MEMORIAL TO JOHN CHAPMAN FRYE (1912-1982)

H. B. Willman
Illinois State Geological Survey

"This situation has led to a deplorable lack of transfer of information from the geologic community to the political decision makers . . . . . In the next few decades, geologic data and advisory input will be needed more urgently than has ever been the case . . . . . When we view an exponentially increasing population set in apposition to finite mineral and land resources, the urgency of the situation becomes apparent."

In these words John C. Frye expressed concern for the basic responsibility of geology to society, views gained from a long career as head of two state geological surveys, active participation in national organizations, commissions, and panels, and dedication to research in applied and theoretical geology. They were spoken in 1980 at the 75th Anniversary of the Illinois State Geological Survey, where he served as Chief for 20 years (1954-1974). When he died at age 70 on November 12, 1982, at Boulder, Colorado, he had only recently retired after 8 years as Executive Director of the Geological Society of America.

John Chapman Frye was born in Marietta, Ohio, July 25, 1912, the son of Harley Edgar and Maude Vesta (Chapman) Frye. His father was a construction engineer and took part in building the flood-control dams along the Muskingum River in Ohio. John graduated from Marietta College with an A.B. degree in 1934. Marietta College awarded him an honorary Sc.D. in 1955. After a term at Ohio State University, Columbus, Ohio, in 1935, John transferred to the State University of Iowa, Iowa City, Iowa, where, under Professor A. C. Trowbridge, he received an M.S. degree in 1937 and a Ph.D. in 1938. His doctorate thesis, "Additional Studies in the History of Mississippi Valley Drainage," a cooperative study with the Iowa and Illinois Geological Surveys, made for him an early start in the Pleistocene geology of the Midwest, the dominant research activity in his career.

John's professional career after college began with the Groundwater Division of the U.S. Geological Survey in Kansas, where he served as Junior Geologist (1938-1940) and Assistant Geologist (1940-1942). He prepared reports on the groundwater resources of Meade and Atchison Counties and made his first studies of Pleistocene deposits and the Pliocene Ogallala Formation in the Great Plains west of the glaciated region.

In 1942 he accepted an appointment as Assistant State Geologist of Kansas and began a career in administration. By 1943 he was in charge of the Survey. In 1945 he became Executive Director, and in 1952 State Geologist, having served under another eminent geologist, Raymond C. Moore. He also maintained an

academic career as Assistant Professor of Geology at the University of Kansas in 1942, Associate Professor in 1945, and full Professor in 1952, teaching courses in glacial geology and geomorphology.

As Director of the Kansas Geological Survey he expanded studies supporting the mineral industries, particularly those associated with oil, gas, and groundwater, as well as basic research in stratigraphy and paleontology. In his own research he pressed ahead in geomorphology and late Cenozoic stratigraphy, collaborating in several studies with A. Byron Leonard in molluscan paleontology, Ada Swineford in mineralogy, Claude Hibbard in vertebrate paleontology, and James Thorp in soil science. These studies made major contributions to stratigraphy of the loess deposits of central Kansas and to correlation of the nonglacial stratigraphy of central and western Kansas with the glacial sequence in the eastern part of the state. With Moore and others he wrote a major bulletin on the Rock Column of Kansas. With Leonard he wrote a classic volume on the Pleistocene of Kansas. It introduced a classification for Pleistocene sediments based on new stratigraphic data and on principles (then new) that require distinction of units based on rock types from those that represent intervals of time. In 1950, he led the third of a series of field conferences sponsored by State Geologists that brought the new Great Plains stratigraphy to the attention of specialists from many states. In 12 years with the Kansas Geological Survey he was author, or coauthor, of more than 60 papers.

In 1954, John was appointed Chief of the Illinois State Geological Survey succeeding Morris M. Leighton, another eminent Pleistocene geologist who had built the Survey to an outstanding position among state surveys during his 31 years as Chief. It was a time when significant growth of the budget permitted John to develop further growth of staff and expansion of the program. It was also a time of significant advances in technology, particularly geochemistry, geophysics, and computer sciences. New equipment was added in many of the laboratories. A laboratory in isotope geochemistry was established. Neutron activation analysis and low-temperature ashing of coal for mineral-matter studies were started.

Under his administration cooperative research with the Natural History and Water Surveys was greatly increased. With the Natural History Survey a Natural Resources Studies Annex building with additional laboratory facilities and storage for well samples, cores, fossil collections, and other materials was built. In cooperation with the Water Survey a field office was established in Naperville and later in Warrenville to give geological service to the Chicago region.

The many new projects started under his administration included a comprehensive study of the Lake Michigan shoreline features and cooperation with other state agencies on erosion controls. The lake bottom sediments in Lake Michigan were studied and correlated with glacial sediments on the bordering lands.

John encouraged and increased summer employment at the Survey of teachers and students of geology, mostly from colleges and universities in Illinois, which supported active projects and stimulated local interest in Illinois geology.

Within the Survey he increased the joint research projects between the geological and geochemical groups. He restyled the Circular series and introduced new series of publications, called Illinois Mineral Notes and Environmental Geology Notes, designed for rapid dissemination of research. His emphasis on publication stimulated additional research. He was generally accessible to all members of the staff, and he initiated frequent meetings for discussion of problems and programs.

He gained favor from the staff by holding administrative reports to a necessary minimum.

A major influence in increasing the productivity of the Survey was his personal dedication to research, as indicated by the many evenings and weekends he put in at the Survey.

Both of John's successors, Jack A. Simon (1974-1981) and Robert E. Bergstrom (1981-1983) had risen through the Survey organization and had many years experience with him in direction of the organization.

By the time John became Chief of the Illinois State Geological Survey his professional standing and administrative accomplishments were widely recognized, and he was in demand for public service on many national and state committees, commissions, and panels. He served on the National Research Council as a member of the Earth Science Division representing the Society of Economic Paleontologists and Mineralogists (1958-1970), and on many committees, including the Executive Committee of the Earth Science Division (1961-1964, 1972-1974), the Committee on Geologic Aspects of Radioactive Waste Disposal (1956-1964, Chairman 1962-1964), the Advisory Committee on Earth Resources Remote Sensing, advisory to the U.S. Department of Interior (1966-1974, Chairman 1966-1969), the Panel on Geology and Mineral Resources (1966-1971), the Committee on Mineral Science and Technology, advisory to the U.S. Bureau of Mines (1966-1969), and the Committee on Radioactive Waste Management, advisory to the Atomic Energy Commission, including the Panels on Disposal in Salt Mines, on Bedrock Disposal at the Savannah River Plant, and on Engineered Surface Storage (1968-1974, Chairman 1970-1974).

For the U.S. Department of the Interior he was a member of the Secretary's Survey Committee for the Geological Survey (the Van Pelt Committee, 1953-1954) and the Advisory Committee to the Secretary of the Interior for the Geological Survey (1960-1966). He received the Public Service Award from the Department in 1972.

John was elected to membership in the National Academy of Engineering in 1971 and served on the Committee on Environmental Engineering and also the Panel on Solid Waste, advisory to the Department of the Navy.

He served on the U.S. National Commission for UNESCO (1967-1972), on the Executive Committee (1967-1972), the Committee on Natural Sciences (1967-1970), and the Committee on Man and His Environment (Vice-Chairman 1970-1972). He served on the Scientific Manpower Commission (1956-1958), and on the Advisory Committee on Future Oil Prospects of the National Petroleum Council (Chairman for Region 9, 1968-1970).

For the Oak Ridge National Laboratory he served on the Advisory Committee on Health Physics (1959-1972), the Advisory Committee on Chemical Technology (1972-1974), and the Environmental Sciences Advisory Committee (1974). He was a member of the Scientific Committee on Problems of the Environment of the International Council of Scientific Unions.

John served on the American Commission on Stratigraphic Nomenclature (1955-1962), and was Chairman (1957-1959) during the formative stage of the stratigraphic code of 1961. He was on the Commissions on Loess and on Stratigraphy of the International Association for Quaternary Geology (1970-1974).

In his professional services in Illinois, John was a member of the Science Advisory Council to the Governor of Illinois (1964-1974). He held various offices and

committee assignments in the Illinois State Academy of Science and was President in 1962-1963. He served in various offices and was President (1967-1968) of the Illinois Section of the American Institute of Professional Geologists. He was on the Executive Board of the Illinois Mining Institute (1958-1961), the Technical Advisory Committee on Water to the State Department of Business and Economic Development (1961-1967), the Executive Committee of the Illinois Water Center, University of Illinois (1963-1974), the Mining Laws Investigating Commission, State of Illinois (1955-1957), and the Advisory Committee on Environmental Programs, Graduate College, University of Illinois (1969-1974). He also held an appointment as a Professor in the Department of Geology at the University of Illinois (1963-1974).

John was a member of the American Association for the Advancement of Science, the American Association of Petroleum Geologists, the American Geophysical Union, the American Institute of Mining, Metallurgical, and Petroleum Engineers, the Association of American State Geologists (editor 1956-1957, Secretary-Treasurer 1957-1958, Vice-President 1958-1959, President 1960-1961, and Honorary Member 1975-1982), the Geological Society of America (Councilor 1959-1961, Associate Editor 1962-1973, Executive Director 1974-1982), the Society of Economic Geologists, and the Society of Economic Paleontologists and Mineralogists (Vice-President 1965-1966).

When he retired from the Illinois State Geological Survey in 1974 John resigned from most of his public service activities. His new assignment as Executive Director of the Geological Society of America did not lessen his interest in public service, but rather permitted him to give service to geologists through the Geological Society of America.

His transfer from Kansas to Illinois only widened the scope of his personal research interest in the Pleistocene geology of the Midwest. The extensive program on the Pleistocene in Illinois had been based largely on field differentiation and geologic mapping. Under his direction it was expanded to include studies of the clays, carbonates, heavy minerals, radiocarbon dates, textural analyses, weathering characteristics, and mulluscan faunas. He strongly believed in the value of teamwork and, as shown in the accompanying bibliography, coauthored papers on many aspects of the program with George E. Ekblaw, Leon R. Follmer, Herbert D. Glass, John P. Kempton, H. B. Willman, and other of the Survey staff, with part-time Survey associates W. H. Johnson, A. Byron Leonard, and Paul R. Shaffer, and with other colleagues outside the Survey, notably Robert F. Black, Roger B. Morrison, Gerald M. Richmond, and Meyer Rubin.

An early study concerned the origin of the material called "gumbotil," which is widely present on the Illinoian and Kansan till plains and was interpreted as an in-situ soil. John's studies with Ekblaw, Glass, Shaffer, and Willman indicated that the gumbotil consisted of two materials, one a poorly drained, gleyed, in-situ soil, the other a deposit of slow accretion, largely slopewash, that accumulated in shallow depressions. The material cited as typical of gumbotil is largely of the latter origin. The material is not till, and the name "accretion-gley" was introduced for it in 1960.

John's interest in stratigraphic classification continued and resulted in several publications. With Gerald Richmond of the U.S. Geological Survey in 1957 he wrote on soils as stratigraphic units. With Willman and Swann a major change in the policy of the Illinois Geological Survey on stratigraphic classification was in-

troduced in 1958, three years before a similar code was published by the American Commission on Stratigraphic Nomenclature. The new policy used multiple classifications, each classification based on specific characteristics of rocks and each entirely independent. Where only three classifications had been used, it introduced six classifications and later two more were added. Although it carried the practice farther than has been followed by other states, or by the American Commission codes, individual classifications were used by others. The report received commendations from Europeans for presenting the American viewpoint on stratigraphic classification, which, at that time, differed strongly from European practice.

A study with Willman of the loesses along the Illinois and Mississippi Valleys and new radiocarbon dating of shells resulted in a major revision of the classification of the Wisconsinan Stage in 1960.

Although the new policy required significant changes throughout the stratigraphic column, major changes were required in classifying Pleistocene sediments, which had been differentiated somewhat indiscriminately on the basis of genesis and age. The complex glacial, water-laid, and wind-blown deposits were classified for the first time as rock-stratigraphic units — formations and members — based on characteristics similar, at least in principle, to such units in the bedrock. This work was published in a bulletin on the Pleistocene of Illinois with Willman in 1970 and has been widely used.

In addition, John, with Glass and Willman, took part in the study of the mineralogy of glacial tills and their weathering profiles, and with Byron Leonard on Pleistocene molluscan faunas and their environmental significance.

One of John's major interests was in environmental geology, a term coined in 1963 by James E. Hackett of the Illinois Survey. John viewed environmental geology as a means of focusing public and professional interest on the application of geology to the welfare of man. He enlarged on this subject in lectures and publications, and he established a publication series, "Environmental Geology Notes," in the Illinois Geological Survey. Environmental geology has become accepted world-wide as important to the life of all people, and many geological surveys have sections devoted to the subject.

In addition to his research activities at the Illinois Survey, John spent part of his vacations in Texas with Byron Leonard studying the physiographic history of the Red and Pecos Valleys for the Texas Bureau of Economic Geology and in New Mexico working with Leonard and Glass on the Pecos Valley for the New Mexico Bureau of Mines and Mineral Resources. The latter studies established caliche and clay mineral zonation of the Pliocene Ogallala Formation, differentiated the Ogallala from the Pleistocene sediments, and determined the westward limit of the Ogallala. The molluscan faunas indicated the environmental conditions during Ogallala time. John also held an appointment with the Desert Research Institute of the University of Nevada and served as a consultant on studies of Pleistocene sediments.

His unpublished works concern the terraces of the Pecos Valley in New Mexico (with Leonard and Glass), the possibility of glaciation and the origin of the geest in the Driftless Area of Northwestern Illinois (with Willman and Glass), and the stratigraphy of the loess and the Pleistocene history of the Lower Mississippi Valley (with Willman and Glass). Field work on these studies was completed before his death, and reports are in preparation for publication.

John gave to the Survey his very large collection of reprints, which has been

expanded by contributions from others of the staff and grows continuously. It has become particularly useful as a ready source of information on Pleistocene and late Tertiary stratigraphy, and on sedimentation, groundwater, and environmental subjects.

When John retired from the Illinois Geological Survey in 1974, he accepted the appointment as Executive Director of the Geological Society of America and moved to the headquarters at Boulder, Colorado. His appointment was extended two years beyond normal retirement, and after eight years service he retired in June 1982, only five months before his death. John is credited with a dramatic turnaround in the Society's financial health, with major advances in streamlining operations at headquarters, and with leadership in organizing and managing new society activities. The GSA Foundation was established and obtained funding for the Decade of North American Geology, a project to celebrate the Society's 1988 Centennial, for which he provided the initial leadership.

In the announcement of his death from GSA Headquarters, it was stated that "perhaps John's most important contribution to GSA was his ongoing effort to stimulate and encourage greater participation in the Society's affairs by the membership . . . . . The result of that effort has been new awareness among the membership of GSA's position and the role the Society must play in the future to best serve the geological sciences."

Despite the continuing demands of administration and public services, which started early in his career, John attained recognition as an outstanding, broadly informed scientist, and a specialist in the field of late Cenozoic, particularly Pleistocene, geology. He had, if effect, three contemporaneous careers, and he excelled in all because he was remarkably well organized, had an outstanding memory, seemed never to run out of energy, knew nearly everyone, and could write the first draft of a report while others were deciding where to begin.

Field work was his principal relaxation, but he did not neglect his administration responsibilities, often delaying a field trip or returning by air to attend a hastily called meeting. He led many field conferences; two of them, for the International Association for Quaternary Research Congress of 1966 at Boulder, Colorado, permitted him to display Illinois Pleistocene stratigraphy to geologists from many countries and resulted in a continuing exchange of ideas on intercontinental correlations.

John was particularly efficient in the field. Nearly always the first in the party to get his well-worn trench pick into the ground, he did more than his share of the physical work. He drilled an auger hole faster than most, and when it was particularly hard going could always make a few more inches, so he did most of the augering. He insisted on making adequate notes and sketches before leaving an exposure. Before turning in every night he called for a conference and then wrote a summary of the findings of that day.

John was not an early starter, but he used the day to the last glimmer of light, even when two hundred miles from home. Field time was precious, and he drove from locality to locality at the maximum rate car and highway could stand. Your first ride with him on a gravel road was a chilling experience, but you soon realized that he was a skillful driver, and survival was most likely. Oddly enough his most severe accident, although minor, occurred in a town when the car was standing still, waiting for a rushing fire truck to pass. Unfortunately, the driver of the car

coming behind had eyes only for the fire truck. John suffered the only injury, a very sore neck from the whiplash.

Only his close associates realized that John was somewhat timid about meeting people, a characteristic concealed by his friendly manner and his effective presentation of talks at meetings. He had a strong aversion to anything pretentious or self-promoting. Public plaudits were not his style. He appreciated and rewarded accomplishments and was generous in sharing the prestige of senior authorship. When he arrived as Chief of the Illinois Geological Survey, formality went out the door, to the consternation of some, the pleasure of many.

Dr. A. Byron Leonard, his close associate for many years, wrote an appreciative memorial of John for the Kansas Geological Survey entitled "A Better Friend Hath No Man," which expresses a deep regard that was clearly mutual, and was shared by many. His friends extend from coast to coast and to many countries.

John was a devotee of classical music. His principal hobby was photography, and he built equipment for his darkroom. He was attached, spiritually, to his cars, and, in his early days at the Survey, it was easy to believe that nothing could be seriously wrong with a man who was so devoted to an old Studebaker station wagon. John was a Mason, Rotarian, and a member of Sigma Xi, Sigma Gamma Epsilon, Alpha Sigma Phi, and the Cosmos Club of Washington, DC.

He and his wife, Ruth, were frequent and gracious entertainers, and an evening in their home was always a pleasant time with stimulating exchanges of ideas on current events as well as those of eons past.

After he retired from the Illinois Geological Survey John returned each summer, except his last, to continue field studies in Illinois. It was a particularly enjoyable time when Ruth accompanied him. John's intense dedication to his professional career came not only from the challenge of his opportunities but even more from strong devotion to his family.

John married Ruth L. Heizer, of Westerville, Ohio, his girlfriend of high school and college days in Marietta, in 1936. They had two daughters, Sally Jean Schwartzlose, of Evanston, Illinois, and Terri Ruth Toedter, of Riyadh, Saudi Arabia, and three grandchildren, all of whom survive. A son, John Douglas Frye, died in 1970.

In August of 1982 John enjoyed his usual field work in New Mexico with Byron Leonard and members of the New Mexico Bureau of Mines and Mineral Resources, and he seemed to be in normal good health. He was planning on going to the Geological Society of America meeting in early November, but he became ill only a few days before scheduled departure. An operation for all stones revealed an advanced stage of cancer. He lived only about two weeks afterward. His family was with him when he died at Boulder on November 12, 1982.

We wish that John could have had time for another career — retirement. He probably would have made a big project of it, with him doing most of the work. John certainly enjoyed his life. It was full enough for any man.

Many members of the staff of the Illinois State Geological Survey contributed to his memorial. Other memorials for John C. Frye include the following: William C. Ackermann, National Academy of Engineering, in press; Robert E. Bergstrom, State Geologists Journal, v. XXXXV, p. 54-55, 1983; and A. Byron Leonard, The Journal, Kansas Geological Survey, v. 5, no. 1, p. 6-8, 1983.

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DEDICATION

We wish to dedicate this volume to the late John Chapman Frye (1912-1982), formerly Chief of the Illinois State Geological Survey.