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ROSS AIKEN GORTNER

1885–1942

BY

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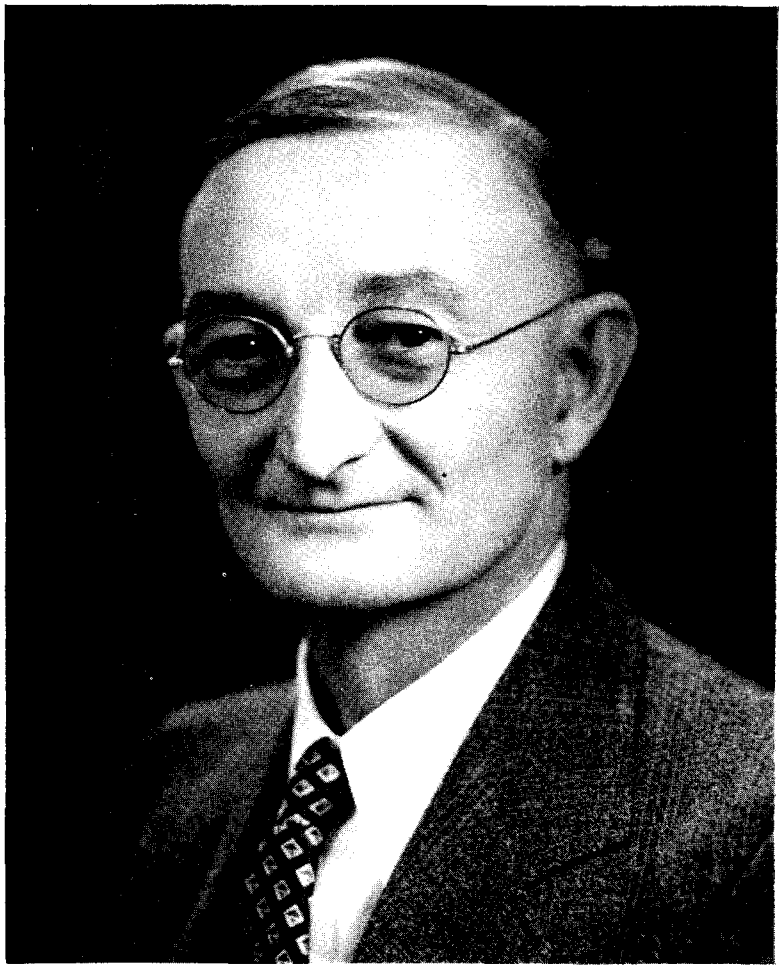

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ROSS AIKEN GORTNER

1885–1942

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Ross Aiken Gortner was born on his father's farm ten miles north of Ewing, Nebraska, March 20, 1885. George Gortner, his great great grandfather, was of Pennsylvania Dutch stock and was said to be the first white man to settle in Lycoming County, Pennsylvania, where he was killed by the Indians in 1778. Ross' father and mother, with their daughter, Lide Edith, a baby of only a few months, left Pennsylvania in 1868 and joined the western migration, settling in Hampshire, Illinois. Here two sons, Harley Dewitt and John Narver, were born, but Harley died in infancy. The pioneer spirit still persisted, and in 1882 the family moved farther west in a covered wagon and settled in Nebraska, where they homesteaded. At the time of Gortner's birth, his father was active as a Methodist minister. In this capacity he rode circuit each week, preaching Friday night, Saturday night, three times on Sunday, and Monday night. Most of the farm work devolved upon the mother, while the father was away on the circuit of sixty miles, which he covered part of the time on horseback and part in a two-wheeled cart.

This family life represented typical American pioneering of that period. According to Gortner's own statement, he was born "in a sod house". At the time it was built in 1883, it was the only sod house in that section of the country which could boast both a wooden floor and two windows with glass. It was looked upon in the neighborhood as an exceedingly luxurious abode. Later a frame house was built on the homestead which the family occupied.

When he reached the age of two and a half years, his father finished "proving up" on the homestead and enlisted as a Methodist missionary to go to Africa, taking with him his family consisting of his wife, young Gortner, and an older brother. They sailed in the fall of 1887 for "Garraway Station" approximately thirty miles up the coast west of Cape Palmas, Liberia. The

location of the station proved to be extremely unhealthy and later came to be known as "The white man's grave." After a few months his father and mother were stricken with "African fever", probably either malaria or yellow fever. His father died early in March 1888 while his mother was unconscious and the older brother so ill as to be unable to walk. His father was buried near the mission house in a rude casket made by tearing down a partition of the house. The family fell temporarily to the care of a Christian native during which period there was a gap of approximately six weeks in the family recollection. When his mother had recovered sufficiently to inquire about her son, no one knew where he was until he was found in the native village a mile from the mission where he had adopted the life of the native children and having learned to speak Kru fluently had more or less forgotten English. As soon as his mother was well enough, she returned with the two boys to the United States and rented a farmhouse in Holt County, Nebraska. The sod house in which he was born had been torn down for the lumber which it contained.

When Gortner was five years of age, the family moved to Evanston, Illinois, so that his brother, who was eleven years older, might study for the ministry, while he started in kindergarten. After he had finished the first grade in the public schools at Evanston, his brother became very ill and the family moved back to the homestead for a year's recuperation following which the family moved to Inman, Nebraska, where his brother had a pastorate for two years, then at Newman's Grove, Nebraska, for two years, and later at Osmond, Nebraska. Gortner attended public school at all of these places. Certainly his youthful education was very irregular and much interrupted.

When Gortner was in his early teens, his mother became very ill. They moved back to the homestead while she was completely bedridden. Gortner then did all of the housework and took complete care of his mother who gradually improved. He attended the country school terms during this period though not during the first year after their return to the homestead. When he was fourteen years old his mother realized the inadequacy of the rural schooling and following his father's

last wish "give the boys an education," he and his mother moved to Neligh, where he entered the seventh grade. They remained there three years by which time he completed the ninth grade. His mother then sold the homestead and purchased a house at University Place, Nebraska, close to the Nebraska Wesleyan University. Here he entered the preparatory school in the fall of 1902 which was closely affiliated with the college, so that he was able to take college work together with preparatory subjects for the Bachelor of Science degree which he received in June 1907. He thus completed three years of preparatory work and four years of college in a five-year period carrying as much as 25 credit hours most of the time. During the first three years of this time, his mother was almost entirely a bedridden invalid, and again the entire housework and her complete care fell upon him. He states there were three weeks at a time when he did not take his clothes off except for a bath or to change them, sleeping on a cot drawn across the door of his mother's room so that he could be at her side when needed. His lessons were prepared in the evening after the housework was done. Washing, bread baking, etc., were finished before he left for a 7:15 class. He had no time for outside activities and during the last two years of his mother's life, spent every evening at home. She died in June 1905 of pernicious anemia. This account of Gortner's early life and schooling reminds one of Abraham Lincoln's early life. Both illustrate typical pioneering spirit. Gortner was also a great reader. While there was no public library in the smaller towns and villages of Nebraska at that time, fortunately his father had left a rather extensive private library, and although many of these books were ecclesiastical, nevertheless, Gortner believed that he had read everything in his father's library with the exception of Caesar's Commentaries in Latin, which he tried to read, picking out one word at a time from the Latin dictionary, but finally gave it us as a hopeless task. Apparently Gortner never had any systematic training either in Latin or Greek.

Partly on account of defective eyesight, first recognized after he entered college and partly because of his mother's invalid-

ism, he was unable to enter into any of the usual boy's sports. He took his recreation in reading instead of play.

Evidently Gortner's preliminary education was obtained under the greatest difficulties, all of which he overcame by his will to accomplish and his unflagging enthusiasm which marked him throughout his later life.

Gortner's description of his first coming under the influence of Professor F. J. Alway with whom he was closely associated later at the University of Minnesota, and his choice of the field of chemistry is quoted as follows: "I had no particular objective in mind at the time I entered the Academy of Nebraska Wesleyan University. In this small school registration was carried out with all of the faculty assembled in the library, each student going to each specific faculty member to ask for permission to register for specific courses. When I matriculated in the fall of 1902, I had a hazy idea that chemistry might be interesting and approached Professor F. J. Alway and asked him what chemistry was like. I shall never forget how he looked up at me, smiled and replied, 'If you stick at it long enough, some day you will be able to do something that no one ever did before.' Then and there I resolved to try to be a chemist."

Even in his undergraduate career, Gortner developed a taste for research and published two papers giving the results of experimental investigations within three years after he came to know Dr. Alway. During his undergraduate years, Gortner gradually worked up to be one of the recognized assistants in chemistry. In return for his services, he received free tuition and laboratory fees. His duties consisted of the care of the stockroom, and, as he says, "the winding up of the windlass which lifted the large drum of rock which in turn acted as a weight and operated the gasoline-gas machine which provided gas for the laboratories." Even under these conditions, all of the assistants were encouraged to carry on research. In 1904 Gortner had his first introduction to organic chemistry. In 1905 his second research paper was published jointly with Dr. Alway in the *Berichte der deutschen chemischen Geschellschaft,* 38: 1899-1901 (May, 1905). He

was so thrilled by the logic of the science of organic chemistry that he resolved to become an organic chemist. During the year 1905-06 he worked practically all of the organic syntheses in Gattermann's "Practical Methods of Organic Chemistry."

He went with Dr. Alway to the Nebraska Agricultural Experiment Station in the fall of 1906 as research assistant, a half-time position that paid fifteen dollars a month. In the remaining half-time, he completed the work for the Bachelor of Science degree at Nebraska Wesleyan University.

Upon graduation he was appointed to a scholarship at the University of California, but resigned to accept the position as assistant in chemistry at the University of Toronto where he worked under the late Dr. W. Lash Miller during 1907-08, and received the Master of Arts degree in June 1908. During his stay with Lash Miller, he gained a training in the field of physical chemistry which stood him in good stead for the rest of his career. In the spring of 1908 he applied for and received appointment as University Fellow at Columbia University where he took a major in organic chemistry under Professor Marston T. Bogert, a minor in physical chemistry under Professor J. Livingston Morgan, and biological chemistry under professor W. J. Gies. He thus rounded out his training both in the field of organic and of physical chemistry and had an unusual preparation to combine the two in his future studies and in their application, including colloid chemistry, to the problems of biological chemistry. During the summers of 1907-08-09 he held full-time positions as research assistant under Dr. Alway at the Nebraska Agricultural Experiment Station. He received his doctorate in June 1909 at Columbia. Shortly before completion of his work he was recommended for a position in the Station for Experimental Evolution of the Carnegie Institution of Washington at Cold Spring Harbor, Long Island, in spite of the fact, as he says, that he never had a formal lecture in biological chemistry. He accepted the position and began work at Cold Spring Harbor on September 1, 1909. He states that he never told Dr. Davenport why he could not begin earlier, but the fact was that he wished to get hold of a good text of biological chemistry and find out what the

subject was about. Besides this preoccupation, he also acted in the summer of 1909 as research assistant with Dr. Alway and read biological chemistry in the evening. He married Catherine Victoria Willis, of Dorchester, Nebraska, on August 4th.

Gortner remained five years in a research capacity in the Carnegie Institution at Cold Spring Harbor. All of his associates were biologists. In the beginning he knew little or no biology. These five years, therefore, gave him an invaluable postgraduate training in that field. During this period he first became associated with Dr. J. Arthur Harris. He also valued highly his associations with Dr. A. M. Banta, Dr. C. B. Davenport, Dr. H. D. Goodale, and Dr. A. F. Blakeslee. Gortner states that this period of association at Cold Spring Harbor made up for much of the inadequacies in his undergraduate preparation. He soon came to realize that his future interest would lie in the field of biological chemistry rather than in synthetic organic chemistry.

Late in 1914 he was offered an associate professorship of soils at the University of Minnesota where Dr. Alway had gone as head of the Division of Soils, a position which he held until his retirement in 1942. Dr. Harris strongly urged that he accept, believing that it would be an advantage for him to come in contact with student thought, which opportunity was not available at Cold Spring Harbor. He entered his new duties on August 1, 1914, and remained for two years as Associate Professor in the Division of Soils. During this time he became associated with Professor R. W. Thatcher who was Chief of the Division of Agricultural Biochemistry. Later with Dr. Alway's consent, Dr. Gortner transferred to that division. A year later Dr. Thatcher was made Director of the Department of Agriculture at the University of Minnesota and Gortner was promoted to a full professorship and was made Chief of the Division of Agricultural Biochemistry which position he held until his death in 1942.

Gortner states that at the time when he became Chief of the Division of Agricultural Biochemistry in August 1917, the University of Minnesota was just emerging from the status of one of a number of state universities to one of the larger

of the American universities. The graduate school was just beginning. It developed subsequently under the leadership of Guy Stanton Ford as Dean of the Graduate School who became Acting President in 1937, and President in 1938. The first doctorate in biochemistry was conferred in June 1915. In the early days of the Graduate School nearly all of the students were subsidized by assistantships or fellowships which was also true of graduate students in agricultural biochemistry. Later Gortner attracted more and more graduate students from all over the world. In 1927 a special building was constructed on the Agricultural College campus to house agricultural biochemistry. It was planned to accommodate thirty-five graduate students. Before Gortner's death more than twice this number had to be accommodated to take care of those who came to him from all parts of the world.

Besides his unusually good training for the field to which he contributed so much, Gortner bore a personal spirit of enthusiasm and a universal interest for scientific knowledge and research which was in my opinion the real secret of his great success. He was a great teacher. His students were devoted to him and he was devoted to his students. He collected about him a very able staff of associates in carrying on the work of his division. He maintained a personal library and a reprint file which was open to all of his students and which provided a most valuable center of research facilities.

One of Gortner's most outstanding contributions to the field of biochemistry was his "Outlines of Biochemistry," a work of about 1,000 pages, the first edition of which appeared in 1929, the second in 1938. In his treatment he cut loose from any restrictions of specialization or application and gave himself widest range over the entire realm of biochemistry. Here he could bring to bear his remarkable knowledge of organic, physical, colloidal and physiological chemistry to produce a remarkable treatise useful alike to all specialists in the fields of biology, physiology and medicine.

The book was received with universal approval. Professor Wilder D. Bancroft stated in his review in the Journal of Physical Chemistry, "It is a pleasure to come across a book

occasionally, which is written because the man knows his subject."

The British Medical Journal stated:

"Professor Gortner's book presents, as no other single book has done, a measure of the contribution of organic and of physical chemistry to the problems of vital processes. . . . It is the book of biological chemistry. . . . The general biological outlook of the book has permitted the assembly of a great deal of valuable material not elsewhere collected in one place. The author exercises wise discretion in the presentation of theories and in the balancing of conflicting views. The text is liberally annotated with references to the original literature. This book may be strongly recommended to students in all branches of pure or applied biochemistry."

William Seifritz, in his review in Science, stated:

"The success of the application of physics and chemistry to biology depends upon two conditions: first, the ability of the biologist to master physics and chemistry and yet remain a biologist, and second, the willingness of the physicist and the chemist to cooperate sympathetically with the biologist. Professor Ross Aiken Gortner is an outstanding example of the fulfilment of the first condition. In reading his 'Outlines of Biochemistry,' it would be difficult to say whether Professor Gortner is biologist or chemist. He speaks to both in their own language, an attribute which few possess."

The last section of his "Outlines" is entitled "The Biocatalysts," which in the first edition included only the vitamins and the enzymes. In the second edition a chapter on hormones is added and that on vitamins greatly extended by addition of the new discoveries of their chemical composition and synthesis.

Probably no field of chemistry will change more in the next hundred years than biochemistry. But Gortner's "Outlines" will remain a landmark recording accurately its status and greatest progress in 1938.

His chemical library and his reprint files were presented to the University of Minnesota and will be retained in his institute for agricultural biochemistry. The collection of reprints will be known as the "Gortner Collection of Separates." This together with a similar collection presented to the Uni-

versity by the late Professor Herbert Freundlich, constitute a most valuable collection of literature in the field of colloids and biochemistry. At Gortner's request certain of his files of journals, such as are already represented in the University library, will be presented later to "a reconstructed Chinese university." His chemical library was donated by his sons, Dr. Ross Aiken Gortner, Jr., and Dr. Willis Alway Gortner. The collection of separates was bequeathed by will to the University of Minnesota.

Although Dr. Gortner never worked in a European laboratory, nor even visited Europe, he developed a research organization with all the spirit and charcteristics of the best European institutes. He was well known to all the leaders in colloid chemistry and biochemistry in the world. Those of them who visited Minnesota, expressed highest appreciation of his contributions and eagerly sought him out for personal contact.

Many honors came to Dr. Gortner during his long and productive career. He was Wisconsin Alumni Foundation Lecturer in 1930, Priestly Lecturer at Pennsylvania State College in 1934, and George Fisher Baker Lecturer at Cornell University for the fall semester of the academic year 1935-36. The Cornell lectures were published in a volume entitled, "Selected Topics in Colloid Chemistry." The honorary degree of Doctor of Science was conferred on him by Lawrence College in 1932. He was president of the American Society of Naturalists in 1932, president of Sigma Xi in 1941, and president of Phi Lamda Upsilon from 1921-26. He served on several committees of the National Research Council, and in 1942 was awarded the Thomas Burr Osborne Medal by the Association of Cereal Chemists. Upon the recommendation of the division of chemistry, Gortner was elected a member of the National Academy of Sciences in April, 1935.

On August 1, 1942, he completed twenty-five years as Chief of the Division of Agricultural Biochemistry. A testimonial dinner had been planned for October 2, 1942, at which he was to have been presented with a bound volume of more than two hundred letters from his former associates, colleagues, and

graduate students. Instead of this happy celebration, fate made it the day of his funeral. He never saw the volume, but it remains as a testimonial of affection and regard of all of those who had worked with him.

In his research and teaching, Gortner adopted and steadfastly held to the principle that if the fundamental phenomena are known and understood, the technological application can be made with greater exactness and certainty.

The number and variety of Dr. Gortner's scientific contributions, more than 300, attests to his wide research interests. The papers may be grouped into about a dozen major fields to which most of his work was directed. They include a study of melanin, the chemistry of embryonic growth, physicochemical properties of vegetable saps, the humin fraction in protein hydrolysates, the organic matter of soil, the chemical and colloidal properties of flour proteins, sulfur in proteins, physicochemical studies on proteins, electrokinetics of colloidal systems, interfacial energy and the molecular structure of organic compounds, the role of water in living processes, the chemistry of wood and of the pulping process. At the time of his death he was engaged in a joint research with Dr. Alway on a comprehensive study of the sulfur metabolism of plants. So varied were his interests that his influence was felt in the research of almost every field of agricultural science.

At the same time, however, that he conducted his researches with so much ability and distinction, he was active in many of the more general interests of the University. He served on many important committees in the Department of Agriculture and in the University. At an early date he became chairman of the Graduate Group Committee for Agriculture in the Graduate School. In this capacity he rendered invaluable service to Dean Ford who perhaps had a more thorough appreciation of his gifted service than anyone else not professionally associated with him.

He also found time to interest himself in such subjects as secondary education. This was brought more forcibly to his attention by the fact that he had two sons and two daughters, who were educated in the public schools of Minne-

sota before entering the University. He acted as chairman of a committee of the American Chemical Society to collect data in the State of Minnesota on the training and preparation of teachers of chemistry in the public schools. His interest in this subject was unabated until his untimely death. Both of Gortner's sons, Ross Aiken, Jr., and Willis Alway have chosen scientific careers. Ross Aiken Gortner, Jr., after taking his Ph.D. degree at the University of Michigan, holds a position as Assistant Professor at Wesleyan University, Middletown, Connecticut, but is now detailed for war service in Washington on the Food and Nutrition Board of the National Research Council. The second son, Willis, who received his Ph.D. from the University of Rochester in 1940, is an Assistant Professor in the School of Nutrition, Cornell University, Ithaca, New York.

His daughters Elora Gortner Page and Alice Gortner Johnson are both married and live in St. Paul. There are seven grandchildren in the four families. All four of Gortner's children were by his first wife who died in March 1930. In 1931 he married Rachel Rude who had served him for many years as secretary. This union proved most suitable and happy, blessing his later years particularly after he was seriously stricken with coronary thrombosis.

The summer of 1938 was spent by Gortner, his wife, and daughter Alice in Hawaii where Gortner served as consultant to the Sugar Planters Experiment Station of which Dr. Harold Lyons was director. Here he renewed an acquaintanceship of long standing with Dr. Royal Chapman who later became Dean of the Graduate School of the University of Minnesota, which position he held until his death. While in Hawaii Gortner was first stricken with what he failed to recognize as a very serious heart attack. He misjudged it to be indigestion and thought to overcome it by such outdoor exercise as swimming, mountain climbing, and deep-sea fishing. He later told me that he regarded it as a most fortunate circumstance that a large, deep-sea fish which he had hooked managed to break away after a struggle of a half an hour. Had he been compelled to hang on much longer for the capture he believed he might

have lost his life on that occasion. It was not until he returned to Minneapolis in the fall of 1938, that his ailment was diagnosed as coronary thrombosis. The peak of the attack had already passed, probably while he was in Hawaii. His condition was found to be quite serious. He was never given any great hope of long survival. After several months of complete rest he was able to return to partial duties and gradually recovered to a point where he again directed the research activities of his laboratory and performed all of his usual daytime duties. He realized that his days were numbered. A few months before his death he told me that he thought he might go on for several years or he might go off suddenly at any moment. He never let this thought disturb him. He proceeded with his daily duties and kept up all his activities with enthusiasm unabated. He died almost literally in the harness, as he had wished. The end came suddenly on September 30, 1942, after he had been forced by one or two severe attacks to be hospitalized for a few days. Thus came to an untimely close a life devoted to science with all the energy and enthusiasm with which it was so richly endowed.

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KEY TO ABBREVIATIONS USED IN BIBLIOGRAPHY

Amer. Chem. Jour. = American Chemical Journal
Amer. Jour. Bot. = American Journal of Botany
Amer. Jour. Physiol. = American Journal of Physiology
Amer. Nat. = American Naturalist
Amer. Sci. = American Scientist
Ann. Int. Med. = Annals of Internal Medicine
Ann. Rev. Biochem. = Annual Review of Biochemistry
Ber. deut. chem. Ges. = Berichte der deutschen chemischen Geschellschaft
Biochem. Bull. = Biochemical Bulletin
Biol. Abstr. = Biological Abstracts
Biol. Bull. = Biological Bulletin
Bot. Gaz. = Botanical Gazette
Bull. Soc. Chim. (France) = Bulletin Société chimique de France
Bull. Torrey Bot. Club = Bulletin, Torrey Botanical Club
Cereal Chem. = Cereal Chemistry
Chem. Bull. = Chemical Bulletin
Chem. Met. Eng. = Chemical and Metallurgical Engineering
Ind. Eng. Chem. = Industrial and Engineering Chemistry
Jour. Agr. Res. = Journal of Agricultural Research
Jour. Amer. Chem. Soc. = Journal, American Chemical Society
Jour. Amer. Med. Assoc. = Journal, American Medical Association
Jour. Amer. Soc. Agronomy = Journal, American Society of Agronomy
Jour. Biol. Chem. = Journal of Biological Chemistry
Jour. Chem. Educ. = Journal of Chemical Education
Jour. Dairy Sci. = Journal of Dairy Science
Jour. Exper. Zool. = Journal of Experimental Zoology
Jour. Gen. Physiol. = Journal of General Physiology
Jour. Home Economics = Journal of Home Economics
Jour. Ind. Eng. Chem. = Journal of Industrial and Engineering Chemistry
Jour. London Chem. Soc. = Journal, London Chemical Society
Jour. Organic Chem. = Journal of Organic Chemistry
Jour. Phys. Chem. = Journal of Physical Chemistry
Ohio Nat. = Ohio Naturalist
Physiol. Res. = Physiological Researches
Phys. Rev. = Physical Review
Proc. Nat. Acad. Sci. = Proceedings, National Academy of Sciences
Proc. Soc. Exper. Biol. Med. = Proceedings, Society for Experimental Biology and Medicine
Proc. U. S. Nat. Mus. = Proceedings, United States National Museum
Rev. Sci. Instr. = Review of Scientific Instruments
School and Soc. = School and Society

Sci. Mo. = Scientific Monthly
Trans. Chem. Soc. (London) = Transactions, Chemical Society of London
Trans. Faraday Soc. = Transactions, Faraday Society

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Joint Editor of two volumes. See under 1934 and 1936 in above bibliography.

EDITORIAL POSITIONS

At various times, R. A. Gortner has served as associate editor of the Journal of the American Chemical Society, of the Journal of Physical Chemistry, and for a long period of years as assistant editor of Chemical Abstracts.