

A TRIBUTE TO CYRIL STANLEY SMITH

Born 1903, died 1992.

Metallurgist, historian of science and technology in relation to each other, and to art and artifacts.

I never met Cyril Stanley Smith. We were generations apart in age if not in attitudes. He was already in retirement when I sought his advice. I am not a systematic filer of such correspondence, but I kept his letters with me as the years passed. I knew that they could not be absorbed at first glance, and was grateful for their generosity of spirit. When he died I had the same sense that one might have a distant benevolent uncle is lost. If only I had asked him more questions...

Those who do not know the scope and power of his insights should sample them at first hand. His selected essays were published in 1981 under the title *A Search for Structure*, with some biographical notes. It is a pity that he did not produce a more integrated and comprehensive expression of his findings. The essays are packed with tantalising themes and tentative ideas which would have richly deserved such a treatment. He could well have written a worthy century-end sequel to D'Arcy Wentworth Thompson. What a pleasing symmetry there would have been in their two triple names!

He also wrote *A History of Metallography* and *From Art to Science*. They represent two stages in his evolution. Beginning as a metallurgist, he became increasingly fascinated by the history of his subject. He explored the complex interplay of science and technology through the ages, and then discerned a further deep connection, between the essential structures which underlay science and art. In the same period literary scholars have tended to the same view from the other side. Few of them can write like Smith!

He called himself a *philomorph*, a word which we might do well to adopt to encapsulate his characteristic approach. It was intuitive and pictorial, a deliberate reaction against the narrow methodology of quantitative science. He saw in materials a richness of forms, as the expression of forces, which had largely escaped his generation of physical scientists, except as failures to achieve some ideal, single phase in perfect equilibrium. He rejoiced, as did the poet Hopkins, in "dappled things" that had texture, beauty, life. He realised that the many complex systems which produced such effects had essential principles in common and fell into broad classes such as dendritic and cellular structures. In each case topology and geometry placed strong constraints on the possible, forcing the similarity of beer froth and grains of brass, imposing order within disorder.

Today we hold such subjects as chaos, fractal theory and pattern generation in high esteem, and must remind ourselves that they are of recent popularity, however ancient their antecedents. Smith was far ahead of his time. He stood alone and original, at least in his early days. For example, his references to the similarity of the complex structures of nature on all scales must have seemed fanciful. Yet today we recognise that the large-scale structure of matter in the universe resembles that of soap froth and those grains of brass which were his earliest concern.

Although he is remembered as a theorist he believed in the importance of direct experience as a stimulus to thought. He spoke of adventures with a Meccano set as a key ingredient of his early training. Scientists, he said, should be allowed to *play*. His advice to me in 1985 was: *I am delighted to hear that you are returning to experimental work with bubbles. Computers are superb for doing what one tells them to do, but one doesn't understand anything unless one has felt it with one's own muscles and produced an effect rather than just seen it develop. Computation is merely the last useful stage of a scientist's activity.* I went straight out and bought a kitchen blender, as specified.

I believe that his writings on the prehistory of solid state physics will never be equalled. That someone else will come along with the same combination of relevant experience, wisdom and interest seems improbable. He declared the history of that subject to be everything that was neglected by previous, conventional accounts of the development of modern science. He filled that void.

For all his protestations of amateur status as a scholar, he must have expended enormous time on the exploration of original sources, and new challenges to conventional wisdom.

Aphorisms abound in his writing. When A. L. Mackay was putting together his charming collection of scientific *bons mots* entitled *Harvest of a Quiet Mind*, he included one from one of Smith's letters. *Matter is a hologram of itself in the field of its own internal radiation.* Please, don't ask me what that means, but doesn't it make you sit up and think?

Selected bibliography

Cyril Stanley Smith

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