

the United Nations Food & Agriculture Organization and the World Health Organization for use in fighting disease and hunger. He developed many of the innovative products sold by BioQuip today in addition to improving the design and utility of numerous products existing in the field.

Richard leaves behind his wife of 45 years, Louise, sons Christopher, Kenneth and wife Lianne, and Stuart and wife Cynthia; grandchildren Melissa, Richard, Natalie; brothers John and Charles; and aunts, uncles, nieces, nephews, and cousins.

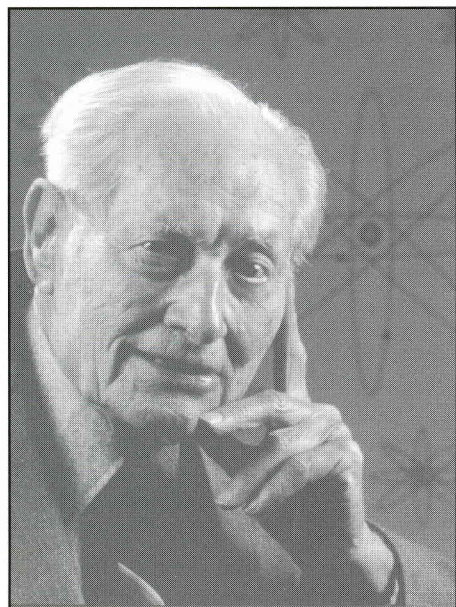
Contributions may be made in his honor to the Richard P. Fall Memorial Scholarship, administered by the Entomological Fund Foundation.

*The Fall Family
Los Angeles, CA*

Edward F. Knipling

DR. EDWARD FRED KNIPLING, who originated the sterile insect technique for eradicating screwworms, died of cancer 17 March 2000 at his home in Arlington, Virginia.

Born 20 March 1909 in Port Lavaca, Texas, "Knip" cultivated a boyhood interest in plants, animals, and insects on his



Edward F. Knipling (1909-2000)

family's 150-acre farm that carried over into studies at Texas A&M and Iowa State universities and a 43-year career with the U.S. Department of Agriculture.

Among his scientific achievements, Knip is best known for developing the sterile insect technique (SIT) and hypothetical models for suppressing entire pest populations.

These techniques set the stage for eradicating screwworms from the United States, Mexico, and Central America. The system has also been used to eradicate or suppress other insect pests elsewhere in the world including the tsetse fly in Africa and melon fly in Okinawa, Japan.

James R. Coppedge, Associate Director for ARS' Southern Plains Area, says Knip displayed a farmer's knack for economics when it came to calculating pest-to-parasite ratios and pest population suppression dynamics. Sometimes these calculations took place over lunch at a favorite restaurant. "He used to go through more napkins than notepads," says Coppedge.

The SIT concept can be traced back to 1937-1938 when Knip and USDA colleague entomologist Dr. Raymond C. Bushland discussed genetic-based strategies for preventing female screwworm flies from laying eggs on wounded livestock. At the time, cattle producers treated infested animals with external controls, such as chemical smears. Knip and Bushland considered such measures insufficient. Instead, they theorized that by sterilizing male screwworms with X-rays and releasing them to mate with female flies, an entire wild pest population eventually could collapse. Correspondence with H. J. Mueller, a Noble Prize recipient for his work with X-rays and *Drosophila*, supported the concept.

SIT's full-scale use in screwworm eradication began in the southeastern United States in 1957, followed by programs in the Southwest and Mexico between 1962 and the late 1970s. Screwworm eradication has since continued into Central America and is nearing completion in Panama.

For the cattle industry, the estimated savings reached into the hundreds of millions of dollars annually. The program also has helped protect many wildlife species and even humans, who are also subject to screwworm parasitism. Today, the SIT approach remains one of the most environmentally sound strategies ever devised for managing pest populations over large areas.

This work and other research won Knip many honors, including awards from *Progressive Farmer* magazine (1999), Japan's Science and Technology Foundation (1995), World Food Prize Foundation (1992), Foreign Agricultural Organization (1991), Agricultural Research Service (1986), and President's Award for Distinguished Federal Civilian Service (1971).

Knip's elder daughter, Edwina K. Lake, recalls her pleasant surprise upon learning of the impact of her father's scientific contributions among Japan's rank-and-file. "A cab driver in Okinawa told me that 85 percent of the people there knew Daddy's name," she says.

Lake says her father also was quite proud

of an award from the Calhoun Cattleman's Association, presented to him February 1994, during a ceremony in his hometown of Port Lavaca, Texas.

Although Knip certainly appreciated such honors, he did not long dwell on them, nor did he purposefully display his awards where others couldn't help but see them. In the same closet where other medals were kept, for example, Lake recently came across a Nobel Prize application that a scientific colleague suggested Knip should prepare. It lay unfinished next to his fishing gear.

Knip's USDA career began in 1930 as a Tlahualilo, Mexico, field aide after graduating with a B.S. from what's now Texas A&M University-College Station. He earned his Ph.D. in entomology from Iowa State University in 1947.

Initially, Knip was uncertain which academic field to pursue in college. Then he settled on entomology.

"I didn't realize until that time that such [arthropod-borne] diseases as typhus and malaria and what-not caused the deaths of hundreds of millions of people worldwide. Of course, I could observe what damage insects could do to plants and animals," he explained in a videotaped interview shortly before his death. "But to realize this from a broad perspective—just how important insects were to the welfare of humanity—impressed me very much," he continued. "When I realized there was perhaps an opportunity to make a profession out of entomology, I decided to major in that field."

Then, there was the matter of repaying half of what his father had loaned him to attend 4 years of college at Texas A&M. Through waiting tables, mowing lawns, and working other odd jobs including later as a USDA field aide, Knip made good on his promise. Instead of the \$900 his father agreed to, "I gave him \$1,000," Knip laughed. "And the first thing I did after that was buy a car."

His USDA service included leading the Orlando, Florida, laboratory, which developed DDT, other insecticides, and repellents to protect U.S. troops during WWII from disease-spreading vermin such as body lice. He also demonstrated how internal medicines could be used to repel external human parasites. He demonstrated this in cattle by treating for horn flies with phenothysine.

While in Washington, DC, from 1946 to 1953, Knip oversaw USDA's Insects Affecting Livestock, Man, Households, and Stored-Products division. He also led USDA's Entomology Division in Beltsville, Maryland, from 1953 to 1971 and retired in 1973, continuing to serve as an ARS science advisor.

Writing about areawide insect pest management using parasitoid augmentation techniques occupied much of his "retirement." In 1992, he published *Principles of Insect*

Parasitism Analyzed from New Perspectives: Practical implications for Regulating Insect Populations by Biological Means (USDA-ARS Agricultural Handbook No. 693).

Knip published over 225 technical articles. He was a member of the Entomological Society of America, National Academy of Sciences, and other societies. He served as an advisor for the National Research Council and the International Atomic Energy Agency.

"Dr. Knipling's dedication and contributions to the profession of entomology are unprecedented," says Coppedge. "He was dedicated to the concept that insect pests can be reduced to subeconomic and sustainable levels using environmentally friendly technology applied to the total insect pest population." Coppedge adds that Knip thoroughly enjoyed discussing the pros and cons of the approach with colleagues, students, friends, and family. Regardless of the person he was talking to, his or her affiliation or standing, "he was pretty much the same kind of guy," adds Lake.

Knip's entomological interests also carried over into his family life; *Anthonomus*, *Culex*, Ladybug, Skeeter, and Tsetse were just a few of the family pets named after insects.

Shortly after learning of his cancer diagnosis, Lake says her father commented, "We have a lot of work to do before I move on." Indeed, he completed "Feasibility of Controlling *Ixodes scapularis* Ticks (Ixodidae), the Vector of Lyme Disease, by Parasitoid Augmentation" (J. Med. Entomol. 37: 645-652).

Knip is survived by five children, 12 grandchildren, and nine great-grandchildren. Phoebe Hall Knipling, his wife of 66 years, died in 1998. Together, they impressed upon the Knipling family a sense of vision, perseverance, humor, humility, camaraderie, and a deep and abiding enjoyment of nature.

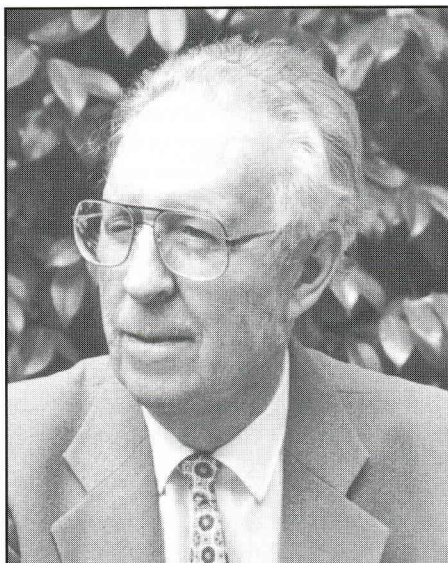
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Earle Gorton Linsley

EARLE GORTON LINSLEY, better known to his friends as "Gort," died in the Agua Caliente Villa retirement home in Sonoma, California, on 6 March 2000 at the age of 89.

Gort was born on 1 May 1910 in Oakland, California, to Earle and Marguerite Linsley. He spent his childhood in the area and early developed an interest in insects. He was influenced by E. Van Dyke at the California Academy of Sciences and became interested in beetles, particularly the longhorned



Earle Gorton Linsley (1910-2000)

beetles, Family Cerambycidae. He became one of the world's leading authorities on the classification of this group. Later he also became one of the leading workers on the biologies and classification of solitary bees.

Gort attended the University of California at Berkeley and received a B.S. (1932), M.S. (1933), and Ph.D. (1938), all in entomology. His Ph.D. dissertation dealt with the Cerambycidae of California. This later was expanded to the Cerambycidae of North America, a monumental work that was completed in 1997.

Gort married Juanita Murdoch, affectionately known as "Peter," on 22 August 1935. Peter was a strong supporter of Gort's career and the two went on many collecting trips in quest of beetles and bees. For many years, they spent portions of summers at the Southwestern Research Station in Portal, Arizona, and completed many projects dealing with pollination of various plants, habits of bees and wasps, insect predation studies, and faunal surveys of longhorned beetles. Several field trips to Mexico to collect specimens and gather data were made with P. D. Hurd, R. F. Smith, J. W. MacSwain, J. A. Chemsak, A. and M. Michelbacher, and J. A. Powell. Peter and Gort also collected many specimens on trips to various parts of California.

In addition to his busy academic life, Gort was an avid collector of postage stamps dealing with biological subjects. He and Peter collected and polished rocks and minerals and also collected Kachina dolls. Their home before its destruction in the 1991 Oakland fire was a veritable museum of rock specimens, books, and biological illustrations. They also were tireless gardeners, growing many plants including cymbidium orchids.

Linsley joined the faculty of the Univer-

sity of California, Berkeley, in 1939 as an instructor in entomology. In 1953, he became a Full Professor of Entomology and retired in 1973. He was Chairman of the then Department of Entomology and Parasitology from 1951 to 1959, and in 1960 he became Dean of the then College of Agricultural Sciences until his retirement. He also was Associate Director of the California Agricultural Experiment Station from 1963 to 1972.

Former Ph.D. students under Linsley include J. L. Gressitt, G. Bohart, J. W. MacSwain, F. H. Rindge, B. F. Barr, P. D. Hurd, Jr., R. S. Beal, H. L. Hansen, J. Rozen, W. E. Ferguson, C. D. MacNeill, J. A. Chemsak, E. E. Gilbert, J. A. Powell, R. W. Thorp, J. F. Lawrence, H. E. Stark, and A. Raske.

During his career, Linsley published more than 400 articles and books (many co-authored), mostly on Cerambycidae and bees. He named or co-authored 573 species and subspecies and 132 genera and proposed seven tribes. Of this total, 458 species and 109 genera were Cerambycidae. There are over 60 dedicatory names. In 1953, he co-authored with E. Mayr and R. L. Usinger the definitive book on systematics, *Principles and Methods of Systematic Zoology*. His primary legacy, in part with J. A. Chemsak, is the nine volume systematic work, *The Cerambycidae of North America*. His studies with various workers such as J. MacSwain, P. D. Hurd, P. H. Raven, R. W. Thorp, and A. Michelbacher are classics and models for future workers.

Concurrent appointments included Research Associate, California Academy of Sciences; Secretary, American Commission on Entomological Nomenclature; Editor, Pan-Pacific Entomologist; Guggenheim Fellow; Research Professor, Miller Institute for Basic Research in Science; and member of the Galapagos International Scientific Project.

Gort was a member of many national societies including the American Association for the Advancement of Science; Entomological Society of America (Vice-President, 1946, 1948; President, 1952; Honorary Member, 1977); American Entomological Society; Entomological Society of Canada; Ecological Society of America; American Forestry Association; Association for Tropical Biology; American Society of Naturalists; Society of Systematic Zoology (Charter Member); Society for the Study of Evolution (Charter Member); Fellow, California Academy of Sciences; Fellow, Southern California Academy of Sciences; Sociedad Mexicana de Entomologia; Kansas Entomological Society; Pacific Coast Entomological Society (Secretary, 1934-1938; President, 1938-1940; Honored Member, 1969-2000).

Honor societies include Sigma Xi, Alpha Zeta, and Gamma Alpha. Honors presented are Fellows Medal, California Academy of