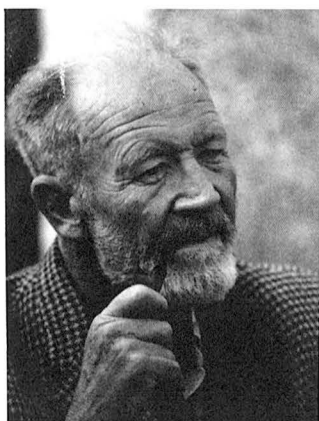


Memorial to Byron Britton Brock 1904-1972

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Britt Brock was born in Kingston, Canada, on July 1, 1904, and died in Cape Town, South Africa, on April 20, 1972. He started on the shores of Lake Ontario and ended at the fairest cape in all the world. In between were sixty-eight years as a boy in Canada and as a student, sailor, labourer, hobo, and geologist in Canada, Hong Kong, Yugoslavia, England, the United States, east, west, central, and southern Africa, Persia, Israel, Cyprus, Burma, Singapore, and Madagascar. He studied rocks, sketched, painted, played the flute and clarinet, sailed the sea, and called himself a happy wanderer. He believed that his life should fit a pattern which had meaning and that he should live for the present. He believed that he should do his

best in everything he undertook, thus precluding wasted time on regrets and self-recrimination in the event of a failure, and that these simple rules, plus the fatalism engendered of wartime seafaring, would combine to make a contented and satisfying life. He once said that what he craved for more than anything else was the time to do all the things he wanted to do. Britt Brock was still looking for that time when he died. His life was still full of things he wished to do.

His father, Reginald Brock, resigned in 1914 as Director of the Geological Survey of Canada to become the first professor of geology at the University of British Columbia, where he subsequently was made dean of applied science. Britt's son, Patrick, is presently teaching geology at Queen's College, Flushing, New York. Over three generations, the Brock family has made a not inconsiderable contribution to the science and practice of geology.

After junior school in Ottawa and high school in Vancouver, Britt attended the Royal Naval College of Canada at Esquimault, British Columbia, and qualified as a midshipman at just the time the Canadian Navy virtually ceased to exist as an institution. He nevertheless served a year at sea on less elegant vessels before entering the University of British Columbia from which he graduated with a B.Ap.Sc. degree in 1926. He then joined the Geological Survey of the Colony of Hong Kong as an assistant geologist. From 1927 to 1928, he undertook mineral exploration in Yugoslavia for Selection Trust Limited, and in 1929 to 1930 he worked on the Britannia Mining Company's silver mine in British Columbia.

By this time, the tide of the great depression was beginning to rise. On the closing down of the mine, Britt went back to the University of British Columbia where he lectured in elementary civil engineering in 1931. As the times became harder, he quit his only experience of the academic life and went to work as a labourer. Even such employment soon came to an end, and, with no prospect of gainful work, he tried hoboism.

In the futility of such activity, Britt decided that the only way to ride out the economic depression was to borrow money and return to the university for his doctoral degree. Between his stints in Yugoslavia and British Columbia, he had sampled St. John's College at Cambridge, and Queen's University at Kingston, but his choice in 1932 was the University of Wisconsin in Madison. Here he was to encounter, in full flower, the second great love of his professional life. In British Columbia, he was charmed by the sea; in Wisconsin, he became infatuated with structural geology. He obtained his Ph.D. in 1934, only to find that the depression had in no way abated and that North America was in no dire need of geologists.

In this atmosphere of gloom, an expatriate Canadian offered to show Britt another world in which he was destined to spend the rest of his life. Joseph Austen Bancroft was Dawson professor of geology at McGill University in Montreal when, in 1927, Sir Ernest Oppenheimer of the Anglo American Corporation of South Africa persuaded him to leave the groves of academe for the endless bush of Northern Rhodesia. From the Copperbelt was to be mounted possibly the greatest exploration programme that African metal mining has seen. In 1934, Britt accepted a one-year contract with Bancroft's team and departed for Northern Rhodesia. Seventeen years were to elapse before he saw Canada again. For the rest of his life, he was to live in southern Africa.

From 1934 to 1941, Britt served as manager of the Rhokana Field Division and gained intimate experience of the great copper deposits along the Congo-Zambesi watershed. As World War II continued, so the lure of the sea became stronger, and, in 1941, he left Northern Rhodesia and joined the Royal Naval Volunteer Reserve in South Africa as a first lieutenant. He subsequently transferred to the Kenyan RNVF and saw service in Kenya, the Persian Gulf, the United Kingdom, Burma, and Singapore. He was demobilized in South Africa early in 1946 and returned to the Anglo American Corporation, based in Johannesburg, South Africa.

Britt acted as assistant to the Consulting Geologist, Dr. J. A. Bancroft, from 1946 to 1952, and when the latter retired in 1952 was appointed Consulting Geologist to the Anglo American Corporation. For thirteen years he occupied this position, retiring in 1965. In the postwar years, he became deeply involved in the intensive prospecting for further gold and uranium mineralization in the Witwatersrand Basin; he played a significant role in the discovery and opening up of new mines in the Far West Rand, Klerksdorp, and Orange Free State goldfields. He was also responsible for establishing and consolidating many of the geological departments on the individual gold mines, and in this way considerably enhanced the status of geology in the mining industry of South Africa. He retired in 1965 and went back to live by the sea in the historic naval dockyard of Simon's Town, on the Cape of Good Hope.

Britt Brock's contributions to the advancement of geological knowledge were in the fields of synthesis and structural geology. Africa was the framework within which his ideas developed and his work progressed. He first became involved in synthesis in

Northern Rhodesia where his prime responsibility was to correlate and evaluate all the bits and pieces of geological knowledge gathered by Bancroft's exploration team of geologists, mining engineers, and prospectors operating in the northwestern part of Northern Rhodesia and the southern part of the Belgian Congo. The importance of the structural setting to the localization of the orebodies became more and more apparent as this work proceeded, and Britt gained the first glimpses of a grand design to the architecture of the African continent. When his activities were transferred to the Witwatersrand goldfields, he was presented with further evidence of the relation between structure and mineral deposits. He was forced to cultivate strength in three-dimensional thinking in order to decipher the subsurface geometry of sedimentary environments favourable to gold and uranium mineralization. From such thinking began his interest in the fragmentation of the sphere that is the Earth. He became convinced that structural geology, in any form, could not be viewed as an exercise in plane geometry.

From this premise he launched himself into an over-all survey of the entire surface of the Earth, with particular emphasis on Africa. He maintained, to the end, that this continent held the key to unravelling the complex history of crustal evolution. The state of exposure and preservation of the full time range of Precambrian rocks gave Africa a decided advantage over other parts of the world. He developed the concept of structural mosaics, each bounded by well-defined lineaments, at the intersections of the latter of which structural vertices developed. In these vertices, conditions were especially favourable for the development of many unique geological environments and for the emplacement of significant mineral deposits. He also firmly subscribed to the hypothesis that the dominant structural force affecting the Earth's crust was vertical tectonics. He first examined the Vredefort ring structure in the Witwatersrand Basin, in the light of this belief, and then extended his studies to the East African Rift valleys. The crustal plates of varying size making up the hierarchy of mosaics remained rigid and moved up and down only, relative to each other. Severe compression was confined to the linear zones separating the rigid plates. As the theory of structural mosaics advanced, so related concepts were formulated: the ubiquity of arcuate structures, the aliquot principle, structural great circles which have been intermittently active throughout their length, vertices as geomorphological centres, and gradation in the order of size of geological features dependent upon time from the Archean to the Tertiary. At all times, he advocated that structural studies of large regions should proceed from the general to the particular, contrary to normal practice, and that a globe of the world was the correct starting place.

Research along these lines culminated in the presentation of a pattern of orogenic evolution, with particular reference to what could be seen in the geology of southern Africa. The linear mobile belts between the cratonic plates were seen as the sutures in the mosaic hierarchy. The finer mosaics are the oldest and the coarsest the youngest, with a gradation in between. There is an apparent constant ratio between the lengths of linear sections of the sutures and the diameters of the bounded cratons. The lengths

of the mobile belts increase exponentially with decreasing age. The number of orogenic belts per era increases with time, from two in the Tertiary to thousands in the Archean.

Britt did not confine his thinking to the continents. His sea-faring background made it natural that he should also consider the geometry of the ocean basins and the significance of the size-shape relations of island arcs. Having seen a systematic pattern in the fragmentation of the surface of the Earth, Britt decided to look at other celestial bodies. He first examined the geometry of lunar features and then extended his studies to the Martian lineaments. He concluded that the tectonic pattern of the moon, like that of the earth, is integrated with the spherical shape.

All the work and thinking of Britt was directed towards formulating a grand strategy of mineral exploration. He believed that the mosaic hierarchy provided the structural framework within which the metallogenic provinces are set. The principle of repetitive patterns has an application to mineral patterns as well as mosaic patterns, since the two are related. The spacing of mineral centres, when seen to be an orderly arrangement, is a reflection of an ordered structural pattern.

In addition to his contributions to original geological thought, Britt served his science admirably through his activities in professional societies and his encouragement of research at universities in England and South Africa. He was a Fellow of The Geological Society of America, a Fellow of the Geological Society of London, a Fellow of the Royal Geographical Society, and a member of the Geological Society of South Africa, the Society of Economic Geologists, the American Geophysical Union, the Institution of Mining and Metallurgy, and the Canadian Institute of Mining and Metallurgy. From 1963, he was a member of the International Union of Geological Sciences' World Commission on Mineral Distribution. He served as Regional Vice-President for Africa of the Society of Economic Geologists between 1960 and 1963. He was first elected to the Council of the Geological Society of South Africa in 1950 and continued in this capacity until he voluntarily stepped down in 1966 upon his retirement from the mining industry. Britt was President of the Geological Society of South Africa in 1957 to 1958; in 1961, this Society awarded him its Draper Medal in recognition of his distinguished contribution to South African geology. He played a leading role in the establishment of the Institute of African Geology at Leeds University in England, of the Economic Geology Research Unit at the University of the Witwatersrand, and of the Precambrian Research Unit at the University of Cape Town in South Africa. His active interest in all three over the years contributed greatly to the progress of these research groups specializing in the geology of the African continent.

Britt had 29 publications to his credit. He spent his retirement years synthesizing all his observations and ideas into his *magnum opus*, *A Global Approach to Geology: The Background of a Mineral Exploration Strategy Based on Significant Form in the Patterning of the Earth's Crust*. This book appeared shortly after his death. In addition to his scientific publications, Britt derived satisfaction from the *Quarterly News Bulletin* of the Geological Society of South Africa, which he started in 1958 and of

which he continued as editor up to 1965. Not only did he edit the bulletin, but he wrote most of the copy for it and drew the illustrations.

This source of pleasure was replaced, upon his retirement, by his activities in the Simon's Town Historical Society. He contributed to the half-yearly bulletin and designed and produced four brochures on various aspects of the history of the naval dockyard. When he died, Britt had all but completed for publication an annotated photographic album of the historic buildings of Simon's Town.

In 1929, while working in British Columbia, Britt married Barbara Grote Stirling. Through the hard depression years in Canada and America, the years of isolation in the Northern Rhodesian bush, the war years, and the years of achievement and fulfillment in South Africa, his wife contributed immeasurably to the goodness of Britt's life and the realization of his hopes and ideals. She survives him and continues to live in the Cape Peninsula. He also leaves a daughter, Elizabeth Mary Robertson, who resides in Johannesburg, and a son, Patrick Willet Brock, of Flushing, New York.

Just a year before he died, Britt wrote: "South Africa, with its abundance of firsts among natural phenomena, should be studied *de novo*. . . . The erstwhile dark continent could become a source of light." If there has been one man in the past two decades who has looked anew at the geology of the country, then that man was Britt Brock. There are only shadows now, where there was once light, down here at the southern end of Africa.

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