NATIONAL ACADEMY OF SCIENCES

# RICHARD JOEL RUSSELL

*1895—1971*

*A Biographical Memoir by*

CHARLES A. ANDERSON



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Richard B. Russell

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BY CHARLES A. ANDERSON

RICHARD JOEL RUSSELL had an outstanding career in the earth sciences. He began with undergraduate work in forestry and vertebrate paleontology, followed by graduate studies in petrography and structural geology at the same time that he was teaching elementary geography. His subsequent professional activities ranged from work in climatology and geomorphology to the careful examination of the Mississippi River Delta and worldwide beach studies. He had the honor of serving as president of the Association of American Geographers (1948) and of the Geological Society of America (1957). He was a member of the faculty of Louisiana State University for forty-three years, dean of the Graduate School for thirteen years, and founder and director for seventeen years of the Coastal Studies Institute.

Richard was proud of his Scottish ancestry; it could be traced back to Robert Russell, one of the early settlers in New England and the first person to be buried in the old "South" cemetery at Andover, Massachusetts. Richard's grandfather, Joel Russell, sailed from Bangor, Maine, landing in San Francisco on January 4, 1850. After two years of gold mining in northern California, he obtained land on San Francisco Bay near Hayward and became a Superior Court judge in Alameda County. Richard's grandmother, Carrie Bartlett, came from Old Town,

Maine, by way of Panama to teach Latin in an elementary school near Hayward. Richard's father, Frederick James, was born on August 7, 1867.

Richard's maternal grandmother, Martha Brennan, a widow with three daughters, sailed from New England in 1870 via Panama to San Francisco to marry a childhood sweetheart named Morril, and the family home was established in Alameda. The youngest daughter, Nellie Potter Morril, was the mother of Richard Joel Russell, who was born in Hayward, California, November 16, 1895.

Richard's father had graduated from Hastings College of Law but he always considered that his mother had forced him into a disdainful career. Because Richard's mother had a strong desire to move away from a domineering mother-in-law, the family had an auction of personal effects in early 1899, and arranged a passage to Honolulu on a three-masted schooner. The father obtained a temporary job in the Customs House, but was soon given a desk in a law office. Being an excellent linguist, he quickly mastered Cantonese and acquired a large share of the Chinese law practice in the Hawaiian Islands. On the death of his mother in 1902, Frederick Russell returned to the Hayward area in order to assume responsibility of handling his share of the estate.

Richard's early education was not orthodox. Two years were spent at Punahou kindergarten rather than in grammar school because his mother admired the teachers. On the return to California, Richard was enrolled in a private school in Oakland, California, where he was taught a little German. The next experiment was enrollment in Dixon's Business College, where at the age of nine, he learned to write Gregg shorthand and mastered the touch system on a Smith Premier typewriter. The next move was to Alameda because his mother knew the second-grade teacher. He spent a few days in that grade and within a month was active in the fifth grade. The next move

was back to Hayward where his mother knew the sixth grade teacher. From then through high school, his education became more regular.

By the time Richard had reached the eighth grade, the family moved to the "ranch," the original land acquired by his grandfather. Richard had the responsibility of breaking the ranch horses, both to saddle and harness, and he rode horseback to school as well as to many camp sites. Other farm chores involved milking cows, which were acquired in growing numbers and left little time for school until his father hired a Swiss milker. About this time, his father began to acquire automobiles; but Richard's first love was a rubber-tired buggy and Ruby, a Thoroughbred of Stanford stock. By the time Richard was fifteen years old, he had learned to drive an automobile and later won a county fair dirt track race, in which he averaged sixty miles per hour for twenty-five miles.

Hayward High School with an enrollment of about one hundred students and a staff of five teachers, offered a classical education. The athletic program was so small that Richard served as track captain for four years and won letters each year in football (rugby). In addition to ranch chores, athletic activities, and studies, Richard built up a business as a professional photographer, handling all of the commercial work for Hayward's three drug stores and taking pictures of houses for rent or sale by real estate agents. Income from this activity as well as from available temporary jobs permitted him to carry on experiments in color photography.

At the completion of high school in 1914, Russell had no desire to enroll in college. Instead, he spent about a year working in lumber yards where he designed small structures such as barns and chicken houses, made step ladders and baseball bats, and replaced window panes. While on a hunting trip in the Coast Ranges, a forest supervisor aroused Richard's interest for an outdoor career in forestry, which resulted in

his enrollment in the College of Agriculture at the University of California (Berkeley) in 1915. In his sophomore year he took a required course in geology that stimulated him to take additional geology courses with the reluctant permission of his advisor in forestry.

Richard, one of the earliest students to be drafted for service in World War I, was discharged immediately for physical disability; he had a crooked left arm that had resulted from a compound fracture of the elbow that had been set incorrectly. After futile attempts to enlist in several military units, he was finally accepted in the naval reserve, where he was trained as a gunner's mate for assignment in the Merchant Marine. Although no openings were immediately available, he was finally accepted in the officer's class and commissioned ensign to teach seamanship and gunnery.

At the conclusion of World War I, Richard returned to the University of California, selected vertebrate paleontology as a major under John C. Merriam, and graduated with honors in 1920. In the summers of 1919 and 1920, he accompanied Chester Stock in collecting vertebrate fossils in Nevada and Oregon. After graduation, he had a choice of a graduate teaching fellowship in geography or in geology: He accepted the former because it involved only five quiz sections per week; the geology fellowship involved fifteen hours a week with the class in mineralogy. During the first year of Richard's teaching fellowship in geography, Professor Ruliff S. Holway became incapacitated and Richard had to take part of Holway's teaching assignments. He had taken almost no courses in geography and he had to learn as he taught. In 1923, Carl O. Sauer succeeded Professor Holway and Richard was advanced to the rank of Associate. He instructed large classes in elementary geography as well as a course in the geography of California and various courses in geomorphology. In 1920, John C. Merriam became president of the Carnegie Institution and Richard changed his

major to petrography and structural geology under George D. Louderback. In 1926 he completed his Ph.D. thesis, "Basin Range Structure and Stratigraphy of the Warner Range, Northeastern California."

Richard Russell had definite convictions that new Ph.D.'s should not remain on the faculty of their alma mater; thus, in 1926, he accepted the position of Associate Professor of Geology at Texas Technological College at Lubbock. There he found that his personal library was larger than the school's geologic library and that his research activities were curtailed by a heavy teaching load. On the positive side, he found plant leaves and vertebrate teeth in nearby Permian and Triassic beds and he encouraged one of his able students to study paleobotany. He found the Carlsbad Caverns a fascinating place for geological observations, and trips to the Colorado Rockies sparked an interest in nivation and solifluction. Because his "Climates of California" (1926) had attracted considerable favorable comment, he used much of his spare time in Lubbock to compile the "Dry Climates of the United States" (1931), which emphasized frequency of median values as more significant than classification based on averages.

Henry V. Howe, an old friend during graduate school days at Berkeley, had started a department of geology at Louisiana State University in 1922 and he persuaded the LSU administration that Russell was needed to develop the field of geography. Richard was delighted at this opportunity, and in September 1928, he arrived in Baton Rouge where he spent the remainder of his professional career. Although he had many invitations to consider transfer to other institutions, he was supremely happy at LSU. He and Howe made a remarkable team and together built a major school of geology and geography. They were particularly proud of the modern university library that grew from two hundred thousand to well over one million volumes. Richard was gratified with the growth of the Department of

Geography, particularly in graduate studies and research. The establishment of the Louisiana Department of Conservation with its series of geology bulletins provided publication facilities for many of the studies of the Mississippi River Delta. Richard enjoyed the interdepartmental freedom at LSU; one could be a professor of geography yet teach structural geology and serve as a major professor for doctoral candidates in either geology or geography. Furthermore, research support was generous and the physical facilities excellent.

Russell's introduction to land forms was at Hayward High School where he had a course in physical geography based on a textbook written by William Morris Davis, and his first class in geography at Berkeley was strictly Davisian physiography. When Richard was a teaching assistant in geography in 1921, he selected the Donaldsonville, Louisiana, quadrangle as an example of "old age" topography, produced after the mountains and hills had worn away and the river wandered aimlessly on its floodplain. In 1925, Richard participated in a seminar given by Davis at Berkeley, and he became very critical of the Davisian methods of explanatory description of land forms based on superficial observations that were subjected to deductive methods. In Russell's fieldwork in the Warner Range, he used deductive methods during his first field trips but found that the fundamental structural features of the range history came as the result of good honest inductive study. This was not surprising as Russell was a protégé of George D. Louderback who counseled his students to keep open minds and to collect field data diligently before arriving at final conclusions. Carl O. Sauer had appreciable influence on Richard in emphasizing that points of view differing from those of Davis must be considered; in the summer of 1928 Russell participated with Albrecht Penck in field trips to many parts of California with particular emphasis on alpine land forms in the Sierra Nevada. That same summer, Richard met Davis again in Berkeley, and

he later admitted that Davis did have a clear head and keen mind, but that the Davis methods of deduction were like chess—worthwhile, if one enjoys it.

After Russell moved to Louisiana, Davis asked him to "try and find out why the Mississippi River follows such a straight course below New Orleans." In later years, Richard reminisced that this request from an old friend was an important reason for starting serious studies on the floodplain and delta of the lower Mississippi River. The fact that Davis asked this specific question illustrated that even though he was old in years, he posed interesting and imaginative problems—and yearned for their solutions. It was some years later that the question was answered ["Aspects of Alluvial Morphology" (1957)] when subsurface data of the lower delta were available. The Mississippi River is comparatively straight below New Orleans because the channel is fixed in clay that was deposited ahead of an earlier delta some 4000 years ago; the present Mississippi River has been unable to scour its bed and therefore does not meander.

Russell's first paper described horizontal offsets along the Hayward fault, which was cited thirty years later in the U.S. Geological Survey's publication covering the Hayward quadrangle. (Richard was delighted to note that he could identify the house where he was born on the geologic map.) Many of his early papers dealt with climatology and, much to his surprise, these contributions were read widely. In 1931, while attending the International Geographical Congress in Paris, he discovered that he was considered a famous climatologist. Russell had written these papers more as a pleasant hobby involving little effort, but in five successive years he was offered a senior chair of climatology in the United States. He wanted to be a geomorphologist and did not believe he was prepared to accept a chair in his hobby field. In contrast, he was disappointed that little attention seemed to have been given to his

early contributions to geomorphology; in 1937, however, he was given the first Wallace A. Atwood Award by the Association of American Geographers because of the publication of the "Physiography of the Lower Mississippi River Delta" (1936). This scholarly and comprehensive report clearly established Russell as one of the leading geomorphologists in America.

In 1928 serious geologic studies of the Mississippi River Delta were made possible by the availability of new topographic quadrangle maps and aerial photographs. At first the delta seemed flat and uninteresting to Richard after field studies in California and the Great Basin. In 1929, Fred Kniffen came to Louisiana State University from the University of California (Berkeley) with an excellent background in anthropology and geomorphology, and he and Russell started searching the swamps and coastal waters for Indian artifacts to establish dates. One memorable trip involved a visit to Larto Lake in central Louisiana, resulting in the proposal that this lake was a remnant channel of the Mississippi River miles from its present location.

"Physiography of the Lower Mississippi River Delta" was one of several contributions on delta studies published by the Louisiana Department of Conservation in which a combination of geomorphological, archeological and botanical reports were combined in a single bulletin. Russell's discussion in the 1936 publication emphasized the concept that the weight of the sedimentary deposits of successive deltas caused local downwarping of the earth's crust, thus developing a geosyncline. The physiography of the delta is characterized by dominant natural levees that form the high land; the gentle slopes of the natural levees lead away from the river to marshes, swamps, and open waters. Upstream, the floodplains have tributaries; downstream, the deltas have distributaries and abandoned channels that have been downtilted in the direction of the distal parts of old deltas. Meanders are present only on the floodplains where the channels encounter material deposited during the same cycle of

alluviation and where the banks are lined by natural levees. He emphasized that the bottoms of large lakes are uniformly hard sand whereas those of small lakes are silty or oozy.

During the 1930s when petroleum resources of Louisiana required new appraisals of property values, remote and hardly used swamp and marshlands suddenly became valuable and questions arose about ownership. The state had title to navigable waterways as of the date of its admittance to the Union in 1812, and many titles hinged on the boundaries of water bodies at that time. Russell's noneconomic fieldwork in alluvial morphology focussed attention on him as having the best background to serve as an expert witness in the various land-title lawsuits. He and Henry Howe presented evidence that won state title to extensive waterbodies in southwestern Louisiana. One by-product of this activity was the addition of the term "chenier" (ridge of sand) to the terminology of geomorphology; it appeared in a geological bulletin (No. 6), published in 1935, on Cameron and Vermilion parishes. Another was a succession of other investigations for legal purposes, resulting in fees that in some years exceeded Russell's university salary.

Russell regarded the field experience in preparation for the witness stand as a rewarding research career. In order to establish precise locations for necessary boring, land surveyors and geologists had to cut trails through the swamps or walk miles on unstable floating marsh. In some cases, botanists, chemists, and other specialists were included in the field parties. No investigation was undertaken without a preliminary reconnaissance to determine if the litigant appeared to be scientifically correct, or, if there were refusals, to permit scientific publication of any data that were obtained. "Louisiana Stream Patterns" (1939) resulted from such a study.

The work of the Louisiana Geological Survey had the enthusiastic support of the petroleum industry, which sponsored a bill in the state legislature trebling their fee for drilling

permits in order to expand the Survey's program. Henry Howe and Richard Russell felt compelled to refuse this expansion of their program because of the difficulty in training personnel to find and interpret geologic evidence in the essentially flat, deeply weathered, densely vegetated, and deep-soil region of the Gulf Coast. Harold N. Fisk, who appeared on the scene in 1935 after receiving his doctoral degree involving volcanic rocks in the Columbia River region, proved to be an exception. Within a few months, Fisk was making important discoveries in central Louisiana and promptly formulated an explanation of Quaternary deposits that received widespread acceptance. A close personal association soon developed between Fisk and Russell, involving work not only in Louisiana but on the Mississippi, Ohio, and Tennessee rivers and along the Atlantic Coastal Plain. Each published a number of papers, separately as a rule, emphasizing Gulf Coast Quaternary history. A number of their reports went into the files of the Mississippi River Commission that dealt with the problems of the levees along the river.

As Russell pursued his studies of the Quaternary terraces upstream along the Mississippi River, he became involved with exposures of loess—homogeneous, unstratified, slightly indurated and porous calcareous sedimentary rock composed of particles of silt size, yellowish or buff in color, that tend to crop out in vertical faces. Most American geologists favored the concept that, during the Ice Age, rivers transported to broad floodplains fine glacial debris, which was picked up by winds and deposited on or near adjacent bluffs; thus loess is an eolian deposit. Richard was convinced that along the central and southern Mississippi River, the field relations demonstrated that the parent materials were terrace deposits similar to the backswamp clays of the Recent Mississippi River; these weathered to brown loam that crept downslope and accumulated in valleys or as mantles on the bluffs. The abundant cal-

cium carbonate found in them was contributed and moved about by groundwater and percolating waters. After an exhaustive literature search, he published "Lower Mississippi Valley Loess" (1944), pointing out similarities to the European loess exposures. He had the satisfaction that many European investigators subsequently accepted his interpretation but he admitted that his American colleagues, in general, were skeptical.

Russell loved to travel and as his university salary and consulting fees increased, he began a series of foreign trips, starting in 1931 with the International Geographical Congress in Paris. In 1937, he and Henry Howe attended the Geological Congress in Moscow where they presented papers on the Gulf Coast geosyncline and participated in field excursions across the Caucasus to Soviet Armenia and to Novaya Zemlya. After his return from this trip, Russell received the Atwood Award for his paper on the Mississippi River Delta, which enabled him to return to Europe in January 1938 to study the Rhone Delta ["Geomorphology of the Rhone Delta" (1942)] in which he noted that the chief contrasts between the Mississippi and Rhone deltas were quantitative; the ratio in area, as limited by marginal distributary streams, is about 20:1. Although there are striking rearrangements in channel patterns in each delta in modern geologic time and coarse sediment is more extensive in the Rhone Delta, channel patterns in both depend on previously existing channels. Both deltas face tideless seas and the modern drainage patterns indicate a decided increase in the Mississippi River Delta whereas the Rhone Delta has remained constant in area; also, the "bird's foot" delta of the Mississippi River is in contrast to the smooth shores and traditional deltoid shape of the Rhone.

After the completion of the field studies of the Rhone Delta, Russell attended the International Geographical Congress in Amsterdam and visited his old friend, Albrecht Penck in

Germany. In 1937 and again in 1938, he saw most of the coast of Norway and much of Finland in both summer and winter. Ten years later (1948) he attended the Geological Congress in Great Britain and made field trips to Wales. This was followed in 1952 by the Geological Congress in Algiers with field trips in the western Sahara and back through the Atlas Mountains. Russell was curious to find out if the Meander River in Anatolia actually meandered. In 1938 he had been unsuccessful in obtaining a visa; in 1952, however, he was appointed to the faculty at Istanbul and in exchange for a minimum requirement of delivering three lectures received the necessary documents permitting field investigations in Turkey. He was delighted to discover that the Great Meander is an excellent type locality for meanders.

The next Geological Congress was held in Mexico City in 1956 where Russell served as co-chairman of the Geomorphology Section. He was also a guest of the Brazilian Government in a memorable Amazon excursion. Two years later, he was active in a Congress of the Association of Sedimentologists in Geneva and Lausanne. In 1959, under the financial sponsorship of the National Science Foundation, Richard was sent to Indonesia to serve as an advisor to the Council for Sciences of Indonesia, and after visiting many centers of research in Java, Sumatra, and Celebes, he wrote *Report on Scientific Research in Indonesia* and many of his recommendations were effected in an amazingly short time. The International Geographical Congress in 1960 gave him the opportunity to join field symposia in Sweden on alluvial and coastal morphology. The following year, he organized a symposium, "Pacific Island Terraces: Eustatic?", for the Honolulu Pacific Science Congress, and he served as co-chairman of the Section of Geomorphology at the INQUA Congress in Warsaw. In 1962, Russell presided at the Geomorphology Section of the Kuala Lumpur meetings of the International Union and he participated in excursions that were made along the coast of Malaya.

Russell was a member of the Committee on Geophysics and Geography for the Department of Defense and a member of the Committee on Geography, Advisory to the Office of Naval Research. In 1949, he learned that progress in coastal research was lagging seriously in defense programs and he was urged by army and navy officers to give his attention to this problem. This offer came as he was named Dean of the Graduate School at LSU, but with the assistance of James P. Morgan, a proposal was presented to the Geography Branch of the Office of Naval Research for a study of trafficability of Louisiana coastal marshes. This study led to the establishment in 1954 of the Coastal Studies Institute with Russell as director. The program expanded rapidly, supported by the federal and state governments and by industrial groups. No classified research was accepted in the program, nor was there any appreciable deviation from basic research in shallow coastal waters and adjacent land areas.

Russell shifted his interest from floodplains and deltas to sea coasts in 1956. His first objective was the Lesser Antilles because that island arc possessed volcanic and organic debris beaches typical of oceanic islands as well as quartz–sand beaches characteristic of continental shores. But he soon became involved in cemented beach material that crops out at about mean sea level in areas of small tidal range. Commonly, several bands of this beach rock are separated by shallow strips of water with the oldest bands seaward and the youngest under the beach; the outer bands are tough and durable in contrast to the friable inner band. All beach rock localities occur where there is coastal recession and the groundwater is heavily charged with calcium carbonate, the cement of the beach rock. The initial studies of beach rock were on St. Lucia, but these led to additional studies in the Mediterranean, the coasts of northern and southern Africa, various Pacific and Indian Ocean islands, New Zealand, and both the east and west coasts of Australia. The work in western Australia revealed long bands of Pleistocene beach rock

20 feet above the present beach; strands of beach rock at the same elevation on islands in the Indian Ocean and West Indies strongly indicate crustal stability in these three areas extending back to the Pleistocene [*River Plains and Sea Coasts* (1967)].

Much of the early literature on sea coasts was concerned with their classification, but Russell firmly believed that taxonomy should follow the acquisition of precise and factual information. Much of his last years of field studies were spent obtaining background information to enable him to identify problems related to sea coasts. He emphasized that the glacio-eustatic changes of level between land and sea by the melting of continental ice sheets raised the level of oceans by 450 feet during the Recent rise of sea level. As a result, all sea coasts were drowned. Some are smooth with barrier islands fronting linear lagoons, but where the rocks are weak and poorly consolidated, other features considered proof of emergence are really demonstrations of the efficacy of wave attack and related shores processes that wear away headlands and fill embayments. In contrast, where resistant and durable rocks are exposed to wave attack, the forces of marine action are almost powerless to change the shorelines. Russell's reconnaissance investigations convinced him that the majority of beaches are diminishing in volume, probably resulting from the Recent still stand in sea level. When the seas were rising rapidly from their pre-Recent low level (eight to twelve inches per century), they encountered old coastal plains and new surfaces were flooded. These surfaces were the sources of the sand that was transported shoreward by wave action. But when still stand was reached, new sand supplies were no longer encountered [*River Plains and Sea Coasts* (1967)].

Writing for particular audiences was a challenge that Richard readily accepted and enjoyed. His "Climatic Change through the Ages" in the 1941 Yearbook of the Department of Agriculture was aimed at the level of the "intelligent farmer." Two books were issued by the Louisiana Department of Edu-

cation, *The Mississippi River* for the fourth grade level and *Louisiana—Our Treasure Ground* for the eighth grade. Chapters in *The Pacific Ranges* and *The Sierra Nevada* were directed to the general public. His wide travels formed the basis of *Culture Worlds,* a widely used text for college geography; Fred B. Kniffen was joint author for three editions; Evelyn Pruitt of the Office of Naval Research participated in both the second and third editions.

Russell, elected to the National Academy of Sciences in 1959, was active in the affairs of the Division of Earth Sciences of the National Research Council, starting in 1936 when it was called the Division of Geology and Geography. He was one of the leaders in broadening the activities in 1953 and getting a more inclusive name for the expanding role of activities by geochemists, geophysicists, meteorologists, soil scientists, and oceanographers. He was chairman of the Division between 1954 and 1956, but he involved himself only with those committees that held a special interest for him.

One such committee was the Committee on Geography, Advisory to the Office of Naval Research, on which he served from 1949 to 1963. This committee did many useful things for the ONR but, as the navy budgets were tightened, the committee was dissolved. One of its major achievements was to assess the navy's need for research geographers, and it recommended that ONR support a program to enable young geographers to do research work outside the United States. The objective was to develop a group of people with first-hand knowledge and active contacts in some country where the navy was likely to maintain an interest. This led to the establishment of the Foreign Research Program, Screening Committee, that started in 1955 and continued until 1972. Richard served on every screening committee, except in 1959 when he was in Indonesia. He also served actively for ten years on the Committee on Waste Disposal, Advisory to the Atomic Energy Commission, starting in 1955. This

committee had many ups and downs, but Richard took the work seriously and made one inspection trip alone to visit AEC installations to see what research was being done on methods of disposing of radioactive waste products. For some years, the annual meeting of the Division of Earth Sciences took a full day for committee reports, budget review, and rambling discussion. With Richard as prime mover, the annual meeting was converted to an hour of business followed by an extensive symposium on a timely research topic in the earth sciences.

Russell was the recipient of many honors during his long career as a geomorphologist and geographer. In 1943, he was Distinguished Lecturer ("Gulf Coast Geosyncline") for the American Association of Petroleum Geologists and in 1958 National Lecturer ("Instability of Sea Level") for Sigma Xi. He was a Special Fellow of the Belgian American Foundation and was honored by membership in the Academy of Natural Sciences of Göttingen, the Royal Danish Academy of Science, Royal Dutch Geographical Society, the Belgian Society of Geology, Paleontology and Hydrology, and the German Academy of Sciences. In 1961, Queen Louise of Sweden presented him the Vega Medal of the Royal Swedish Society of Anthropology and Geography, and in 1962 he received the Cullum Medal of the American Geographical Society. He was Hitchcock Lecturer at the University of California (Berkeley) in 1965; the subject of these lectures resulted in *River Plains and Sea Coasts*, published in 1967. The U.S. Navy Distinguished Service Award was given to Richard in 1967.

Russell had the reputation of being a superior but rigorous teacher. His conversation was ordinarily free and easy, but he could pour forth a tremendous sales pitch when he thought that the occasion warranted it. He was a good story teller, seasoned with his low keyed dry humor, who often saw the wry funny side of serious situations. He had a reputation for expertise in Chinese restaurants and could steer his friends into

superb combinations of plates. He liked to adapt himself completely to the life in foreign countries and in some of the small places in Turkey, the natives thought that he was a Turk. When he was in Indonesia, he broke away from American ties as much as possible so that he could live like an Indonesian. He became a member of the Masonic Order while a student at Berkeley and was affiliated with Phi Kappa Sigma, Gamma Alpha, Phi Sigma, Sigma Xi, and Phi Kappa Phi. He was very active in Theta Tau, an engineering fraternity with a chapter at Berkeley limited to mining engineers and geologists, and he rose through the ranks to become Grand Regent between 1928 and 1932. He was a member of the Cosmos Club in Washington, D.C., where he usually stayed during his many trips to that city; in his spare moments, he could usually be found at the club playing billiards.

Richard Joel Russell married Mary Dorothy King of Covina, California, in 1924, and their son, Benjamin James, lives in Hermosa Beach, California. Dorothy died in Baton Rouge in 1936. Richard married Josephine Burke of Wabash, Indiana, in 1940, and had four sons, Robert Burke of Foley, Alabama, Charles Douglas of New Orleans, John Walter of Dayton, Ohio, and Thomas William of Montreal, Canada. Richard is survived by a sister, Helen (Mrs. George W. McCollum), of Oakland, California.

RICHARD JOEL RUSSELL left extensive biographical data that have been most helpful in the preparation of this biographical memoir. Correspondence from Russell, largely written from Lubbock, Texas, was loaned by A. O. Woodford, and William R. Thurston provided information on Russell's contribution to the National Research Council. The bibliography was assembled by Romaine L. Kupfer and the staff of the Coastal Studies Institute, Louisiana State University.

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*KEY TO ABBREVIATIONS*

Am. Assoc. Pet. Geol. Bull. = American Association of Petroleum Geologists Bulletin
Am. Meteorol. Soc. Bull. = American Meteorological Society Bulletin
Assoc. Am. Geogr. Ann. = Association of American Geographers Annals
C. R. Congr. Int. Géogr. = Comptes Rendus du Congrès International de Géographie
C. R. Congr. Int. Géol. = Comptes Rendus du Congrès International de Géologie
Coastal Stud. Bull. = Louisiana State University Coastal Studies Bulletin
Coastal Stud. Inst. Tech. Rep. = Louisiana State University Coastal Studies Institute Technical Report
Geogr. Rev. = Geographical Review
Geol. Soc. Am. Bull. = Geological Society of America Bulletin
J. Geogr. = Journal of Geography
K. Ned. Aardrijkskd. Genoot. Tijdschr. = K. Nederlandsch Aardrijkskundig Genootschap, Amsterdam, Tijdschrift
La. Conserv. Rev. = Louisiana Conservation Review
La. Dep. Conserv. Geol. Bull. = Louisiana Department of Conservation, Geology Bulletin
Proc. Conf. Coastal Eng. = Proceedings, Conference on Coastal Engineering
Univ. Calif. Publ. Geogr. = University of California Publications in Geography
Z. Geomorphol. = Zeitschrift für Geomorphologie

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