NATIONAL ACADEMY OF SCIENCES

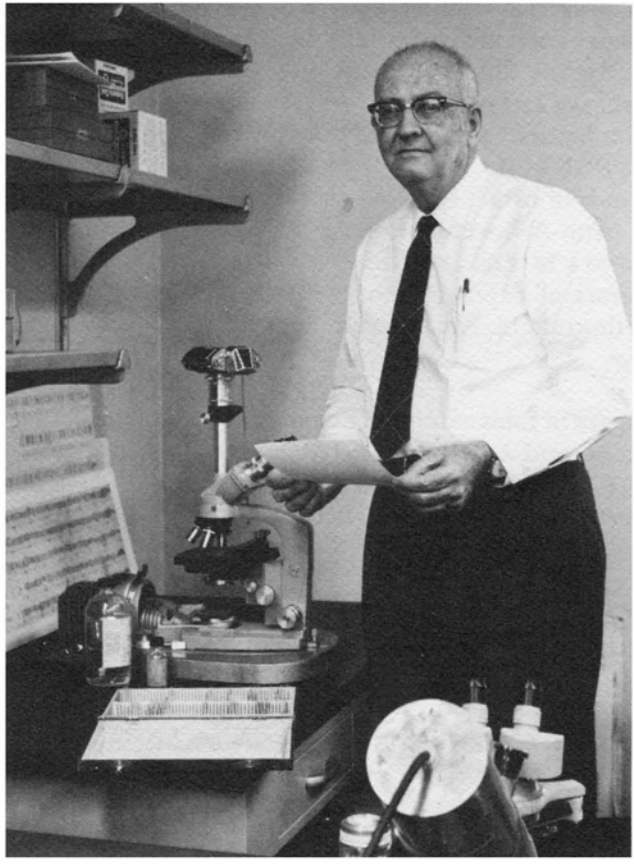
WILSON STUART STONE

1907—1968

A Biographical Memoir by

JAMES F. CROW

Biographical Memoir



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Wilson S. Stone

WILSON STUART STONE

October 6, 1907–February 28, 1968

BY JAMES F. CROW

WILSON STUART STONE was born October 6, 1907 in Junction, Texas, and died February 28, 1968 in Austin. He was elected to the National Academy of Sciences in 1960.

Except for the years from 1942 to 1945, when he served in the U.S. Army Air Force, he spent his entire life in Texas. His academic career was at the University of Texas. His death, unexpected and coming after a very short illness, occurred as he was in the midst of one of the most active phases of his academic and research career.

EDUCATION AND MENTORS

Wilson Stone attended Brackenridge High School in San Antonio from 1921 to 1924. His family wanted him to be a preacher, and in this tradition he attended Baylor University, an institution with Baptist ties. After one year, however, he transferred to the University of Texas, receiving his B.A. in 1931. He received the master's degree in 1932 and the Ph.D. in 1935, both from the University of Texas. Immediately after graduation he joined the faculty, becoming an associate professor in 1936 and a professor in 1945.

His undergraduate career was initially undistinguished, and he had a mediocre academic record. This changed abruptly under the influence of H. J. Muller. In genetics,

Stone discovered a consuming interest; Muller discovered in Stone a keen, analytical mind. It is greatly to Muller's credit that he looked through Stone's weak background and poor academic record to recognize his intellectual power and creativity.

Prior to this time, J. T. Patterson, who was to be Stone's major professor, had spent summers at Woods Hole, Massachusetts, where he became acquainted with T. H. Morgan and his students. Although Patterson was working in embryology at the time, he acquired an increasing interest in genetics and brought some of Morgan's *Drosophila* cultures to the University of Texas. Soon after, he also brought H. J. Muller and arranged for him to have an X-ray machine. This led to the discovery of radiation-induced mutation in 1926, for which Muller received the Nobel Prize twenty years later.

Stone became Muller's assistant and helped with the *Drosophila* stocks. While still an undergraduate, he coauthored with Muller a paper on X-chromosome translocations. This shows how soon Stone became a productive researcher after entering genetics; it also shows Muller's high esteem for him.

Muller left Texas in the summer of 1932, the year Stone received his master's degree. Stone's Ph.D. thesis, begun under Muller's tutelage, was continued with Patterson. It was the beginning of an unusually rich collaboration that continued throughout the remainder of Patterson's active career.

It was while Stone was a graduate student that T. S. Painter discovered the giant salivary gland chromosomes in *Drosophila melanogaster*. The combination of producing chromosome rearrangements by radiation and analyzing these by salivary gland cytology became a powerful, and now standard, research technique. Stone played a crucial role at the very beginning by suggesting to Painter that one way of being sure that these giant objects in the salivary glands were

indeed chromosomes was to show that cells from strains known by genetic analysis to have X-ray induced chromosome abnormalities also have visible structural changes. Stone had joined Muller, Patterson, and Painter in the great Texas school of *Drosophila* cytogenetics.

SCIENTIFIC WORK

Stone's thesis, as mentioned before, was based on a problem originally instigated by Muller, but carried on with Patterson. In this paper, he showed that when the X-chromosome is broken and the originally distal part is brought closer to the centromere, the amount of crossing-over is greatly reduced. On the other hand, the remainder of the X, which has had its tip removed but is unchanged as regards the centromere, has crossing-over that is nearly normal. He also demonstrated that flies survive despite a large degree of chromosomal unbalance for the X-chromosome. He did this by combining normal and rearranged chromosomes in such a way that identifiable chromosome regions were present too few or too many times.

Patterson and Stone, along with several of their students, then undertook a systematic study of translocations. The object was to understand the effects of aneuploidy on viability and fertility, to learn the effects of rearrangement on crossing-over and disjunction, and to search for a possible female sex-determining gene on the X-chromosome. The original paper in this series, written by Patterson, Stone, Bedichek, and Suche in 1934, is a classic; it is still studied and quoted.

At this time Patterson was especially interested in following an earlier idea of Muller's that one could use judicious combinations of broken X-chromosomes to locate the element that makes the X-chromosome the female determiner. Stone joined him in this effort and they devised a procedure

for combining two different translocations between the X and the tiny fourth chromosome, broken at different places on the X, in such a way that the fly had the equivalent of one complete X-chromosome plus a fragment. If a major sex-determining gene was in the fragment, the fly should be female, otherwise it would be male. After a series of frustrating attempts (one duplicated region persistently killed the fly too early to determine its sex), the question was finally answered by others: no single region is responsible, so sex-determination must be polygenic.

During this period Stone also studied the variegated patterns that accompany rearrangements involving heterochromatin, the production of gynandromorphs by irradiating the parents, the effect of chiasma formation in reducing non-disjunction in rearranged chromosomes, and the viability and fertility reduction caused by aneuploidy.

In 1938 Patterson's interest, guided by Stone's repeated suggestions, turned to the study of *Drosophila* evolution. Together they began a systematic study of wild *Drosophila* species. One of the early studies, which has become a model, was the combination of data on geographical distribution with genetic and cytological analysis to work out the phylogeny and speciation mechanisms of the *virilis* group of *Drosophila.* A series of papers by Patterson and Stone, characteristically done in cooperation with a succession of graduate students, reported experiments on speciation, isolating mechanisms, and phylogeny for one *Drosophila* group after another. The culmination of this was Stone's only book, *Evolution in the Genus Drosophila,* coauthored with Patterson. However, he and Patterson edited a series of collected research papers published by the University of Texas.

Upon his return from military service in World War II, Stone devoted part of his time to collaborative experiments in bacterial mutagenesis. Along with Felix Haas and Orville

Wyss, he made the startling discovery that mutations could be induced by irradiating the culture medium *before* the bacteria were grown in it. This finding came almost immediately after the first realization that chemicals could be mutagenic. Subsequent analysis showed the effect to be most likely accounted for by peroxides and other chemicals induced by the radiation, which were acting as chemical mutagens. This work was followed by a series of studies with oxidants, antioxidants, sulfhydryl groups, and cyanide on mutation and repair mechanisms.

This never was a main issue with Stone, however, and he soon returned to evolutionary problems in various *Drosophila* species. In addition to writing the book with Patterson and continuing the pattern of genetic and cytological analysis of related Texas species, by then so well established, he branched out in three new directions.

One of these was a study of *Drosophila* from the Pacific Islands that had been the site of bomb testing. Cooperating as usual with colleagues and students, he was able to find the expected genetic variability induced by the radiation. Most of this was in the form of hidden recessive lethal mutations whose presence was revealed by inbreeding.

The second line of work grew out of his realization that the Hawaiian Islands had a particularly rich and diversified population of *Drosophila* species, many of them indigenous. The island structure offered an especially good chance to study species in the making. Stone was a leader, not only in the actual research, but in arranging for the organization, logistics, and funding of the cooperative program between Texas and Hawaii. His last paper, published posthumously, is a review of this work.

The third area of inquiry issued from his early realization that isozyme differences detected by gel electrophoresis provided a particularly sensitive indicator of variability in natural

populations. Largely through Stone's initiative, the University of Texas acquired a number of people who were ready to exploit this field. Texas became a leader in experimental population genetics, thanks to his guidance.

It was while he was most active in these last two areas that his death occurred. It is indicative of his deep involvement that several papers on Hawaiian Drosophilidae and on isozyme variants have been published since his death—papers that had been in various stages of completion and were finished by his co-workers.

In the period before World War II, Stone was known outside the Texas laboratory mainly as a member of the great research group that included Muller, Painter, and Patterson. After Muller's departure for Russia in 1932, Stone became increasingly the intellectual leader of the group. As a graduate student there from 1937 to 1941, I quickly learned that the person with the deepest insights and most imaginative suggestions was Stone. After his return from military duties, he became recognized throughout the world of genetics as the force behind the Texas program. Over a period of years, he grew in influence from first being Muller's assistant; then the collaborator with Muller, Painter, and Patterson; then the man behind the scenes who was providing most of the ideas; and eventually the recognized leader.

Stone was an author of about sixty major articles and some twenty abstracts of papers presented at meetings, usually of the Genetics Society of America.

In summary, his work is not distinguished by one or two major discoveries, but rather by consistent production of high-quality work. Most of all it shows the evidence of his enormously fruitful collaboration with Patterson. It also demonstrates, time after time, his close working relationship with students.

SERVICE TO THE UNIVERSITY OF TEXAS AND TO THE NATION

Before he left for military service, Stone took little interest in administrative questions. He was mainly the idea man for the Patterson-Stone program, content to remain behind the scene while Patterson handled all the administrative details.

This changed abruptly on his return. Although he had little liking for administrative problems, it soon became apparent to him and to his colleagues that continued excellence of the Texas genetics program depended on his leadership. In 1952, largely through his own efforts and with the active cooperation of C. P. Oliver, then chairman of the Zoology Department, the Genetics Foundation was formed. Stone was its director from 1952 until his death. The Foundation provided the necessary organization for a coherent program of research and graduate teaching and a mechanism for soliciting and channeling funds. He was chairman of the Zoology Department from 1959 to 1963. In 1964 he became advisor to the Chancellor for Graduate and Research Programs. The next year he was Vice-Chancellor for Graduate Affairs, and a year later he became Vice-Chancellor of the University of Texas. He was largely responsible for obtaining the funds for a biology research building, named after J. T. Patterson and dedicated in 1969. In 1966 he relinquished his administrative duties and returned to his first love, research. He had planned to teach an undergraduate course, but death intervened.

Nationally, he served in many ways. He spent three years as first lieutenant and captain in the Army Air Force during World War II. He was active in the Genetics Society and the Society of Naturalists, and was secretary of the latter from

1947 to 1949. He served as a member of the first Genetics Study Section (1958–1962), Cell Biology Fellowship Section (1963–1964), and National Advisory Research Resources Council (1964–1968)—all for the National Institutes of Health. He was a consultant on genetics for the Atomic Energy Commission from 1955 to 1957. He was coeditor, with C. P. Oliver, of *Genetics* from 1956 to 1962. He also served on many state and local committees.

While doing all this administrative and committee work, he continued his research and teaching. Twenty-four students received the Ph.D. with Stone as their major professor. To this number should be added four who were working toward the doctorate under his direction at the time of his death and several others (including myself) who were officially students of Patterson, but who were influenced at least as much by Stone, and were the beneficiaries of their complementary abilities and friendly cooperation.

I don't think Stone liked administrative work. He found it hard. But he did it conscientiously and very successfully, and he did it because he thought that it needed to be done. Texas science, and genetics in particular, flourished during the time of his leadership.

WILSON STONE, THE MAN

The aspect of Stone's personality that first impressed me as a graduate student was his sharp intellect. I recall vividly his way of thinking through complex *Drosophila* breeding experiments without the pencil and paper on which others are so dependent. He simply sat back in his chair and thought it out, seemingly without effort.

He was absolutely honest and completely unaffected. He had no guile, nor pretense. He had almost no interest in small talk, although he loved to converse about politics, music, or any of his many other interests—including, of course, evo-

lution and genetics. He enjoyed concocting evolutionary-selectionist explanations for any biological fact that came up in conversation, and for the quirks of human behavior. He never thought any of these worth publishing, although others would have.

As a classroom teacher, he did everything wrong by the ordinary standards. He spoke in a barely audible monotone; he paced back and forth in front of the class with an ameboid flowing motion; he looked out the window; he filled the blackboard with endless rows of numbers; and he didn't introduce the subject, nor summarize it. But it was somehow thrilling! For me, it was my first contact with a really first-class analytical mind. The class was pure intellectual excitement; it didn't require any trappings.

Another trait was his unselfishness and lack of desire for personal aggrandizement. He was intensely loyal to his colleagues and to his institution. He managed somehow to take his work seriously without taking himself seriously. He worked best as part of a team, at first with Patterson, later with others. But in every case, he furnished ideas.

Stone's quiet, almost shy manner kept him from making quick, superficial friendships. Yet, he took a genuine personal interest in his students. He had a deep love of music and those who shared his pleasure in listening to records were taken regularly to his home for an evening of his favorites. In the late 1930's these included Rimsky-Korsakov, Prokofieff, Shostakovich, Debussy, and Dohnanyi.

Wilson Stone was married to the former Jean Lampman, who also had been an assistant to H. J. Muller. She had an unusually quick, sharp, retentive, and inquisitive mind. She also had a strong, often consuming interest in political and social problems, which she shared with her husband and which she still retains. There were three children: Charles Stuart, Laurie Jean, and Michael. The great tragedy of

Stone's life was the death of his younger son, Michael, as a young boy in a vacation accident. The father and son were very close, and Michael's death had a deep effect on his father, one that was noticeable to close friends for several years.

In 1971 the University of Texas began an award, the Wilson S. Stone Memorial Award, for the outstanding achievement in the biomedical sciences accomplished by a student in the United States. Since that time it has been given annually as a memorial to Stone's great contributions to the University and to the nation.

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