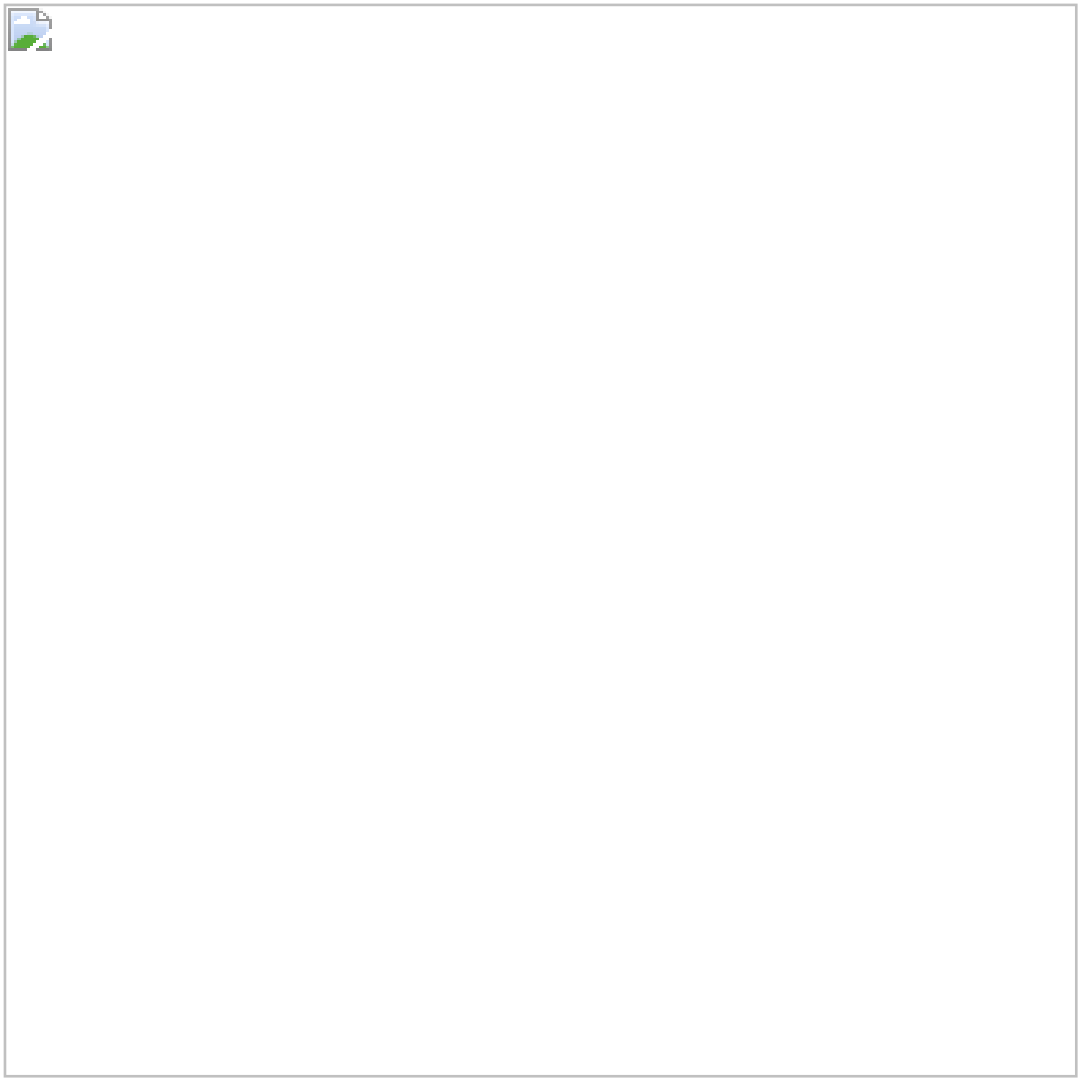

Will Whitcomb: Entomologist and Old-School Naturalist

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Will Whitcomb: Entomologist and Old-School Naturalist

It's a great pleasure and privilege to reflect on the life and career of Dr. Willard Hall Whitcomb. I tend to agree with Norm Leppla's assessment that "Dr. Willard Whitcomb, without a doubt, was the most colorful entomological character I have ever known." I knew Will chiefly by scientific reputation before briefly meeting him in 1988 for the first time. My first significant interactions with Will came in 1994 while I was with the University of Georgia in Tifton, and we tossed ideas back and forth until his death in 2002. However, I never felt that I knew the man well, and after going through the exercise of preparing this presentation, I realize that I knew far less about him than I realized. And there are many, many questions about Will that I have not been able to answer, and which may be unanswerable since his wife Dot passed away in 2013, and they had no children to pass along stories and answers to fill gaps.

It appears to have been at about age 12 that Will encountered a National Geographic article that piqued his interest in insects. He purchased an entomology book and some simple collecting equipment, and was off to the entomological races (The Bates Student 62[11]; 24 Oct 1934).

Will attended Somerville High School (Somerville, Massachusetts), graduating in 1933. Of no surprise to those who knew him in later years, Will was active in the school's Webster Debating Society. His senior inscription in the "Radiator Yearbook" (Fig. 1) was a quote from Hamlet – "Stay! Speak, speak! I charge thee speak!". Anyone who experienced Will's presentations at meetings could compellingly argue that most of this quote was directed at Will himself, rather than at fleeing ghosts or an unseen audience. The only portion directed at his long-suffering audiences would be the first word: "Stay!".

At about the time of his graduation, Will took a correspondence course in entomology at Harvard, further developing his interest and skill in the field.

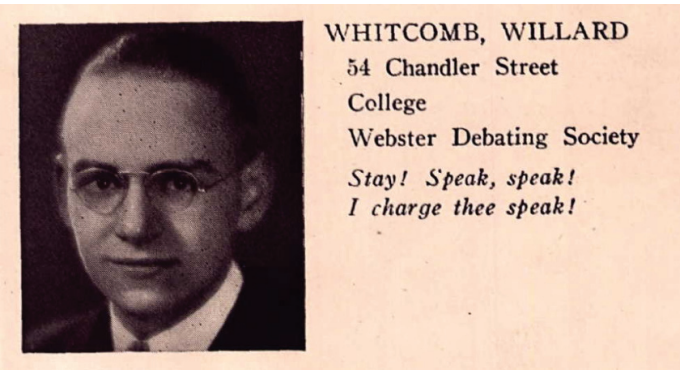

Fig. 1. Will Whitcomb's senior picture and inscription in the Somerville High School (Somerville, Massachusetts) 1933 Radiator Yearbook, p. 91.

After high school, Will attended Bates College in Lewiston, Maine, notable for such distinguished alumni as Robert F. Kennedy and David Hasselhoff. When he entered Bates in 1934 at age 19, Will claimed to have had over 1,000 specimens in his personal insect collection, and he immediately went to work at Bates College curating the moldering insect collections of the late Bates College naturalist Jonathan "Uncle Johnny" Stanton. Will was at least partially supported in this task by the National Youth Administration Program, a Depression era program that funded needy students, or those with special talents (The Bates Student 63[15]: 4; 14 Nov 1935). Will also was active in making presentations and exhibits for people to enjoy the insects in the museum.

Also while at Bates College, in the summer of 1937, Will was employed by the US Government surveying for Japanese beetles in New England (The Bates Student 65[8]; 23 Sep 1937).

Will graduated from Bates College with a BS in 1938. His senior inscription in the Bates College yearbook, the "Mirror," reads: "Big butter-and-bug man. Taught the biology department several things about entomology. Always attends strictly to business and thereby gains attention." (Fig. 2). It should be noted that "butter-and-bug man" is a play on a phrase of the day – "butter-and-egg man," which referred to a wealthy rural man or farmer who lives larger-than-life in the big city. Obviously, his professional persona was well-formed by the end of his undergraduate tenure.

Will's activity at Bates College in science and German clubs undoubtedly contributed to him receiving a post-graduate fellowship to study at the University of Rostock in Germany following graduation from Bates in 1938. He and his father sailed together on the TSS Tuscania from New York to Europe in July of 1938. His father returned to the US the next month, leaving Will to mess about in Europe with the University of Rostock.

I was unable to determine what Will studied in Rostock, but it most certainly had to do with insects and ecology. Not surprisingly, his experiences expanded a bit unexpectedly. Apparently one day in mid-Aug of 1939, Will was pursuing his entomological interests in the region of northern Germany not far from the Polish border. While he was gamboling across the countryside, he stumbled across a mass of German soldiers and vehicles preparing for the upcoming Blitzkrieg into Poland to initiate the Second World War. What happened after that is not entirely clear, except we know that Will was detained, questioned, and told to leave. Kris Elvin Godfrey added: "Dr. Whitcomb tells a story of being forced to carry an SS officer on the handlebars of his bicycle from one village to another. He also told a story about being detained by Nazi SS and questioned about his activities that involved smuggling Jews out of Poland. After several hours of the interrogation, the SS strongly recommended he get on a ship to the US."

Will left the Continent, and departed from Glasgow, Scotland, on 26 Aug 1939, arriving in Quebec, Canada, on 2 Sep. Following his return from Germany, Will returned to living at home in Massachusetts. Will

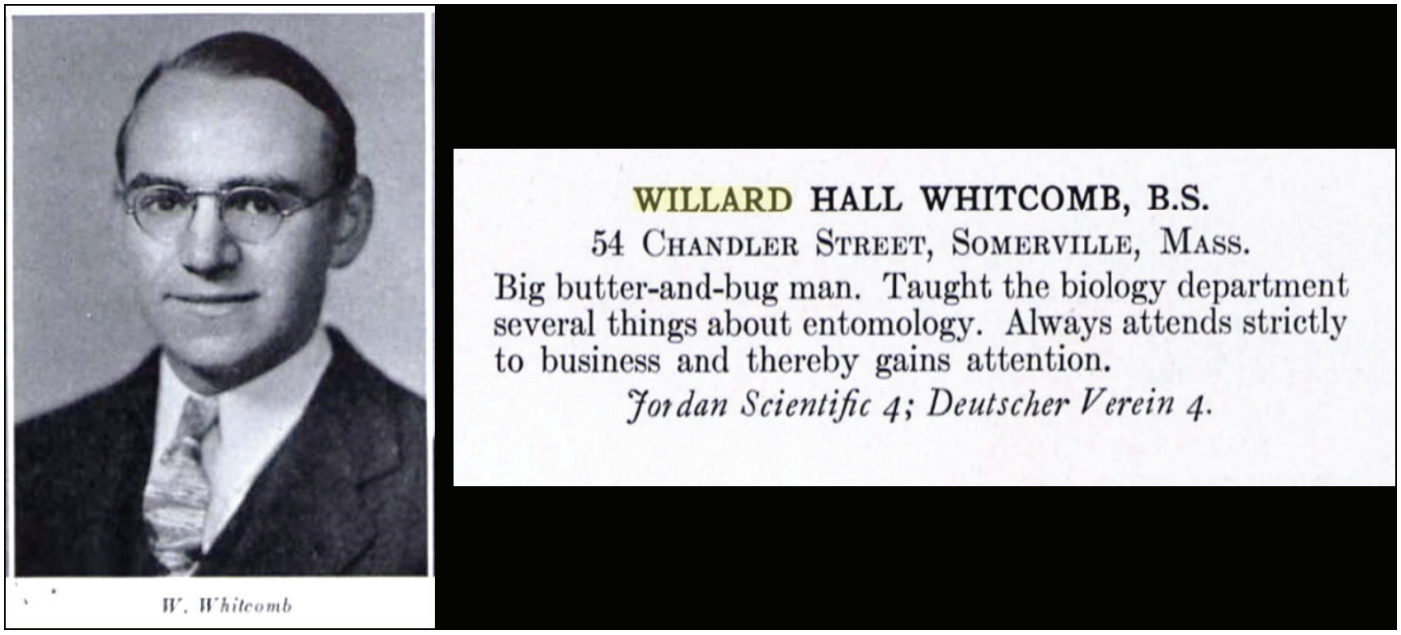

Fig. 2. Will Whitcomb's senior picture and inscription in the Bates College (Lewiton,Maine) 1938 Mirror Yearbook, p. 64.

attended Texas A&M from 1940 to 1942, and received an MS from that institution for his thesis titled, "The Taxonomy of the Thysanoptera of Brazos County, Texas."

Will returned to the Northeast, and was enrolled at Cornell University by 1943. In Ithaca he met the diminutive Dorothy Goodwin, nicknamed "Dot," the daughter of a traveling dry-goods salesman (Fig. 3). Dot was a studious and serious student who had graduated from Glens Falls High School (Glens Falls, New York) with interests in science and German (see yearbook photo), both of which interests probably drew the two of them together.

Will was a member of the Future Farmers of America while at Cornell, indicating his interest in agriculture at that time (1946 Cornellian, p. 142). Will finished his PhD in 1947, producing a dissertation titled, "The Biology of the European Chafer *Amphimalon majalis* (Razoumowsky)."

Immediately after graduating from Cornell, Will accepted a position with the University of Central Venezuela in Maracay working on agricultural problems from 1947 to 1952. During this time, he coauthored a thorough description of tobacco leaf curl virus and its whitefly vector in Venezuela (Wolf et al. 1949), and worked on ecology and management of the fall armyworm (Whitcomb & Salas 1950).

Subsequently, he was hired by Shell Oil Company (Royal Dutch Shell), and was with them from 1952 to 1956. Beginning in the early 1930s, Shell Oil took an active role in building goodwill in Venezuela, investing in hospitals, schools, and agriculture (Salazar-Carrillo & West 2004). Will directed agricultural research and trained personnel at an important agricultural experiment station in central Venezuela (Cagua city in the state of Aragua) (Troconis 2006).

During his Venezuelan tenure, Will also was exposed to tropical agriculture. Here he devoted intense effort to finding ways to improve pest management through biological control and habitat management, and to improve the quality of entomological knowledge in the country.

In 1950, Will convinced cotton growers in a portion of Aragua Valley to adopt an early season calendar approach to managing boll weevil that had become popularized in the US (Whitcomb 1969). Although the program did a great job controlling the boll weevil, the secondary pests created by the early season disruption of natural enemies led to a very poor yield. This only reinforced Will's interest in conservation biological control, and underscored the importance of naturally occurring predators in suppressing pests.

Will had a keen interest in supporting the producers of Venezuela. In 1957 Will and colleagues published the first listing of common names of pest insects in Venezuela (Fernandez Yepez et al. 1957), creating greater opportunities to teach growers about pests and their management. This also was an overarching element of Will's career. He wanted his work to be highly relevant to producers, and he wanted it to be accessible to them.

Will became and remained fluent in Spanish for the rest of his life, which facilitated his many travels to Central and South America in the remaining decades of his life.

From 1956 to 1967 Will worked at the University of Arkansas. In Arkansas, Will developed a reputation as a demanding field observer, and he seemed to have just one massive hammer in his experimental toolbox – direct field observations. To this tool he coupled compliant (if not thrilled) and available labor, and then drove and inconvenienced them mightily.

Nearly every summer in Arkansas, Will hired his so-called "Whitcomb Harem" – female students and community members – to work alongside his staff and students for hours on end in the field. Will preferred hiring women because he said they lasted longer in the field, and were much more careful in their observations and recording. All of

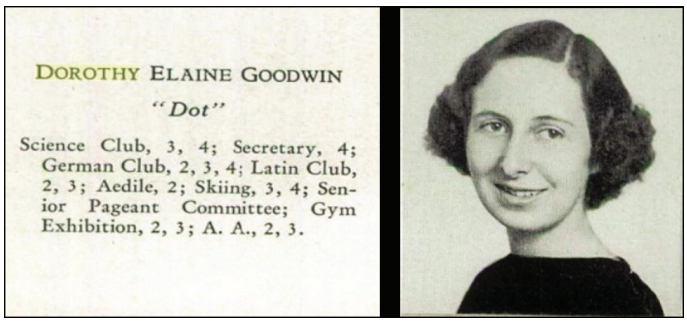

Fig. 3. Dorothy Goodwin's senior picture and inscription in the Glens Falls High School (Glens Falls, New York) 1939 Red and Black Yearbook, p. 16.

Fig. 4. Will Whitcomb (blue shirt at left) on one of his many visits to Latin America. Photo provided by David B. Richman.

his field crews were expected to spend hours sitting or lying in the field watching for predators to feed on natural or sentinel prey items. Typical observation periods were 3 to 6 hours long, and could be any time of the day or night. He inflicted this approach on workers throughout the rest of his career, and demanded detailed care and diligence in the observation process, a skill that his trainees acquired and utilized in their own careers. He published a variety of papers in Arkansas, typically in Arkansas Agricultural Experiment Station publications, describing the predators that came to moth eggs and caterpillars at various times of the day and night, and how much they consumed – the most detailed such information available up to that time.

Most of us who work on predation in the field have worked hard to find ways to circumvent direct observations in the field – using gut analyses, radiolabeling, DNA, immunoassays, and so on. While these tools have proved very useful in characterizing predation and the predator complex, in the end there is still unmistakable value in those interminable hours of watching and recording. And so this practice continues to be valued and valuable, although very rarely done to the extent that Will practiced it.

Will started loudly beating the drum for the promotion of generalist predators in agroecosystems in the mid-1960s, particularly after publishing what must arguably be considered his magnum opus in 1964, "Predaceous Insects, Spiders, and Mites of Arkansas Cotton Fields" (Whitcomb & Bell 1964), which has been cited hundreds of times throughout the world as a primary reference on predator biodiversity in an agricultural cropping system, and has been a standard work for anyone working in cotton. It is 84 pages of species lists and valuable biological information, documenting over 600 species of predatory arthropods in cotton fields in Arkansas. Even today there are very, very few other examples of such a comprehensive and informative work for any crop anywhere in the world. Will became a very vocal advocate for the importance of conserving natural enemies, including spiders and ants, for successful IPM and sustainable agricultural production. For a man of his sweeping interests and intellect, conservation biological control held the ideal blend of understanding taxonomy, behavior, and ecology. And it tied all of these directly to the important human venture of agriculture, but in a sustainable manner.

Will was a faculty member at the University of Florida from 1967 to 1984. The first two years he spent at Monticello, which is where he became a fixture at Tall Timbers with his ecological agriculture research. He also was a key figure in establishing the Tall Timbers Conference on Ecological Animal Control by Habitat Management, which first met in Feb 1969 and concluded after its 7th gathering in 1980. These conferences were a who's-who of giants in integrated pest management, ecology, and biological control, and the proceedings are rich with ideas and case studies that are well worth reading today.

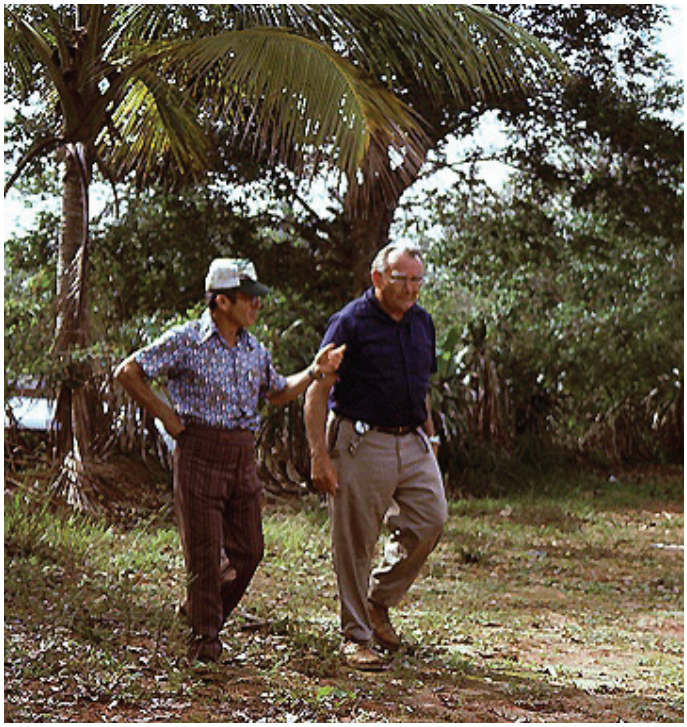

Fig. 5. Will Whitcomb (blue shirt, center) on one of his many visits to Latin America. Photo provided by David B. Richman.

During and after his University of Florida years, Will continued to travel extensively in Central and South America as a consultant for the UN Food and Agriculture Organization, and for other agencies and his own interests, and he continued his rather Brownian pursuits (Figs. 4 & 5). He discovered the first boll weevil in Paraguay, located the likely original home of the US populations of the red imported fire ant in Brazil, located and reported on numerous natural enemies of pests, and pursued a keen interest in palms, becoming an authority on the plants. Indeed, Will and Dot made a palm jungle of their yard, which did nothing to endear them to their neighbors with their traditionally landscaped yards. It was easy to find Will's yard on the street, although the house took considerably more effort to spot from the road. Carl Barfield noted that, "Will was a classic eccentric. He would return from the tropics with banana spiders and release them in his home for roach and fly control. One could expect to have a spider drop onto their head or shoulder at any moment. Needless to say, Will and his wife did not have an extensive social life. Only his graduate students would venture into his home." And he continued to argue strongly for the importance of conserving generalist predators, highlighting the importance of spiders and ants, as a primary pest management tactic. He also actively implemented his ideas in conservation biological control programs in his travels. He was always easily found at meetings with his booming, stentorian voice and loud cackling laugh. These were perhaps the most commonly mentioned traits by those whom I reached for their stories. David Richman observed of Will that "he said of himself that he could be holding a conversation on the second floor of a building and break up a conversation on the first floor."

What precisely is Will's legacy? Will made a number of fairly notable contributions, such as discovery of the first boll weevil in Paraguay and finding the apparent original home of the US populations of the red imported fire ant, but these are secondary lineages in his legacy, in my opinion.

Will's legacy is rather complex to encapsulate. He didn't leave behind a corpus of high-impact papers – he has only 4 papers cited more than 40 times. And most of his work was published in state and regional journals; he had little concern for publication prestige. He didn't publish a classical and defining tome or devise some groundbreaking theory that reshaped the field. Instead, he addressed a very broad spectrum of topics. His professional presentations tend to be remembered far more for their length and the quirkiness of their delivery than for content. He addressed a very wide range of topics. So, what did he do, actually?

Will was among the first – and certainly the loudest and most adamant – to demonstrate the value of the entire suite of predators in agroecosystems, and to promote knowledge-based conservation biological control focused on a suite of generalist predators. Very few people have or are willing to spend hours lying in a cotton field watching predators at all hours of the day and night. But his willingness to do so and to induce others to do so, along with his extensive taxonomic capacity, more fully clarified the complex suite of predators in agroecosystems and what those predators do, and when they do it, even at night, which has opened up new areas of work in biological control studies.

Throughout the last half of his life, Will continued to promote the critical nature of conservation biological control for agriculture, but also challenged us to know what really lived in our cropping systems, and what they did there, so we could design an appropriate production agroecosystem for them. He challenged the prevailing primacy of classical biological control as a biocontrol tactic, relegating it to a role of last-resort if the native natural enemies were inadequate. The severe challenges to the ecological safety of classical biological control, that came as thunder from a blue sky for biological control workers in the late 1980s and 1990s, were no surprise to Will and served as a validation of his perspective. However, a recent biological control text devoted 125 pages of text to classical biological control and only 38 pages to conservation biological control, despite the obvious complexity of nurturing and utilizing a complex of existing natural enemies. So Will's ideas still have a way to go to convince the biological control community. Similarly, despite many decades of substantive work, augmentative biological control has largely failed to live up to its hoped-for promise in the open field. But Will has inspired a number of agroecologists who are increasingly championing what Will began (e.g., Michaud 2018). And many successful sustainable pest management systems around the world attest to Will's wisdom that we should and can successfully use the natural enemies we already have. Will was without doubt a founding father in making biological control through naturally occurring natural enemies a linchpin in sustainable agriculture, and that impact continues to ripple across the international stage today through Will's contributions and mentorship.

Indeed, Will was something of a binary or all-or-none personality. He tended to either go all-out on something, or he saw no value in it and dismissed it. He appeared to have a set of priorities when he addressed a potential question: (1) Is it sufficiently interesting? (2) Will the answer be useful to producers, especially smallholders? (3) And perhaps most importantly, does it require travel?

Today, we remember Will as a quirky, eccentric, witty, snappish fellow who boomed his opinions through meetings and hallways, who was a risk to everyone in the vehicle and on the road when driving, and who had an encyclopedic mind that gobbled knowledge from any and all directions, and gushed it out freely. We also remember him as an ardent supporter of the Florida Entomological Society and powerful advocate of conservation biological control and sustainable agriculture. I remember Will as a senior mentor and friend, and I miss his loud voice, his easily provoked cackling laugh, his switching between English, Spanish, German, and scraps of Russian and Hindi. At least in the waning years of his life, beneath his irascible and sometimes off-putting exterior was a genuine warmth that encouraged me and many others to stay and speak, as Will's high school yearbook once pleaded, and, of course, to listen and learn (Fig. 6).

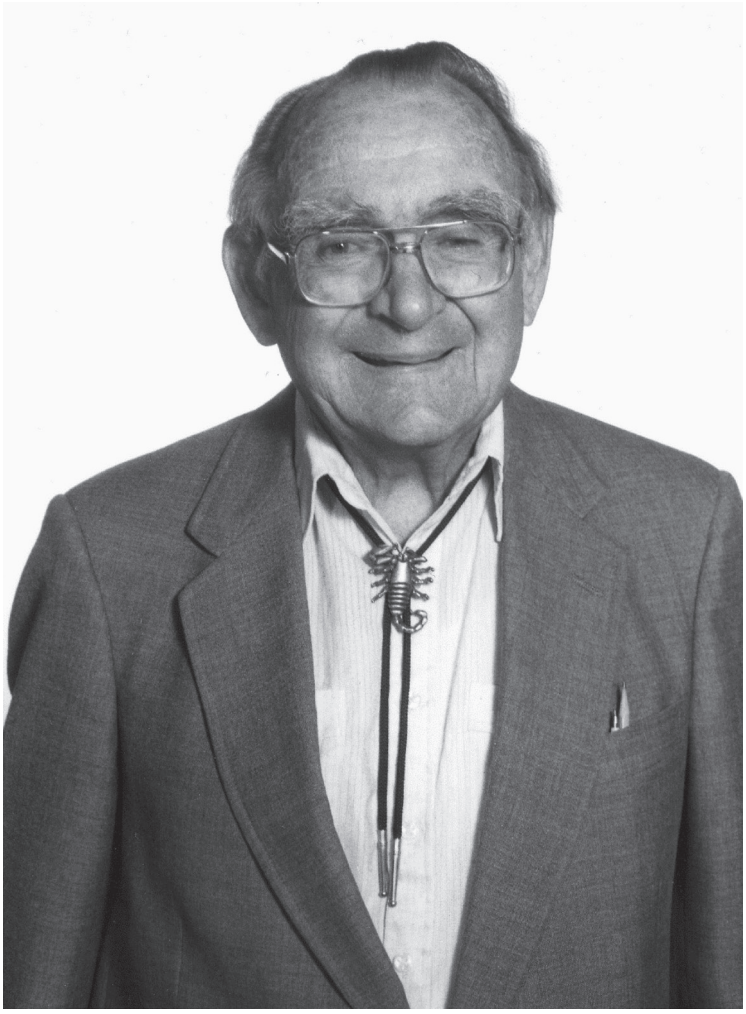

Fig. 6. Will Whitcomb shortly before his death on 15 Jan 2002, in Gainesville, Florida. Photo by Jeffrey Lotz (image from Florida Department of Plant Industry, shared by James Nation).

Acknowledgments

I greatly appreciate the many insights, anecdotes, and images of Will shared by Kris Elvin Godfrey, Miguel Altieri, Larry Buschmann, David Richman, Don Hall, Norm Leppla, Rob Wiedenmann, Carl Barfield, Howard Frank, Tim Kring, Dan Wojcik, Juanita Whiddon, and James Nation. I also am grateful to the Florida Entomological Society for the invitation to learn more about Will and share what I learned. References on specific activities in Will's life noted here are available on request.

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