SEARCH

Scientists Who Serve God

From Curiosity To Curating

Edward Luther Kessel is a retired biologist, field entomologist, taxonomist, museum curator, educator, and editor. He was born in 1904 in Osborne, Kansas, but his curiosity about nature stems from childhood experiences in subtropical Africa as an MK—a "missionary kid."

Natural History Lessons in Zulu Land

Young Edward Kessel and his older brother John went with their Free Methodist parents to South Africa the day after Ed's fourth birthday. The two boys returned to the U.S. in 1916. During those eight years Ed learned to speak Zulu and many other things as well. He learned that cobra-like snakes called mambas, which invaded the Kessel home at times, could kill an ox with one bite. A huge python once crushed and devoured a full-grown goat along the same grassy path Ed had to walk to get to school.

Edward's parents were remarkable people who encouraged his interests in natural history. With his slingshot of "amatungulu" wood (Natal plum) he bagged birds in the station's mulberry orchard and frogs in a nearby swamp. His Zulu playmate Umsizi was his first biology teacher. Umsizi taught him how to dig out three-inch-long queen termites and cook them. With no western medicine available, Umsizi rid Ed's father of a tapeworm by having him eat pumpkin seed meats by the handful.

When Edward was seven, his brother (who later became a distinguished medical parasitologist) gave him some silkworm eggs and a reel to wind the silk from the cocoons. By the time he was ten, the young silkworm rancher won first prize in a Young People's Industrial Exhibition in South Africa. The prize was a book about a fictional professor, who became something of a model for Ed's future career as a teacher and entomologist.

A Distinguished Biological Career in America

After the two brothers returned from Africa during World War I, Edward finished high school in California. He graduated from UC Berkeley in 1925 after publishing his first entomological article (on "Silk Culture in California"). After studying for a year at the Church Divinity School of the Pacific, then located at Grace (Episcopal) Cathedral in San Francisco, he earned an M.S. at "Cal." He taught zoology at Marquette in Wisconsin for several years, then returned to teach biology at the U. of San Francisco and work part-time toward a Ph.D. in entomology at Berkeley, awarded in 1936.

In 1974 Professor Kessel retired from USF after 45 years of teaching and from his long editorship of USF's *Wasmann Journal of Biology*. For some 30 years he was also associated with the California Academy of Sciences, where he edited over 370 technical papers and served as Associate Curator of Insects.

Collecting Insects and Memories

Edward Kessel has been an acute observer and energetic collector. In appreciation of his work, Volume 4 of *Myia, A Publication on Entomology* of the California Academy of Sciences was dedicated to him in 1989 on the occasion of his 85th birthday. It reprinted a widely cited 1955 paper of his from *Systemic Zoology* and catalogued his 76 papers on insects and 21 on other biological topics. It also contained his 184-page *Autobiographical Anecdotes (I Was A Preacher's Kid)*. The photos in this issue of SEARCH are from that wonderful collection of Professor Kessel's memories.

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Scientific Investigation

Adventures In The Animal Kingdom

Biology became a science only after the 18th-century Swedish botanist Carolus Linnaeus worked out a scheme for systematically classifying living things. Each level of his hierarchical scheme, from the most general (kingdom) to the most specific (species) is called a *taxon* (pl., *taxa*). Within the animal kingdom, for example, the phylum Arthropoda contains invertebrate animals with jointed legs; among the arthropods are "classes" of such creatures as insects, spiders, centipedes, and lobsters.

Chasing Flies and Fleas

Edward Kessel devoted most of his scientific studies to the class Insecta, and within it to the order Diptera ("two-winged" insects, such as mosquitoes and the common housefly). In 1945 he began donating his personal collection of Diptera to the California Academy of Sciences. He contributed 23,167 insect specimens, including 78 new species, 15 new genera, and two new subfamilies. All but one of the previously unclassified taxa were in the family Platypezidae ("flat-footed flies").

For his Ph.D., Kessel studied "The Embryology of Fleas." Of the several hundred known species, he chose to study one found on cats and another found on rats. He hunted rats at a city garbage dump (attracting a crowd of curious onlookers), then combed out their fleas and transferred the fleas to laboratory mice as substitute hosts.

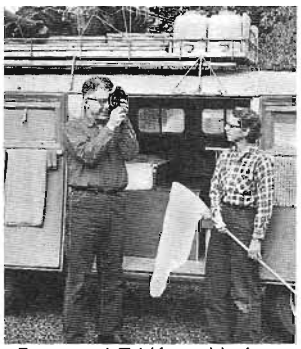
Mice groom each other and relish fleas as tidbits, so unless kept in individual cages they quickly de-flea each other. With suitable contortions, a mouse can even capture and eat its own fleas, so a special collar was put on each host mouse to protect its flea colony. A pet cat named Dodo served as host for the cat-flea culture, producing thousands of eggs for Kessel's studies. Microscopic examination made sure that the cultures had not been invaded by "foreign" species.

Kessel's dissertation bulged with intimate details of embryonic fleahood. Published in the prestigious *Smithsonian Miscellaneous Collections* in 1939, it was the first paper on insect embryology to be illustrated exclusively by photomicrographs.

Collecting and Curating

For three years during World War II, with many workers gone from their jobs, Ed Kessel taught biology in the daytime and worked evenings as a shipfitter at Marinship in Sausalito, where his entomologist wife Berta also found work as a welder. Personnel shortages at the California Academy in Golden Gate Park led to another part-time job, helping to curate the millions of insect specimens in the Academy collection. The young entomologist was encouraged to carry on personal research projects. His principal interest became the "flat-footed flies."

In his office at the California Academy, about 1950.



Berta and Ed Kessel in front of their VW camper, about 1974.

After the world authority on Platypezidae died, Ed Kessel "adopted" them as his specialty. With travel grants from the National Science foundation, he and Berta searched out that group of flies in every state except Hawaii (where they are not known to occur) and in every Canadian province except Labrador. By the time he retired, they had logged over 375,000 miles in a VW camper, 125,000 more in a Condor motorhome rigged to serve as a mobile laboratory.

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TAXONOMISTS: AN "ENDANGERED SPECIES"?

Who will replace the "systematic biologists" of Edward Kessel's generation? The National Science Foundation is worried because fewer students are entering the field, and because not enough professors are available to train those who do. The growth of "molecular biology" seems to have pushed systematics out of the academic mainstream.

In all phyla, only about 1.4 million species have been described even superficially. To describe the estimated number of species that exist (perhaps 20 times that number) could take 25,000 professional lifetimes. In the world's universities and museums today only about 6,000 taxonomists are at work. The number of graduate students preparing to do systematics dropped from over 3,000 in 1978 to 1,154 in 1988. Many species may be driven to extinction (by destruction of tropical rain forests, for example) before they are even named.

Some molecular geneticists moving into entomology are now helping taxonomists classify insects by their DNA patterns. With so many insect species to work on, molecular entomology is more open to discovery than well-explored fields like yeast genetics. Entomology is shifting toward more basic biology, but "bug chasers" will still be needed to explore the diversity of the insect world.

Theological Reflection

Mysteries Of Creation

When Edward Kessel was a PK ("preacher's kid") on a mission station in Africa, Sundays were for worship and reading the Bible or books pertaining to the Bible. His father, who held fundamentalist beliefs, considered scientific books suitable for Sunday reading because they taught his young son some of God's creation secrets. His young son agreed.

The Creator's Handiwork

The Kessel family soon after arriving in South Africa: John, the governess, their mother, Ed, and their father (clockwise from left).

Ed came to believe that "God had created the universe, our solar system, and all living things, including humankind," by natural processes. Many changes had taken place, were still taking place—all ordained by God. This is what some Christians call "theistic evolution."

For Ed, a pet baby monkey was "my first lesson in theistic evolution, showing how God created the human body." Firmly accepting God as Creator, Ed also accepted the idea that instead of being manufactured by hand, "we were designed, conceived, gestated, and born as creatures produced by God's most effective device for populating and replenishing the world." Throughout his life, Ed Kessel has studied that divine plan for creating new individuals.

Not all believers in the Bible understand its message of creation that way, nor would all accept some of Kessel's other interpretations of Scripture. As a boy he saw infections by the guinea worm *Dracunculus* (from the Greek *draco* for "dragon" or "snake"). The pain it caused was fiery enough, and it could grow to a length of four feet in the human body. The time-honored method of removal requires cutting through tissues to reach its head, lassoing the worm around the neck with a fine string, and carefully extracting it by winding it on a stick. Young Edward concluded from Numbers 21:6-9 that Moses not only taught the Israelites how to deal with those fiery serpents but used a visual aid as part of his instruction.

Theorizing and Theologizing

Scientists "play with theories" to help them think clearly, especially when they have few facts to go on. Christians untrained in science may feel uncomfortable "theorizing" about possible interpretations of biblical passages, but one can learn to consider various proposals without losing confidence in Scripture's authority.

In a 1983 article on "A Proposed Biological Interpretation of the Virgin Birth" Edward Kessel tried to picture "the basic natural process that God used to accomplish the physical aspects of the Incarnation," citing the relatively rare biological process of parthenogenesis as a "model." Some readers responded that it is irreverent even to think about such things.

The author argued that if something akin to Divine Parthenogenesis occurred, Jesus would have become a phenotypic male after being conceived by the Holy Spirit as a chromosomal female. The biology made sense, but some Christian readers—mostly men—questioned the theological implications. Some Christian women, however, said they found it easier to form a personal bond to a Christ who was not merely male. The idea seemed to fit in well with the statement in Galatians 3:28 that "there is neither male nor female; for you are all one in Christ Jesus."

To Edward Luther Kessel, emeritus professor of biology, "the Bible believer should be flexible enough to search for and defend the truth, whatever that turns out to be, and without regard for prevailing theological opinions."

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A COLLECTOR'S COLLECTION

For more photographs and yarns of Edward Kessel's missionary boyhood and biological adventures, see his *Autobiographical Anecdotes (I Was A Preacher's Kid),* in *Myia: A Publication on Entomology,* Vol. 4 (1989), edited by Paul H. Arnaud, Jr. The hardbound tribute to Kessel includes his bibliography and a paper on "The Mating Activities of Balloon Flies." A fascinating book that might influence other young people to consider science as a Christian calling.

Myia 4 can be ordered from the Dept. of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118; checks payable to California Academy of Sciences ($10 plus $1.60 for domestic postage, $3.20 for Canadian and overseas; CA residents add sales tax).

The ASA *Journal* in which Kessel's paper, "A Proposed Biological Interpretation of the Virgin Birth" (Vol. 35, pp. 129-136. Sept 1983), appeared is now known as *Perspectives on Science and Christian Faith.* A microfilm of that issue is available at nominal cost from University Microfilms, Int., 300 North Zeeb Road, Ann Arbor, MI 48106. A paperback book based on that article, *The Androgynous Christ* (1988) was privately printed but not for sale. For information, write Edward L. Kessel, Apt. 337, Rose Villa, 13505 S.E. River Road, Portland, OR 97222.

As a white child in South Africa 80 years ago, Ed Kessel was sometimes confused and disturbed by the racial discrimination he saw there. Even the Christian missionaries tended to treat black people much as the white farmers did, supporting the beginnings of apartheid. Because Ed made close Zulu friends, he discovered for himself that "true friendship is based on the quality of individuals and their value as persons, rather than on their color."

Edward L. Kessel in Lone Scout Uniform, Fair View, South Africa, 1915.

Knowing better than to misjudge people's character by their color did not exempt him from embarrassing misunderstandings. His first American experience on his return from Africa was an overnight train ride. The Pullman porter failed to respond to Ed's friendly attempt at conversation in Zulu. The twelve-year-old was shocked. He had never before met a black person who did not speak his own second language.

A Fatal Flaw?

Later, another kind of embarrassment influenced Ed's choice of careers. Although he differed from their rather narrow views on science and religion, he honored his parents and their desire that he consider a calling to the ministry. Realizing that other Christian groups might not force on him the same kind of choice between science and religion, he began studying theology at San Francisco's Episcopal divinity school. He was soon appointed student pastor of a mission church in West Berkeley. Episcopalians, he discovered, like Free Methodists, regarded home visitation as an important part of a pastor's life.

On his first home visit the hostess served tea to the young minister in the parlor. The young minister's problem was that he had been born with an essential tremor in his hands, making it impossible for him to hold a fancy English teacup without sloshing some out. His hostess politely refilled his cup to the brim with the boiling liquid, with which he again scalded his leg. He was soon too nervous to carry on a respectable conversation.

Realizing that an endless line of teacups lay ahead, Kessel decided that his tremor was leading him out of the ministry and into science. Ironically, by making it too difficult for him to pin insect specimens, the tremor eventually helped end the laboratory phase of his scientific career also.

Another Side of the Story

But this story has another side. For his Ph.D. work Ed had to remove the shells from tiny flea eggs under a dissecting microscope to expose the embryos. Convinced that his tremor would make it impossible to carry out his professor's wishes, he thought, "There goes my Ph.D." Friends with steady hands offered to help but even they couldn't perform the delicate manipulation without smashing the eggs. In desperation, Ed tried it himself. To his amazement he saw that his tremor "was gently vibrating the needle, cutting into the shell like a tiny, silent, smoothly running ultrasophisticated machine." As it turned out, Ed was the only one in the lab who could do the procedure—because of his "handicap."

Our Lord uses all sorts of abilities—and disabilities. He accepts people of all races, with all kinds of flaws, to transform into his own. Ed Kessel's father loved to quote Ephesians 4:24, urging Christians to "put on the new nature, created after the likeness of God in true righteousness and holiness." When God looks at a person, he sees us as we *can* be, in Christ.

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Thoughtful Worship

Seeing The Good

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