the Tennessee Valley Authority at Wilson Dam, AL, actively participated in the establishment of the pilot experiments. Hathaway and these men, also including other LMCA representatives, made a 2-wk tour of the coastal parishes to study and select research sites.

Regional field stations were established along southern Louisiana, and supervisory personnel were hired by Hathaway to monitor the field experiments. The New Orleans field station was administered by Charles H. Anderson. The office in Lafayette was housed in facilities at the University of Southwestern Louisiana and jointly supervised by A. G. Owens, Jr., and Sam S. Riche. In Lake Charles, the office was located on the campus of McNeese State College and was directed by Wayne Harris and later by Norman Thompson.

At 2 pm on October 3, 1961, in a marsh at Cypremort Point in St. Mary Parish, a dragline scooped up the first bucketful of earth from the marsh. This marked the start of a system of access ditches and launched the first of several pilot experiments.

By 1964, Hathaway's and Ritter's "anti-mosquito war" and the LMCA were 7 years old. The primary goal had been to educate and convince Louisiana citizens that mosquito control was possible. With that goal seemingly accomplished, Hathaway now declared that the second phase of the program would begin in 1965. He outlined the plan in his paper, "Mosquito Control and Wildlife Problems in Louisiana," at the First Annual Conference on Mosquito Suppression and Wildlife Management in Lafayette, LA (Hathaway 1964). This phase attempted to cut the cost of a district operation so that the financially deprived parishes could not only participate but also develop economic stability. He suggested that landowners of marshlands produce valuable crops (e.g., rice, grasslands for cattle and food plants for waterfowl), thereby reducing the nuisance mosquito populations. It would require collaborative efforts from agriculture, wildlife and fisheries officials and engineers (hydrologists), and include mosquito control specialists. National authorities in agriculture, wildlife and fisheries endorsed the plan.

Also in the report, Hathaway ranked 17 southern parishes according to their ability to establish a mosquito control district based on popu-

lation, land area, tax assessment and buying power of the residents. Hathaway indicated that the *ad valorem* tax was the most common means of raising money; however, he believed that it was not necessarily the fairest way. His alternative suggestion was a sales tax or assessing a percentage of the water bill. Of the top 8 most likely parishes (Orleans, Jefferson, Calcasieu, Lafayette, Terrebonne, Lafourche, Iberia and St. Mary), only 4 (50%) currently have professionally operated programs (Orleans, Jefferson, Calcasieu and Iberia). Of the lowest ranked 8 parishes (Vermilion, St. Bernard, St. Tammany, Jefferson Davis, Plaquemines, St. Martin, St. Charles and Cameron), a surprisingly seven, or 88%, currently have programs (only St. Martin does not). Later, in a review paper to the LMCA Board titled "The Campaign for Mosquito Control in Louisiana (1957–68)," Hathaway announced that after 6 years of LMCA's pilot experiments (1961–67) two common methods of water management (ditching and impoundment) were highly successful under south Louisiana conditions, referring to Plaquemines, Orleans and Jefferson parishes.

As the pilot experiments were getting underway in the early 1960s, mosquito control was about to reach a new plateau. In 1963, Judge Leander Perez of Plaquemines Parish contracted with a local spray company to treat hordes of mosquitoes that were tormenting the parish citizens. The first spraying was moderately successful, the second was a failure. Judge Perez summoned the County Agent Murphy McEachern and Fred Deiler. Deiler contacted Hathaway again. As the executive director of the LMCA, Hathaway made a crucial decision that was to provide the impetus for the start of organized mosquito control in Louisiana. He recommended that E. John Beidler be hired by Plaquemines Parish as a consultant to make a thorough survey of the parish and recommend a control program. At the time, Beidler was serving as the director of the Indian River Mosquito Control District in Vero Beach, FL. Beidler completed the study and submitted his report in November 1963. In April 1964, Plaquemines Parish formed a district, the first in the state. Robert E. Bartnett of St. John's Mosquito Control District in St. Augustine, FL, was hired as Plaquemines Parish's first director, and Charles Anderson was named assistant director.

Table 1. Parish mosquito control districts in Louisiana including the years in which they were formed.

1964	Plaquemines	1978	Ouachita
1964	Orleans	1979	East Baton Rouge
1965	Jefferson	1979	Jefferson Davis
1966	St. Bernard	1982	St. Charles
1968	St. Tammany	1982	Iberia
1973	Cameron	1985	Caddo
1975	Calcasieu	1990	St. John the Baptist
1977	Vermilion		

Orleans Parish also was in the process of developing an organized mosquito control program. From the Chatham County (Georgia) Mosquito Control Commission, George T. Carmichael was hired in May 1964, as the director in Orleans Parish. Jefferson Parish, also in the greater metropolitan area, hired Paul J. Hunt (Florida) to make a mosquito survey in 1964. It was to form the third organized mosquito control district in the state with Glenn M. Stokes as its director in February 1964. Other parishes began to realize the benefits of professional mosquito control and were soon to establish their own districts. Currently, Louisiana has 15 mosquito control districts (Table 1), the majority of which are located in the lower third of the state.

In January 1964, Dr. William C. McDuffie, Chief of Insects Affecting Man and Animals Research Branch of the USDA-Agricultural Research Service, and other federal representatives visited Lake Charles to assess establishing a federal laboratory to conduct mosquito research. The laboratory was approved, and Dr. H. C. Chapman was transferred from Fresno, CA, to direct the USDA program in mid-1964. Both Hathaway and Ritter fully supported the establishment of the facility.

CONCLUDING YEARS AND HONORS FOR HATHAWAY AND RITTER

Early in 1968, Ritter died following a brief illness. He had served jointly in the Louisiana Department of Health as the director of the Division of Engineering and the chief of the Insect Vector Control Section. During the latter stages of his career, broader duties and encumbered health caused him to relinquish direct responsibilities for insect vector and rodent control to Hayes, who was on loan from USPHS. According to Hayes, Ritter exemplified the "bioneer"—judicious use of biological and engineering disciplines in vector control. Ritter had served as the project director for the Louisiana *Aedes aegypti* Eradication Program, president of the LMCA and vice chairman of the Public Health Vector Control Conference. He is survived by his wife, a son (David), a daughter (Linda) and several grandchildren.

In the death of Ritter, Hathaway had lost a close friend and professional colleague. However, he continued with his duties as executive director of the LMCA, including a limited mosquito research program. During the mosquito

season of 1968, Hathaway conducted mosquito surveys in south Louisiana by monitoring 12 New Jersey light traps located from New Orleans westward to Lake Charles. Hathaway concluded,

> ... from those 12 stations, I am reminded of some young biologists at Harvard University who announced what they called "the Harvard Law," which reads as follows, "populations of animals under rigorously controlled conditions do as they damn please." It seems that the Harvard law offers the most credible explanation of our statistics.

One day while sitting in Jung's office, Hathaway confessed quite earnestly that it was getting more difficult for him to hop from one clump of marsh grass to another, and he was wondering if the LMCA would think he was shirking his duties if he quit the field work—Dr. Hathaway was in his mid-80s at the time. By 1969, the pilot experiments had been completed, and the field offices at Lafayette and Lake Charles were closed.

The year 1970 was a very eventful period for Hathaway and the LMCA. Hathaway resigned as LMCA executive director on March 11th after 9 productive years (1961–70) but remained for another year as a LMCA consultant at the request of the Board. On June 30th, the LMCA dissolved itself as a research entity but retained its commitment of disseminating scientific research data, educational information and operational techniques to its members and other professional colleagues, governmental agencies and interested citizens through annual meetings, workshops, newsletters, etc. The original newsletter, *Le Maringouin* (The Mosquito), began in 1970 but lasted only 2 years due to the lack of funds. However, the newsletter was revived in June 1979 under the title *LMCA Newsletter* with Hayes as the editor. Currently, it is distributed to LMCA members in numerous states.

The Technical Advisory Committee of the LMCA was established also in 1970 and is still active. Its primary objective is to advise city and parish governmental officials about professional mosquito control practices and the merits of organized programs within their jurisdictions. However, aside from establishing organized mosquito control districts in Louisiana, it is the educational nature of the LMCA annual meetings, workshops, newsletters and other communications that encompasses the very heart of what Hathaway and Ritter wanted for LMCA.

At the end of his career, Hathaway had been a member of numerous scientific and professional organizations and had served as an officer in many of them. While serving as president of the Louisiana Academy of Sciences from 1953 to 1954, he was instrumental in recruiting its first black members. However, the AMCA was certainly his favorite professional organization, and the AMCA recognized his contributions to the association and to mosquito control in general. He was among a group of 4 individuals including C. F. Scheel (Illinois), D. L. Collins (New York) and T. G. Raley (California) to receive the first presentation of the AMCA's Meritorious Service Award in 1972. That same year he received also the prestigious AMCA Honorary Membership. A co-recipient of the honorary membership that year with Hathaway included Alan Stone (Maryland) (Chambers et al. 1985).

Dr. and Mrs. Hathaway continued to live in their uptown home in New Orleans not far from Tulane University, and he often worked in his laboratory on campus. His motto, "Better to wear out than to rust out," exemplified his tireless work ethic.

Hathaway kept busy with several self-generated projects. His neighbors often observed him standing in his front yard each day taking mosquito landing counts. He also conducted numerous experiments that included the selection of the most appropriate lawn grass for homes in New Orleans and studying the ecology of microinvertebrates in the city park pond.

Following the death of his wife in 1978 and his encumbered health, he moved into a nursing home in Denton, TX, to be near his daughter and her family. It was there he died 8 years later.

The LMCA Board established in 1983 the Hathaway-Ritter Distinguished Achievement Award in honor of these 2 men. It is given upon occasion to those persons who have made significant contributions to mosquito control in Louisiana. The first award was given to Dr. H. C. Chapman in 1984. Other recipients have made significant contributions during their careers dating back to the 1940s.

As a fitting tribute also, Tulane University established in 1985 a Hathaway Memorial Lecture Series. A distinguished authority on mosquito bionomics and mosquito management strategies is selected annually to present a formal lecture to the faculty, students, mosquito specialists and other interested persons. The first lecture, "Mosquitoes and Their Niches," was given in March 1985, by Dr. Lewis T. Nielsen (Department of Biology, University of Utah).

In summary, the distinguished legacy of Hathaway and Ritter has been told, and the spirit of their commitment will remain with us. Their

tireless work and outstanding contributions to the educational aspects of our profession and organized mosquito control in general are deeply appreciated, and we shall not forget.

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