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Memorial of Stuart Olof Agrell 1913–1996

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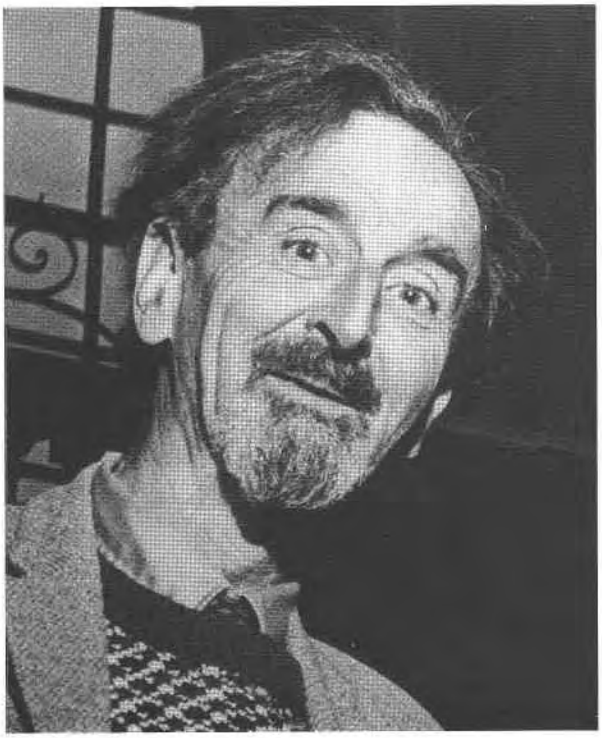
Stuart Agrell, optical mineralogist without peer and pioneer collaborator in the application of the electron probe to petrology, was a passionate proponent whose enthusiasm and erudition touched workers in many fields.



Born near London on March 5, 1913, the son of a Swedish father and English mother, Stuart was reared in a cultured, unconventional family atmosphere and after elementary schooling entered Cambridge University at the age of 18. This was the first year of Tilley's new Department of Mineralogy and Petrology. Stuart, whose previous geological interests had been predominantly paleontological, was won over by the excitement of the new crystal chemistry and rapidly developing structural mineralogy of the time; by graduation in 1934 his sights were firmly set on a "hard rock" career. His doctoral work under F.C. Phillips was a substantial study of Scottish metamorphics utilizing the briefly fashionable technique of petrofabrics. This was never published, but a small study of sodium metasomatism around a diabase dike did see print and gave early evidence of skill with the microscope. That was soon put severely to the test in 1939, a year after his move to join the staff at Manchester University, when World War II erupted and he was set to study industrial slag mineralogy in the effort to improve furnace process efficiency. With his microscope the only tool, each minuscule phase had to be categorized by careful optic orientation, refractive index determination, and where Winchell was wanting, the patient hand-picking of tiny grains for wet chemical analysis. Doubtless his later legendary petrographic ability with fine-grained natural material—the "Agrell Eye"—owed much to the discipline of this war work, undertaken with such basic techniques.

When the war ended, his attention returned to natural products. Stuart's study of pyrometamorphosed lateritized basalts from Northern Ireland is an early illustration of progressive reduction of iron in such an environment. His treatment of the consequent variation of the iron content in spinels, corundum, and mullite, carried out on samples ground to 50 μm grain size and carefully separated with hydrofluoric acid, is a classic of precision from the pre-probe era.

In 1949 he returned to Cambridge University as Lecturer and Museum Curator in Tilley's Department, continuing his work in the laterites and extending his interest to calcareous rocks. In the Jurassic siliceous dolomite country rock of the Ardnamurchan igneous complex he discovered the new minerals rustumite, dellaite, and kilchoanite, differentiating an early, high-temperature decarbonation episode from a low-temperature hydration associated with a later intrusion. On textural grounds kilchoanite, a polymorph of rankinite, was deduced to invert at temperatures lower than those of the reaction wollastonite + spurrite → rankinite + CO_2 and could not therefore be stable under high P_{CO_2}—a conclusion then novel and anticipating the more sophisticated treatments of mixed gas equilibrium soon to follow. The difficulty and tedium of manipulating these fine-grained materials rendered him unusually receptive to the promise of microanalytical techniques and a chance meeting with J.V.P. Long, then working on X-ray microanalysis in the Cavendish Laboratory, started a long and fruitful collaboration. Stuart's persuasion of Tilley secured a grant for the construction of an electron probe designed specifically for petrological use and he played a prominent part in the design of the optical system for Jim Long's "Geoscan"—the first commercial electron probe to be built with transmitted light facility.

The great revelation of Stuart's career came in 1962 with an appointment as Visiting Professor on the American Geological Institute scheme. The experience of touring the U.S., both university and field, was a liberating one: for him, as for many at the time, it really was the "new frontier." His enthusiasm, knowledge, and insight made no less powerful an impact on his American hosts and in the late 1960s he spent much of his time in the U.S.; apart from occasional trips for field work, two and a half years were occupied with Professorships at the University of Minnesota and at Berkeley. On his first visit he had been shown the Franciscan blueschist megaknocker quarried at Laytonville, in which he speedily identified the three new minerals, which with topical appropriateness he named deerite, howieite, and zussmanite. By now he had fingers in so many petrological pies that the irksome task of writing up was easily set aside; the only publication on this fascinating occurrence that bears his name is a conference abstract.

On his assumption of the Cambridge curatorship, Stuart had taken in hand an extensive but ill-organized collection of meteorites originating from the acquisition by William Whewell of Wold Cottage and L'Aigle in 1820s. In his pioneer electron probe work with Jim Long he had examined relations in octahedrite meteorites and his establishment of the reality of nickel depletion in kamacite as a boundary with taenite is approached has been recognized by the designation "Agrell Effect." No less active in the study of stony meteorites, he was by the end of the 1960s so acknowledged an expert that despite his having published little on the subject, he was appointed not only a Principal Investigator for the Apollo program, but also the only non-American petrologist member of the preliminary examination team at Houston. Then followed the glory days. Arriving back in Britain with moon rock in a carpet bag he became something of a media celebrity. With his tall, spare frame and lively goatee-bearded face Stuart was instantly recognizable and much in demand for interviews and lectures. His appeal was in no way diminished by the hint of Groucho Marx unexpected in so well-bred an English setting—the slightly surreal wit of his ready repartee enhanced by flashing eyes and mobile brows.

Although an excellent communicator, Stuart was a poor formal lecturer partly because of a mild word dyslexia that also made writing difficult for him. It was in practical teaching that he was superb. His classes whether in the laboratory or in the field were tightly disciplined and exacting; woe betide the student who, having asked "What's this mineral?" could not fully answer the rejoinder "What're its properties?" In microscope sessions he was continually speeding to the cabinets of the thin-section collection originally developed by Harker and Tilley but brought by his energy to a comprehensive assembly of some 150,000 specimens; he seemed to know them all by heart, and with eyes flashing and beard working would rapidly seize the precise examples he wanted, bearing them back to the student who might sit amazed that such a simple question should have unlocked such an explosion of enthusiasm and erudition. Students, of course, sensed they were in a master's charge, and most rose to the challenge, proceeding to play prominent parts in the petrological advances of the 1960s and 1970s. Nor were visiting workers treated less bountifully to his largesse. The casual inquirer often received more in the way of ideas and stimulation of thoughts from Stuart's swift moving and astringent mind, appropriate samples being offered freely and unselfishly from the cornucopia of his collections.

Although not particularly ambitious of personal advancement he played an important if unobtrusive part in guiding the policies of both his Department and his Cambridge College, Trinity Hall, of which he had been elected a Fellow in 1955. As his involvement in the Apollo program diminished, he was able to devote more time to the promotion of meteorite studies, attracting talented workers who formed a flourishing planetary sciences group in Cambridge during the 1970s. The first recognition in nature of β Mg_2SiO_4 (wadsleyite) was his, while many unusual inclusions in chondritic meteorites spotted by the "Agrell Eye" provided fertile subjects for detailed research by other workers, even now several continue to do so.

Stuart at this time inhabited an ancient rambling house north of Cambridge with ceilings suited to the stature of 15th century fenmen—to see his gaunt figure bowed under the massive Tudor timbers was to imagine oneself 'tween decks on a wooden man of war. He enjoyed tending its large garden, and sailing his small boat on the nearby river. This was a happy and hospitable household in a great jumble of books, with Jean, whom he married in 1937, and sons Peter, Michael, and Ben. Jean (Imlay), a former fellow graduate student in Tilley's Department, was accomplished, courageous, and charming. Her skills, which included special fluency in Russian and computing provided great strength for Stuart, as did her companionship and guidance on many field trips, sojourns, and conferences abroad.

Stuart's retirement in 1980, coincident with the merger of Mineralogy and Petrology into the new Department of Earth Sciences that he had quietly helped achieve, made little difference to his activity except in releasing him from formal duties. Award of Leverhulme Emeritus Fellowship enabled him to return to the Marysvale district of Utah where in the 1960s he had located a unique and mineralogically extraordinary occurrence of contact metamorphosed argillized and zeolitized volcanics—a typical Agrell find! Stuart's energy and total disregard of discomfort in the field had always belied a not overstrong physique; it seems likely that the hard work in rough terrain (with the enormous rock loads he was unable to resist collecting and carrying) proved, at three score and ten, too much for him.

Despite failing health, however, he accepted election as President of the Mineralogical Society of Great Britain at a difficult period in that body's history. In 1986, near the end of his three-year term, a cerebral stroke at the wheel of his car involved him in a serious road accident. He emerged from the hospital with diminished memory and loss of practical skills. The master could be seen fingering bemusedly his once all-powerful microscope, for all the world a freshman first essaying the craft. Yet in fighting this devastating disability his slow recovery set the scene for one last Agrellian coup. The description of a new CaAl silicate phase in the Allende chondrite reminded him dimly of a phase he had isolated from a slag during the war—a half century previously! Consulting his yellowed notes and original material confirmed the identity. His coarser grained samples then allowed the (as yet unnamed) mineral's more complete characterization.

Sadly this remission was but brief, and as he entered his eighties, Stuart again began to decline. With Jean's devoted help he continued to attend conferences, even making the long centenary trip of the Trans Siberian Railway from Vladivostock to St. Petersburg! Then Jean, too, began to suffer increasing impairment. She died just three months before Stuart's decease on January 29, 1996.

Stuart Agrell was associated with no major theory, and he published too little for his memory long to outlive those who have benefited from his enthusiasm, inspiration, and generosity. It is good, then, to know of his permanent commemoration in the fluo-silicate agrellite, a mineral, like its eponym, choice and rare.

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ERRATUM

Ferri-clinoholmquistite, $Li_2(Fe^{2+},Mg)_3Fe^{3+}{}_2Si_8O_{22}(OH)_2$, a new ^BLi clinoamphibole from the Pedriza Massif, Sierra de Guadarrama, Spanish Central System, by José M. Caballero, Angeles Monge, Angel La Iglesia, and Fernando Tornos (v. 83, 167–171, 1998).

In light of new nomenclature, the term "ferri-clinoholmquistite" should properly be "sodic-ferri-clinoferroholmquistite" through out the article.