MEMORIAL OF TERENCE THOMAS QUIRKE

CARLETON A. CHAPMAN, *University of Illinois, Urbana, Illinois.*

Terence Thomas Quirke was born July 23, 1886, in Brighton, Sussex, England. His father, a concert violinist of distinction and a violin teacher, had come to England from Ireland in the early 1860's. His mother was an accomplished pianist who, with her husband, gave over thirty annual concerts in Brighton.

Young Terence received his elementary schooling in private schools in Brighton and was later admitted to Bancroft's School in Woodford, Essex. At this public school (private school in the American sense) he received a fine training in preparation for university work. While at Bancroft's School, Terence won prizes in Scripture, free hand drawing, French, Latin, and fencing and won school letters in soccer and cricket. After graduation he hoped to be accepted in an officer's training school for the British navy but his eyes would not pass the test, and it was recommended that he spend a year in an open-air life to improve his myopic condition. He decided to go to a ranch in North Dakota and so in March, 1904, he left England. With limited financial resources and with no knowledge of manual labor, he was headed for a rugged life for which by birth, by education, and by temperament he was unprepared. Perhaps, one of the major accomplishments of his early days in America was the manner and rapidity with which he was able to readjust himself from his particular English status to a very humble life in a ranch house of whitewashed logs and dirt on the prairies of North Dakota. At the end of a year on the ranch, he decided to try his luck at other things, still planning to return to England in a year or two. He took a position as clerk with a steamboat company on the Missouri and Yellowstone Rivers. In this work, which lasted about a year, he became a good friend of Captain Marsh of Missouri River fame and developed a keen interest in the nature and behavior of streams in flood as well as in other stages.

It took considerable persuasion on the part of friends, and in particular his uncle Francis Grace, to induce Terence to continue his education. This Mr. Grace, a mining engineer in New Zealand, had hoped to have his nephew become his geologist when training was completed. However, Mr. Grace died during the last year of Terence's graduate work. It was nearly six years after coming to the United States that Terence entered the University of North Dakota to study mining engineering. He had caught the "fever of America" and realized he did not want to return to England to live. His first course in geology was greatly stimulated by recollections of his childhood days in Sussex along the sea-

coast with its white chalk cliffs and over the rolling downs country farther inland. In three years time he was graduated but stayed on another year, as a Fellow, to finish his master of science degree. From 1913–1915 he was a Fellow at the University of Chicago where he completed the Ph.D. degree in 1915. It was here that his mind turned to the problems of pre-Cambrian geology.

His first field experience was gained while a student at North Dakota; for four summers he was assistant to the state geologist. Four more summers were spent as Geologist on The Geological Survey of Canada; and during the summers of 1919–1931, he was Chief of Survey Party in Canada. In 1915 he accepted an instructorship at the University of Minnesota and was advanced to Assistant Professor in 1917. In 1919 he came to the University of Illinois as Associate Professor and Chairman of the Department of Geology and Geography. He was promoted to Professor in 1925 and continued to serve as Chairman until 1928.

His outstanding contributions to science were in the field of pre-Cambrian geology and included the mapping of numerous large areas in Ontario. The first was his work on the Espanola District of Ontario. This study was one of several conducted in an attempt to correlate certain rocks at Sudbury with those along the north shore of Lake Huron. The demand for iron during World War I led to a study of the Michipicoten iron ranges in which he participated. Some of the results of these studies were published by him in joint authorship with W. H. Collins in 1926. In 1924 and 1926 he published on the Huronian-Grenville relations and showed evidence that some of the so-called Grenville of southeastern Ontario is to be correlated with the Huronian of the north shore of Lake Huron, and that the associated granite is Killarnean and not Laurentian. In the summers of 1923 and 1926, he studied the rocks north of Killarney, on Georgian Bay; and in 1930 he published, with Collins, the thesis that the "Disappearance of the Huronian" east of Killarney is due largely to granitization or the transformation of Huronian sediments by igneous material. An earlier paper (1927) on the "Killarney Gneiss and Migmatites" deals with the processes involved in this type of transformation. In the French River Area, east of Killarney, he believed the granitic rocks were replacements of sedimentary rocks and that here was an example of how batholithic material might be derived.

Among his early, but relatively minor contributions, were numerous papers on meteorites, structural and tectonic geology, ore deposits and general geology. In 1931 the Canadian Geological Survey was no longer permitted to employ foreign geologists; and it was, therefore, no longer feasible for Doctor Quirke to continue his field studies in this pre-Cambrian area. Unfortunate as this may have been, he turned to consulting

TERENCE THOMAS QUIRKE
1886–1947

work in ore deposits and to laboratory studies in the field of mineralogy and crystallography. The results of these studies are to be found in his more recent publications. At the time of his death he had completed for publication a revised edition of his textbook "Engineering Geology."

Doctor Quirke was a member of many national scientific societies and

fraternities. He was a Fellow of the Geological Society of America, the Mineralogical Society of America, the Society of Economic Geologists, and the American Association for the Advancement of Science. He was a member of the American Institute of Mining and Metallurgical Engineers, the Illinois Academy of Science, Sigma Xi, and Gamma Alpha. His interest in geology and geologists of foreign countries is shown by the fact that as a delegate he took on active part in the deliberations in the meetings of the International Geological Congress held in Brussels in 1922 and in Madrid in 1926. He had also been appointed as an official delegate to the Congress to be held in London in 1948.

As a party chief, he felt a keen sense of responsibility for his men and always made careful plans in organizing for explorations. His unselfishness in assignment of duties and his patience in explaining the work to his assistants left nothing but admiration on the part of these men for their party chief. He was a good camper and packer, carrying a great weight for his size. Though not a person of robust stature, he did possess great physical endurance and was a skillful canoeman, having covered many thousands of miles by canoe during his field studies. He had a passionate love for field work and mapping and was extremely thorough and meticulous. Although many of these fine qualities were inborn, it is logical to assume that some of them were more highly developed as a result of his close association, over a period of many years, with his beloved friend and colleague W. H. Collins.

September 23, 1916, he married Anne Laura McIlraith, a student he had met while at North Dakota, and it was about his home and family of three children that many of his outside interests were centered. For years in his home, symbolic of hospitality, refinement and friendliness, students, faculty and others, friend and stranger alike, have been entertained most graciously. He had a profound interest in nature study and outdoor life which is made apparent in his completed but yet unpublished work called "Exploration and Adventure," a book intended for older boys, on the subject of life in the open. One hobby, somewhat allied to his profession, was his interest in gem stones. These stones he had studied and collected for years and, at the time of his death, was preparing a book on the subject. An extensive research, over a long period of time, on the subject of canoes and small craft was completed in a manuscript of several hundred pages. Another pastime was translating certain German works including "The Laws of Rock Metamorphism" by V. M. Goldschmidt and "Types and Nomenclature of Arder (Vein) Rocks" by P. J. Holmquist.

Doctor Quirke was an Episcopalian and had a fine religious spirit. He was a Rotarian, and his diligent performance as counselor for his

fraternity, Sigma Nu, and as a Boy Scout Leader indicates a great pleasure derived from working with young men and boys. He was an enthusiatic and inspiring teacher and his lectures were well seasoned with stories and anecdotes derived mainly from his wide personal experiences.

During the morning of August 19, 1947, Doctor Quirke had taught scheduled classes in geology, but after lunch, while at home, he began to experience some discomfort and shortly realized that the end was near. The end did come at 4:20 P.M. as a result of coronary occlusion. His passing came as a complete and unexpected shock to his many relatives and friends. He will always be remembered by his students who received his counsel and inspiration; by his fellow scientists who knew him for his field work, his writings and his contributions to pre-Cambrian geology; and by his friends who knew him as a real gentleman, a sympathetic and understanding neighbor, and an individual with the utmost respect for his privileges as a citizen of this country.

He is survived by his wife; two daughters Frances Grace (Mrs. Walter Washburn) of Austin, Texas, and Dorothy Geneva (Mrs. Robert Reedy) of Worcester, Massachusetts; a son Terence, Jr., of Urbana, Illinois; two brothers in South Africa; two brothers and two sisters in England; and a brother in Richmond, Virginia.

Bibliography

Espanola District, Ontario: *Can. Geol. Sur., Mem.*, **102,** 1–75 (1917).

Classification of ore deposits based upon origin, deformation and enrichment: *Econ. Geol.*, **12,** 607–609 (1917).

Measurements of the radio-activity of meteorites (with L. Finkelstein): *Am. Jour. Sci.*, 4th ser., **44,** 237–242 (1917).

The Geology of the Killdeer Mountains, North Dakota: *Jour. Geol.*, **26,** 255–271 (1918).

The Richardton (North Dakota) meteorite: *Science*, new ser., **49,** 92–93 (1919).

The Richardton (North Dakota) meteorite: *Jour. Geol.*, **27,** 431–448 (1919).

Metallic copper in a meteorite vein: *Econ. Geol.*, **14,** 619–624 (1919).

Concerning the process of thrust faulting: *Jour. Geol.*, **28,** 417–438 (1920).

Discussion of "Summaries of pre-Cambrian literature of North America," by Edward Steidtman: *Jour. Geol.*, **29,** 469–474 (1921).

Geneva Map Area, Sudbury District, Ontario: *Can. Geol. Sur.*, Summ. Rept. 1920, part D, 7–18 (**1921**).

Moncriff and Hess Townships, Sudbury, Ontario: (map) *Can. Geol. Sur.*, Pub. **1865** (1921).

Wanapitei Lake Map Area, Sudbury District, Ontario: *Can. Geol. Sur.*, Summ. Rept., 1921, part D, 34–50 (**1922**).

Boudinage, an unusual structural phenomenon: *Geol. Soc. Amer., Bull.*, **34,** 649–660 (1923).

Elements of Geology for Technical Students: 144 pages, Ann Arbor, Mich., Edwards Bros. (**1923**).

Huronian Complex near Killarney, Ontario: (abstract with discussion by A. C. Lawson) *Geol. Soc. Amer., Bull.*, **35,** 89–90 (1924).

Correlation of Huronian and Grenville Rocks: *Jour. Geol.*, **32,** 316–335 (1924).

The undertow: *Science*, new ser., **61,** 468 (1925).

The size of sea waves: *Science*, new ser., **62,** 108–109 (1925).
Elements of Geology: 414 pages, 147 figures, New York, Henry Holt and Company (**1925**).
Potholes and certain features of glacial abrasion: *Ill. State Acad. Sci., Trans.*, **17,** 194–198 (1925).
Some features of continental glaciation: *Ill. State Acad. Sci., Trans.*, **18,** 394–400 (1925).
Origin of sedimentary iron ores: (discussion) *Econ. Geol.*, **20,** 770–771 (1925).
Huronian-Grenville Relations: *Am. Jour. Sci.*, 5th ser., **11,** 165–173 (1926).
Michipicoten iron ranges (with W. H. Collins): *Can. Geol. Sur.*, Mem. **147,** 1–141 (1926).
Mineral deposits of Rutter Map Area, Sudbury District, Ontario: *Can. Geol. Sur.*, Summ. Rept., 1924, part C, 89–95 (**1926**).
Evidence of assimilation and assimilation processes: *Jour. Geol.*, **35,** 180–182 (1927)
Killarney gneisses and migmatites: *Geol. Soc. Amer., Bull.*, **38,** 753–770 (1927).
Structure of the Killarnean Terrane: (abstract) *Geol. Soc. Amer., Bull.*, **39,** 189–190 (1928).
Larger earth deformations: *Pan-Amer. Geol.*, **49,** 241–258 (1928).
Earth deformation: *14th Internat. Geol. Congress*, Spain, 1926, *Comptes rendus*, fasc. **4,** 1537–1558 (1929).
The structure and batholiths of French River Area: *Jour. Geol.*, **37,** 683–699 (1929).
Panache Sheet, Sudbury and Manitoulin Districts, Ontario (with W. H. Collins and P. Eskola): *Can. Geol. Sur.*, Pub. **2175** (1929).
The disappearance of the Huronian (with W. H. Collins): *Can. Geol. Sur.*, Mem. **160,** 1–129 (1930).
Geology, Key Harbor Sheet, Parry Sound and Sudbury Districts, Ontario: *Can. Geol. Sur.*, Pub. **2205** (1930).
Geology, Delamere Sheet, Sudbury and Parry Sound District, Ontario (with R. H. Pegrum): *Can. Geol. Sur.*, Pub. **2204** (1930).
Spring Pits, sedimentation phenomena: *Jour. Geol.*, **38,** 88–91 (1930).
Eastward delimitation of original Huronian complex (with W. H. Collins): *Pan-Amer. Geol.*, **54,** 339–344 (1930).
Streaks in deep zone gneisses: *Royal Soc. Canada, Trans.*, third series, **25,** 245–256 (1931).
Differential flow of silicate rocks: *Royal Soc. Canada, Trans.*, third series, **25,** 257–268 (1931).
Arthur Gray Leonard (1865–1932): *North Dakota Univ. Quart. Jour.*, **23,** 147–153 (1933).
Memorial of Arthur Gray Leonard (1865–1932): *Geol. Soc. Am., Bull.*, **44,** 395–401 (1933).
Chemical stability of the terminal faces of acicular crystals (with D. W. Pearce and B. S. Hopkins): *Am. Jour. Sci.*, 5th ser., **30,** 116–120 (1935).
A new means of demonstrating optic figures: *Ill. State Acad. Sci., Trans.*, **29,** 177–178 (1936).
Origin of watercourses near French River, Ontario: *Geol. Soc. Amer., Bull.* **47,** 267–287 (1936).
New nepheline syenites from Bigwood Township, Ontario: *Ill. State Acad. Sci., Trans.*, **29,** 179–185 (1936).
Angle of polarization as an index of coal rank (with L. C. McCabe): *Am. Inst., Min. Met. Eng.*, Tech. Pub. **791** (1937).
The Law of Rock Metamorphism (A Translation from the German by V. M. Goldschmidt): 28 pages, Champaign, Illinois, Univ. of Ill. Supply Store (**1937**).
A new study of the preparation and properties of the higher oxides of lead (with G. L. Clark and N. C. Schieltz): *Jour. Am. Chem. Soc.*, **59,** 2305–2308 (1937).
Methods of determining refractive indices of vitrains (with L. C. McCabe): *Geol. Soc. Amer., Bull.*, **49,** 669–682 (1938).

Memorial to William Henry Collins (1878–1937): *Geol. Soc. Amer., Proc.* 1937, 157–168 (**1938**).

Direct projection of optic figures: *Am. Mineral.*, **23,** 595–605 (1938).

Espanola Sheet, Sudbury District, Ontario (with W. H. Collins): *Can. Geol. Sur.*, Map 291A (**1938**).

Geology: For Students of Applied Science: 124 pages, Champaign, Ill., Stipes (**1938**).

Mineral resources of the chemical industries (with R. N. Keller): *Econ. Geol.*, **34,** 287–296 (1939).

(Review of) A Descriptive Petrography of the Igneous Rocks, Volume 3, Intermediate Rocks, Volume 4, The Feldspathoid Rocks, Pt. 2, Peridotites and Perkinites, by Albert Johannsen 1937–38: *Jour. Geol.*, **47,** 774–776 (1939).

Measurements of the indices of refraction in anisotropic media (with W. C. Lacy): *Am. Mineral.*, **24,** 705–724 (1939).

Minerals basic to industrial chemistry (with R. N. Keller): *Ind. Eng. Chem. News Edition* **17,** 444–445 (1939).

Granitization near Killarney, Ontario: *Geol. Soc. Am., Bull.*, **51,** 237–253 (1940).

Deep-zone dome and basin structures (with W. C. Lacy): *Jour. Geol.*, **49,** 598–609 (1941).

Our Home, The Earth, Sec. 2 of The Marvels and Mysteries of Science: 86–221, New York, Wm. H. Wise and Co., Inc. (**1941**).

Geology for Engineers: 178 pages, Champaign, Ill., Stipes (**1941**).

Rare element prospecting in pegmatites (with H. E. Kremers): *Econ. Geol.*, **38,** 173–187 (1943).

Pegmatite crystallization (with H. E. Kremers): *Am. Mineral.*, **28,** 571–580 (1943).

Hydrothermal replacement in deep seated iron ore deposits of the Lake Superior Region: *Econ. Geol.*, **38,** 662–667 (1943).

Velocity and load of a stream: *Jour. Geol.*, **53,** 125–132 (1945).

Geology for Engineers: 200 pages, Urbana, Illinois, Stipes (**1947**).

Geology for Engineers: *Geol. Soc. Amer., Inter. Proc.*, Pt. 1, 16–21 (**1947**).

The Quirke crystallographic charts: (**1947**).

A remarkable set of rainbows: *Science*, new ser., **106,** 225 (1947).