Memorial to Charles Andrew Cotton
1885–1970

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A link with that classic chapter in the history of landscape study—the days of W. M. Davis, Douglas Johnson, Reginald Daly, Andrew Lawson, and Eliot Blackwelder—was severed in June with the passing of Sir Charles Cotton. A personal acquaintance of, and a long-time correspondent with those great men, Sir Charles earned his own permanent place among the notable earth scientists of this century through the merits of a career of research, teaching, and writing which lasted more than sixty years. This career justified the following citation on the occasion of his recent knighthood in 1959: For outstanding service as a geologist in New Zealand, particularly as Professor of Geology at Victoria University of Wellington and for research and publications of international repute.

Born in Dunedin, New Zealand, in 1885, Charles Cotton received his early education in that "Edinburgh of the South," and then attended the University of Otago where he came under the influence of two notable teachers, Patrick Marshall, Professor of Geology, and James Park, Professor of Mining, whose controverted opinions on many issues did much to enliven New Zealand geology during the first quarter of the century. Cotton obtained his bachelors degree in 1907 and Master of Science degree in 1908, both with distinction. It is often forgotten that Cotton's early career had little to do with geomorphology. His first paper, published in 1909, was largely petrological and his first professional appointment in the preceding year was as director of a small regional School of Mines at Coromandel in the Hauraki gold fields. His concern with mining matters lasted at least until 1913, when he gained the internationally recognized Associateship of the Otago School of Mines. Two years later he was awarded the senior research degree, the Doctorate in Science, by the former University of New Zealand. Other distinctions were to follow.

In 1909, a Department of Geology was established in Wellington at Victoria College, then a constituent college of the University of New Zealand,[1] and Cotton was appointed Lecturer-in-Charge. He did not become a professor of geology until the chair was founded in 1921, then, apart from some extended

Photo courtesy M. D. King, Victoria Univ., Wellington, N.Z.

overseas sabbatical trips, he remained at Victoria until his retirement at the end of 1953.

His particular interest in geomorphology was not yet developed, however, upon moving to Wellington, Cotton very soon perceived many features in the surrounding landscape which called for explanation, for he was now living in a region no less dynamic than that around San Francisco Bay. In need of philosophical guidance and very much a pioneer in his own land, Cotton sought inspiration in the teachings of W. M. Davis. Davis helped him to define the questions, provided a language with which to express them, and offered a first approach to solution. Thus began a life's work in geomorphology. There could, however, be no greater mistake than to think of Cotton simply as a geomorphologist; his interests and contributions ranged over the entire field of earth sciences (except perhaps paleontology).

It was in this last respect that Cotton had an advantage over Davis. Through training and practice he had the outlook of the geologist rather than the physiographer, a sense of timing and geological perspective, a fourth dimension which enabled him to adapt and apply, in a more enduring way, the principles of his recognized master, Davis, whose sequential cartoons of landscape evolution he was able to exemplify with greater realism, continuity, and humility. As an additional advantage, Cotton's geomorphologic awakening took place in a relatively small country which encompassed a wide variety of geologic terranes, climates, and rates of geomorphic change, as dictated by the regional variations in the tempo of recent tectonic events.

Strictly Davisian "cycle" dogma is no longer the chief basis for beginning classes in geomorphology, and indeed in some quarters there has been a strong reaction against the more rigid teachings. It would also be a mistake to throw Cotton out with Davis. His successful adaptation and promulgation of Davis's "explanatory description" approach, which enabled problems to be defined and provided terms in which to discuss them, never amounted to a blind adherence. Cotton reverently acknowledged an early debt to Davis (*Landscape as developed by processes of normal erosion,* 1941), but his later works do not fail to give due prominence and fair presentation to the views of Walther and Albrecht Penck, L. C. King, and other German and South African authors. It is noteworthy that not one of his books was dedicated exclusively to Davis. Lester King, incidentally, is a former student and junior colleague of C. A. Cotton.

Simple uncluttered line drawings and block-diagram sequences, skillfully conveying notions of secular change, matched with the very readable straightforward literary style of the earlier works, enabled Cotton to capture the

[1]A federal system of provincial teaching colleges served the central degree-granting University of New Zealand until it was devolved in 1960; Victoria College then become Victoria University of Wellington.

interest of students, professional geographers, and engineers, and to attract many generations of beginners into the realm of geological studies. Here lay the secret of his enduring success as a teacher, rather than in his lecture courses which, more often than not, were delivered in unenlivened tones.

During his first ten years as a University teacher, Cotton produced many significant papers on New Zealand geomorphology, structure, and tectonics, some of which were republished in book form as a tribute after his retirement, with the title *New Zealand Geomorphology* (1955). Historically, perhaps the most significant of all was his first book, *Geomorphology of New Zealand —Part I: Systematic* (1922), prepared for students, the general reader, and teachers of physiography. Although intended for domestic consumption, its excellent illustrated examples found applications in other lands, and it filled a gap in the field of English language geomorphic texts, so the book sold well overseas. Sir Charles told of his surprise, when travelling on a New York subway train in about 1930, to see this book in the hands of a young person sitting opposite. The promised *Part II: Regional* never appeared—perhaps it was too early to arrive at a satisfactory tectonic or geomorphogenic basis for subdividing the land, and indeed this would be difficult even today —but by 1926 a second edition of *Part I: Systematic* was required. This continued to be used as standard reading for most geology and geography students throughout the English-speaking world (except in England!) until replaced in 1942 by *Geomorphology—an Introduction to the Study of Landforms.* This was published first in New Zealand, but subsequent editions were handled in North America by Wiley and Son's, New York.

For the advanced student he later wrote *Landscape as Developed by Processes of Normal Erosion* (1941), *Climatic Accidents in Landform Making* (1942), and *Volcanoes as Landscape Forms* (1944). These compendia of geomorphic ideas and controversy have enjoyed a remarkably lasting popularity, and, as of 1969, were still being reprinteed in America. Although Cotton makes many comments on the doctrines and philosophies discussed in these books, in contrast to the original *Geomorphology of New Zealand* they contain less of the author's own philosophy. On the other hand, his published papers since 1950 have developed original ideas and revived some old ones in a new context, with a great deal of emphasis on the role of climate.

Cotton rarely published in coauthorship. The most important exceptions are two papers with Martin Te Punga in 1955, which first drew attention to periglacial features in New Zealand. He continued to write vigorously and usefully until the last year of his life.

Cotton showed no great enthusiasm for the mid-century swing toward the numerical expression of geomorphic data, feeling that too much preoccupation with numbers was antipathetic to inspiration. The exercise of as-

sembling and ordering cold data for the sake of so doing never appealed to him, and he was known to be cynical about what he thought were largely delusions of precision and objectivity in "the new geomorphology." Mere description was never an end in itself. Cotton had always perceived problems by looking at actual landscapes, at photographs, and at maps; his explanations arose intuitively, were tested rigorously against the relevant geological data, then were compared with his personal observations in many lands and his vast found of vicarious experience through literature, as well as innumerable contacts overseas. The ideas were presented, logically justified, and unmistakably illustrated by the explanatory diagrams. Is this approach really outmoded? Without it, the auhor wonders, how does one know how to instruct the computer to deal with masses of numerically descriptive landform data?

The most noteworthy of numerous scientific awards and honours bestowed upon Sir Charles during his long teaching and writing career are mentioned here. The highest scientific distinctions in his own country are the Hector and Hutton medals, awarded by New Zealand's "academy of science," the Royal Society of New Zealand (known as the New Zealand Institute prior to 1933). He received these medals in 1927 and 1947, respectively. The Honorary Doctorate of Laws was granted him in 1954 by the former University of New Zealand, and it was no surprise when he was elected Professor Emeritus on his retirement in that year. Overseas recognition includes the Victoria Medal of the Royal Geographical Society of London, Honorary Fellowship in The Geological Society of America, and Honorary Membership in The Geological Society of Belgium.

Former students, including myself, remember Professor Cotton as a modest, rather retiring, highly intellectual person, one whom some found aloof and not easy to approach. His shyness occasionally engendered mutual embarrassment and quite unnecessarily led some to stand in awe of the great man. Those who succeeded in making personal contact with him never failed to find it most rewarding, for he was a friendly person. Though undemonstrative, and without any liking for trivial conversation, he clearly had concern for the welfare of his students and colleagues, with whom he was always happy to discuss problems and share his enormous fund of knowledge or his recollections of notable figures of earlier days, who have since passed from the scene. Sir Charles is survived by a son and a daughter, and by Lady Cotton. She is remembered with affection by earlier generations of students for the kindly warmth and dignity of her reception of them as visitors to the Cotton home.

Those seeking further information about Sir Charles Cotton may find it in the special issue of the *New Zealand Journal of Geology and Geophysics*

(Vol. 9, Nos. 1 and 2) marking his eightieth birthday in 1966. That Journal is acknowledged by the writer as the source of some biographical details.

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