Arthur W. Sampson—Pioneer Range Scientist

Highlight

Arthur W. Sampson, internationally known range scientist, plant ecologist and professor of forestry, died of pneumonia in San Francisco, California, February 7, 1967. This brief biography by his former close friends, associates, and students is affectionately dedicated to his memory.

Portrait of the Man

KENNETH W. PARKER

Director, Range Management and Wildlife Habitat Research, Forest Service, U.S.D.A., Washington, D.C.

"Sammy," as he was affectionately called by his wife, students, and associates, was born March 27, 1884, in Oakland, Nebraska. There he received his primary and secondary education. He attended the University of Nebraska, receiving the B.S. degree in 1906 and the M.A. degree the following year. Additional post-graduate study was taken at Johns Hopkins University in 1914 and 1915, and George Washington University in 1917, where he was awarded the Ph.D. degree in Plant Ecology and Climatology.

Sammy started his professional career in 1907 as an assistant plant ecologist with the Forest Service, U.S. Department of Agriculture. His career in the Forest Service extended until 1922 when he accepted an appointment as Associate Professor of Forestry with the University of California at Berkeley. He became Professor in 1940. He served at this institution until the time of his death. Although retiring as Professor Emeritus in 1951, he maintained regular office hours thereafter. His last major research contribution of 1963 appeared more than a full half century after his first publication. He married a longtime sweetheart, Helen Rannells of Manhattan, Kansas, December 28, 1940—his only survivor.

Sammy had a wide range of interests—the natural sciences, people, humor, athletics; regardless of his interests, he was always among the front runners. At the University of Nebraska he won gold medals in 440, 880, and mile relay track events in 1904, 1905, 1906. Even after graduation he won medals in his specialty at meets at Walla Walla County Fair in 1908, George Washington University in 1909, Johns Hopkins University and Georgetown University in 1910.

His interest in physical fitness and athletics continued throughout his life. While Director of the Great Basin Experiment Station (1912-1922) he wrestled professionally at local County Fairs. At the Station headquarters as daily exercise Sammy is reported to have tossed a heavy medicine ball to the top of a 35-foot flagpole. He remained always an avid supporter of the "Cornhuskers" and the "Golden Bears," especially in track and football. Even in the off years of "poor Cal," he always had season tickets, attending both track and football events. While on his honeymoon, after a strenuous day afield, he left his bride with a former student, to rush to the nearest radio in Globe, Arizona, to hear a World's Championship Heavy Weight fight. Up until the time of his death he could hold his own with most anyone at horseshoes.

His sense of humor was great, but a "salty" story always had to have a point. He would often relate these stories with serious mien as a personal experience, much to the amazement and disbelief of the listener. He always had an anecdote in store for the campus policeman, the janitor, or whoever he thought might appreciate it.

The stories by or about Sammy are a legend among his former students and associates. As an example: He was so wrapped up in his teaching and research that he was inclined to be absentminded. His apartment was close enough so that he usually walked to his office. He once reported his car as being stolen from his garage and the police advised him it was parked on the street where he had left it, with seven overnight parking tickets!

Sammy had an intense interest in people, their personal lives, welfare, and future—regardless of race, creed, or color. To the janitor he was always a soft touch for a temporary loan, if it was repaid promptly. He was adept at finding jobs for the needy student, particularly those whom he considered should be encouraged to undertake post-graduate study. If he did not have the funds to hire the student he usually located another professor who did. Sometimes it was a "make work" nature, or arranging for a tutoring job—but always of benefit intellectually to the student.

Dr. Sampson was a distinguished and original investigator throughout his entire professional life. In his career with the Forest Service, as well as later with the University, he scored many "firsts" or near-firsts. Among these were: one of the first researchers to study grazing and watershed problems of the West, the first director of the Great Basin Experiment Station, the first to teach a regular and continuing course in range management, the first to publish a *standard* textbook on

range management; among the first to utilize lysimeters (Lowdermilk), grow grasses in phytometers in different soil horizons (Sinclair), grow grasses in nutrient solution to determine effect of various levels of defoliation (Parker), recommend research in U.S. on biological control of St. Johnswort or Klamath weed (Parker), and to study the movement of carbohydrates in range forage plants (McCarty).

During his later years, with the Forest Service, Sammy gave short courses in range management at the Universities of Nebraska, Syracuse, and Cornell. These assignments whetted his appetite for teaching, together with his continued interest in research, and led to his acceptance in 1922 of the teaching and research opportunities offered by the University of California.

Research with the Forest Service (1907-1921)

W. R. CHAPLINE

Former Chief, Division of Range Research, Forest Service, U.S.D.A., Washington, D.C.

At about the time Dr. Sampson completed his graduate work at the University of Nebraska, serious range problems were developing on the forest reserves of the West. In 1905 the forest reserves were transferred from the Department of the Interior to the Department of Agriculture and their administration as National Forests was initiated by consolidating them with the Bureau of Forestry to form the Forest Service.

Livestock numbers were at a peak; the livestock industry, accustomed to free range and having generally little knowledge of proper management, was firmly entrenched; feuds simmered between cattlemen and sheepmen and in between these groups the small homesteader was attempting to hold his own. Sheep grazing was considered by foresters as incompatible with timber reproduction. Much of the range was rapidly deteriorating and many watersheds were already in critical condition. Factual management information was urgently needed by Forest administrators.

Albert F. Potter, Chief of Grazing in the Forest Service, arranged with Dr. F. V. Coville, Botanist of the Bureau of Plant Industry, in 1907 for the selection of Sampson and James T. Jardine as Forest Service researchers to study urgent range problems in the mountains of eastern Oregon. Under Dr. Coville's cooperation and general guidance, and with Sampson's ecological and other botanical background, obtained from such professors as Dean Chas. E. Bessey of Nebraska, Sampson was well equipped to undertake the important studies assigned to him.

Sampson's studies furnished essential information for determining ways and means of using the forage consistent with the growth requirements of the vegetation. They led to understanding grazing values of the native plants, better seasons of grazing, and refinement of deferred and rotation systems of grazing. Studies were also made of reseeding deteriorated Oregon mountain meadows with cultivated forage plants. During 1911 the studies of reseeding mountain meadows were extended into other states and studies were undertaken, in cooperation with William A. Dayton, of the relation of grazing to timber reproduction on the Shasta National Forest in California.

When the Utah (later Great Basin) Experiment Station was established on the Wasatch Plateau of central Utah in 1912, Dr. Sampson became its first director and served as such until 1922. From a range standpoint, the aim of this Station was to make more fundamental studies of growth and efficient use of the range forage in relation to: sustained grazing capacity and improvement of depleted ranges, climate of the several elevation zones, erosion control and flood prevention, suitable seasons of grazing the different elevational zones, the influence of grazing on aspen reproduction (a major forest tree of the area), and the adverse effect of current heavy grazing of oak brush.

Sammy undertook research with vigor. With the aid of well-directed assistants[1], he developed important answers to these problems or carried them to the point where more conclusive answers could be obtained. He also developed a considerable understanding of range plants, their life history and forage value, and the plant succession process in its relation to range improvement and deterioration, especially on high mountain ranges.

He initiated the A and B watershed study on the Wasatch Plateau at the Great Basin Station in 1912. This paired watershed experiment was the first of its kind to demonstrate that herbaceous vegetation can profoundly affect storm runoff and erosion—a hydrologic fact that most livestock graziers, many engineers, and some foresters had been unwilling to accept.

Research activities relating to harvesting, regeneration, and establishment of forests through planting were conducted by forest associates, among whom were the late Frederick S. Baker, Dean, School of Forestry, University of California, and C. F. Korstian, Dean, School of Forestry, Duke University.

[1] *Chapline served as a grazing assistant under Sampson in 1913-1914.*

Establishment of a University Curriculum (1922-1932)

LLOYD W. SWIFT AND GEORGE W. CRADDOCK

Formerly Director, Division of Wildlife Management, Forest Service, U.S.D.A., Washington, D.C. and Asst. Director, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Dr. Sampson's selection in 1922 to teach in the forestry Division of the College of Agriculture on the Berkeley campus of the University of California proved to be a wise choice by the University; it was also a happy one for a host of students who came to know him as an inspiring teacher, an indefatigable researcher, and a truly lovable man.

First Range Class

Previous experience in research and in the classroom had prepared Sammy well for his first class at Berkeley. Some students in this initial group who were looking for easy credits felt that Sammy was overly prepared and had included too much material for the time allowed. This could well have been true, as Sammy was bursting with ideas and information gathered from his penetrating studies of range management and ecology, and was eager to share them with his students.

Sammy quickly made it clear that he intended to teach range management on a professional and "no-nonsense" basis, as is colorfully attested by one of his first students (Don Leidig):

> "As I recall, in 1922 some seven or eight seniors took Sammy's first course more or less as a lark and out of curiosity. We almost all had more units than we needed to graduate and four or five of us, who were full of pep, sat in the back row and were noisy. At the end of his lecture, he requested us to remain after class, and gave us a real going-over. When Sammy was angry, he reminded me of a coiled rattlesnake, until he grinned, and then it was like sun breaking through a Utah desert thundercloud. He told us he was not going to stand for any 'messing around' in class, but if we so desired he would show us off-campus that he could out-story tell, out-box, and, if necessary, out-party any of us. A couple of evening tours with Sammy in San Francisco nightspots proved he was not bragging. Needless to say, we few potential big-shot Forestry seniors ceased to be trouble and became close friends with this wonderful educator."

A Range Management Curriculum

Sammy didn't limit teaching to his first formal range class. He was aware of the urgent need in the U.S. Forest Service for trained range men. The hurdle for employment was the Junior Range Examiner examination, which at that time was a two-day written ordeal, occurring once a year. He persuaded seven or eight of his first class to point for this entrance test, and then helped them by providing many extra-hour seminars and tutoring on phases yet to be included in the forestry curriculum. All of this first group, and many others in succeeding years, passed this examination with qualifying grades. Such accomplishment further attests to the excellent training that Sammy initiated soon after he came to Berkeley.

Sammy firmly believed that range training should be supplemented by a good understanding of the physical, biological, and economic sciences that are related to the range resource. This philosophy was fully shared and encouraged by Professor Walter Mulford, then head of the Forestry Division, but not so enthusiastically by others on the forestry staff. However, through logical argument, persistence, and sometimes guileful persuasion, he won staff approval not only for additional specialized range courses but also for permission for range majors to substitute range-oriented electives in lieu of some of the traditional forestry courses.

To foster the broadening of range training, he also developed friendly and cooperative working relations with key people in other divisions, departments, and colleges on the Berkeley campus, and at the Agriculture Branch College in Davis. These contacts opened the door for many students in search of electives beyond the fields of forestry and range.

In 1926, Sammy was selected to serve as acting head of the Division of Forestry, while Professor Mulford was in Europe on sabbatical leave. When the Forestry Division won Department status, Sammy was put in charge of the first graduate conference or seminar course. This led to another first, namely, as a member of the committee to approve the first Ph.D. in forestry.

Research on California Rangelands

Along with his devotion to teaching and his constant interest in the individual student, Sammy maintained, in his first decade at Berkeley, a surprisingly high level of research production. He brought to Berkeley a wealth of information on range management and ecology, which he promptly assembled into three major textbooks. The first, *Range and Pasture Management*, was published in 1923; the second *Native American Forage Plants*, in 1924; and the third, *Livestock Husbandry on Range and Pasture*, in 1928. The three texts, each of over 400 pages, constituted the most authoritative and useful books written on range management. They were a boon to students and practitioners, and certainly enhanced the prestige of the Division of Forestry.

Sammy was not content with these early laurels; with characteristic zeal, he quickly launched a new program of research. He initiated studies on the complex association of annual grasses and forbs in California—many of which were introduced during the mission days from the Mediterranean area. He also began research on the ecology and management of brushlands (often referred to as chaparral). Brushland management problems provided Sampson a fertile field for research on such matters as reaction of native shrubs to fire, watershed protection, conversion to grassland, and relation to wildlife and commercial forests. Discussion of his findings with concerned professional and lay groups, and publication of current results not only enhanced his professional stature; but of greater importance, they stimulated interest and support for initiating a sound research program, including expanded graduate studies in the Forestry Division.

Sammy's importance to the forestry faculty and to the profession of range management became rooted during his first decade at the University. He quickly demonstrated consummate skill as a teacher of range science, and established his competence as a scientist in the fields of range management and ecology. But the importance of Sammy as a vital personality, imparting enthusiasm to his students for the subjects he taught, and serving as friend and teacher at the same time—these characteristics are for many individuals the lasting qualities that characterized his early years at the University, and marked him as a great friend and professor.

Teaching and Research at the University (1933-1950)

HUDSON G. REYNOLDS

Principal Wildlife Biologist, Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S.D.A., Tempe, Arizona.

Dr. Sampson amplified his prowess as a scholar, scientist, and educator during his mid-period at the University of California. By this time, range management problems in need of solution had matured in his mind. The problems that he considered worthy of intense research included: (1) carbohydrate assimilation and storage in relation to the developmental growth cycle of forage plants—particularly the regenerative spring growth period; (2) relative nutritional values of forage plants as a basis for better estimates of grazing capacity; (3) factors affecting palatability of forage plants; (4) effect of fire on: physical and chemical soil properties, soil nitrification, soil microflora and fauna, water regime (e.g. percolation and runoff) and rate of soil rebuilding in relation to the ecology and physiology of plant succession; (5) economic principles determining multiple use possibilities of range lands; (6) edaphic requirements and life-history characteristics of plants poisonous to livestock as a basis for developing control programs; (7) the relation of intensity of grazing to maintenance of a soil protective plant cover, the relative erosivity of soils in the different climatic regions, and how eroding areas might be reseeded and restored; and (8) areal and forage conflicts between game and livestock.

Some Research Results

Dr. Sampson contributed some knowledge to nearly every facet of his statement of range management problems. A few highlights of some of his findings are illustrative.

He was particularly concerned about the inconsistencies in the general *trends in the mineral constituents and organic contents of forage plants* with advancement of the growing season. By collecting his materials at phenological growth stages instead of chronological dates he was able to demonstrate an orderly decline in the crude protein, silica-free ash, calcium, phosphorus, and potassium from the earliest appearance of leaf blades to plant maturity; and an increase in percent of crude fiber in most grasses, grass-like and broad-leaved forage plants.

From intensive studies he found that undisturbed chaparral of northern California effectively protected the soil against serious erosion. The unfavorable *effects of soil erosion from burning* of such plant cover were found to vary with weather conditions, character of vegetation, kind of soil and topography, and the degree of grazing and trampling. Moreover, he demonstrated that the slight quantitative superiority of soil moisture values on freshly burned sites was of little ecological significance or economic importance.

Chaparral range improvement.—A final comprehensive ecological report of California chaparral studies was published in 1944. Among the conclusions he reached were : (1) Sprouting forms of chaparral are not killed by a single hot fire, but nonsprouting forms may be eliminated. (2) Forage increases from burning any chaparral are only temporary. In sprouting chaparral, increase in herbaceous growth practically disappears by about the fifth year; in areas of nonsprouting brush, forage increase lasts somewhat longer. (3) Attempts to improve grazing capacity of chaparral lands by burning should be confined to fairly level topography and deep productive soils and should be followed by conservative systems of grazing management.

Particularly frustrating to Dr. Sampson were his investigations in *dendrochronology*. In fact, he considered the entire discipline an "enigma." He courageously stated his case as follows:

> "Although tree-ring studies are interesting and may be limitedly useful in some studies, the claims of preperiod climatic interpretations are thus far unreliable, and, on the whole, unscientific."

A symposium of scientists, called by him in 1941 to discuss the subject largely confirmed his opinion.

Testimonial to Dr. Sampson's scholarship were major compilations on *stock poisoning plants* of California—a review of 116 publications on the subject; and the status of *plant indicators*—a compilation of 142 publications—in which he concluded that communities of plants are more reliable indicators than are individual species.

As an Educator

During the Depression years, students became much interested in job opportunities in the forestry profession. As a result, classes at the University of California were large. Sammy carried a heavy load during this period, teaching courses in forest ecology, and elementary and advanced range management; in addition, he conducted graduate seminars in forest ecology and range management. All of these classes were taught during one semester so that the alternate semester could be devoted entirely to research.

Sammy worked hard at teaching. He prepared carefully for every lecture, burning much "midnight oil." He expected his students to work as hard at learning as he did at teaching. Reading assignments were used liberally to amplify classroom presentations, and to encourage familiarity with scientific literature. If students learned little from his classes, it was their fault, not Sammy's!

His counseling of graduate students instilled his own intense scientific curiosity and research personality in them. As expressed by one student:

> "I will always treasure my association with Sammy. I consider myself among those fortunate enough to have sensed something of his spirit. What he taught me is insignificant beside the inspiration he provided to me. The will to do, to try, to never be satisfied with accomplishments of today, but always to seek to do better on the morrow is something that only comes from proper association. Sammy gave me this. For the gift, I will always be grateful."

His Educational Philosophy

Over the years, Dr. Sampson developed a broad philosophy of forestry education. He believed that a

range manager should be trained in several disciplines rather than a narrow specialty. His broad concept of a range management education is suggested by the subjects that he recommended for a curriculum, to wit: English, chemistry, mathematics, physics, geology, soils, botany, genetics, economics, zoology, engineering, sociology, philosophy, agronomy, and animal husbandry, besides range management and forestry. He contended that a sound scientific background would be more helpful to a student in future years than specialization in a narrow subject field. His statement of education was:

> ". . . a primary mission of a college education is to train students to think. The ability to think may best be acquired by a combination of formal training in philosophy and logic, with a goodly sprinkling of technical courses."

Sammy believed deeply in the education of youth. He was concerned that few schools in the United States below the collegiate level offered a formal course in the conservation of renewable land resources. He believed that failure to educate youth properly was a real obstacle to improved range land use. He thought that the teaching of conservation of rangelands should begin with 4-H and similar agricultural clubs in elementary and high schools and should culminate at the university level.

Dr. Sampson believed sincerely in scholarly pursuits. He was a member and loyal supporter of several honorary fraternities. Among these honoraries were: Phi Beta Kappa (liberal arts), Sigma Xi (scientific), Xi Sigma Pi (forestry), and Alpha Zeta (agriculture).

He was a strong believer in "salesmanship" of range management. He thought that range workers—particularly researchers—should be able to disseminate their findings clearly in the spoken and written word, to both lay and scientific audiences, and in both technical and popular style.

He insisted upon simplicity of expression whether in speaking or writing. To be able to speak and write easily and effectively was to him the mark of an educated man. His publications, expressed in a simple, direct and concise manner, are evidence that he took his own advice to heart.

Professor Emeritus Years (1951-1967)

DONALD R. CORNELIUS AND HAROLD H. BISWELL
Range Scientist, Agricultural Research Service, U.S.D.A., and Professor of Forestry, University of California, Berkeley.

Dr. Sampson's students and followers have carried the information, ideals, and principals of ecology and better range management throughout the United States and around the world in their responsibilities at many different universities, governmental agencies, and private enterprises. Many of his former students and others continued through his retirement years to correspond with and, if possible, to visit with him to obtain additional information as they encountered problems in their respective professional careers.

The improvement of range education became of great concern to him as the subject developed in more colleges and universities. In 1951 he surveyed the higher institutions offering courses in range management and reported on the educational status of the subject. A few years later he brought the survey up to date reporting on range management courses, curriculum requirements, and number of students at various institutions.

Research Contributions

Dr. Sampson continued to publish during professor emeritus years. These publications were highlighted by a comprehensive treatment of the California grasslands and range grasses in 1951 and of California range brushlands and browse plants in 1963. Much of California's range flora received ecologic and taxonomic treatment in these two publications. Both publications are widely used and highly valued as reference manuals.

His last textbook on range management was translated into several foreign languages including Spanish, Korean and Serbo-Croation. The English edition received world-wide distribution, brought him international recognition, and led to his participation in several international conferences and publications.

National and International Affairs

In 1948 he presented a paper on fire-forage relations at the Inter American Conference on Conservation of Renewable Natural Resources at Denver, Colorado. In 1949, at the United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, New York, he reviewed the application of ecological principals in determining condition of grazing lands. At the VI International Grasslands Congress at Pennsylvania State College in August 1952, he presented a paper and was vice-chairman of a section.

Dr. Sampson had considerable correspondence with international scientists. Many foreign students made special effort to take his courses. He accepted an overseas assignment in August 1952 to review experimental range for the University of Hawaii on the five largest islands; he lectured at the University of Hawaii and to livestock organizations on the various islands.

He held membership on the steering committee for the Mid-Century Conference on Resources for the Future of the Ford Foundation and helped plan the national meeting of that organization in 1952.

He accepted assignments with several federal agencies to study range conditions. The U.S. Forest Service appointed him in August 1955 to work with the Portland, Oregon office to rechart and rephotograph subalpine grassland plots established by him in 1908 in the Wallawa area.

He served as Consultant to the Bureau of Reclamation in determining the influence of construction of a dam on water relations in grazing lands nearby. He presented his suggestions for management of southern California brush watersheds at a hearing of the U.S. House of Representatives, Interior and Insular Affairs Committee.

Honors

Several high honors were bestowed upon Dr. Sampson during his retirement years. The Ecological Society

of America awarded him "Eminent Ecologist" in 1958. The American Forestry Association presented the 1958 Conservation award in the field of education to him "as the founder of the first school of range management in the world."

He was elected to the Board of Directors of the American Society of Range Management from 1949 through 1951. This Society awarded him a Certificate of Merit in 1957 commemorating more than 40 years of teaching, encouraging, and leading all citizens interested in the preservation and full production of the range resource of the United States.

The Society of American Foresters elected Dr. Sampson a fellow in 1959 in recognition of outstanding achievements in Forestry. The University of California Alumni Foresters elected him to honorary life membership for outstanding service in the field of forestry. Also, the University of Nebraska honored him with the Distinguished Service award.

Chronological Bibliography

HUDSON G. REYNOLDS

Dr. A. W. Sampson produced much scientific literature in the disciplines of plant ecology and range management. Scarcely a facet of rangeland science escaped his attention. Moreover, he popularized his research by publishing in lay journals. The experience of nearly 50 years of research and teaching was compiled in his last of four books, *Range Management — Principles and Practices*. This tremendous outpouring of investigations, analyses, and compilations should provide inspiration to all people with a desire to learn of the enlightened management of rangelands—based on sound physiological and ecological principles.

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