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Editors

From Topology to Computation:
Proceedings of the Smalefest

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Banquet Address at the Smalefest

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It is a pleasure to wish Steve a happy birthday and to acknowledge the profound influence that he has had upon British mathematics. Prior to that influence, I remember the first lecture that I ever heard Henry Whitehead give way back in 1950: Henry was saying rather pessimistically that topologists had to give up the homeomorphism problem because it was too difficult and should content themselves with algebraic topology. Marshall Stone said much the same thing in a popular article called "The Revolution in Mathematics," that topology had been nearly completely swallowed up by algebra.

Then, during the next decade, two spectacular results came whizzing across the Atlantic completely dispelling that pessimism. The first was Barry Mazur's proof of the Schönflies Conjecture (later beautifully refined by Mort Brown), and the second was Steve's proof of the Poincaré Conjecture. The secret in each case was the audacity to bypass the main obstruction that had blocked research for half a century. In Barry's case, the blockage was the Alexander horned sphere which he bypassed by the hypothesis of local flatness, and in Steve's case it was dimension 3 which he bypassed by going up to dimensions 5 to infinity. Steve's result, in particular, gave a tremendous boost to the resurgent British interest in geometric topology.

But even more profound has been his influence in dynamical systems. British mathematics had suffered since the war from an artificial apartheid between pure and applied, causing research in differential equations in the UK to fall between two stools and almost disappear. But thanks to the influence of Steve and René Thom, there is now a flourishing school of dynamical systems in the UK, which is having the beneficial side effect of bringing pure and applied together again. In particular, Steve and many of his students came to the year-long Warwick symposia in 1968–69 and 1973–74 which had the effect of drawing widespread attention to the field, and in 1974 we were very proud to be able to give him an honorary degree at Warwick.

I would like to focus on three characteristics of Steve's work. Firstly, his perception is very geometric, and this has always enabled him to see through to the heart of the matter. It has given a unifying thread to all his work. His lectures are beautifully simple, and yet profound, because he always chooses

exactly the right little sketch that will enable his audience to visualise the essence and remember it.

The second characteristic is his excellent mathematical taste. Or to put it another way, I happen to like the same kind of mathematics as he does. We both started in topology, and then both moved into dynamical systems. I remember at one point we both independently became interested in game theory, and when we turned up at the next conference—I think it was at Northwestern—we discovered we had both inadvertently advertised talks with the same title, dynamics in game theory, but luckily the talks were quite different.

Of course, the real evidence for the excellence of Steve's mathematical judgement is the number of mathematicians worldwide who now follow his taste. In fact, I have only known him to make one serious error of judgement, and that was his opinion of catastrophe theory.

The third characteristic of Steve's work to which I would like to draw attention is his audacity and courage. These two qualities are complementary. His audacity is his desire to make a splash, to shock people, to get under their skins, and to make them confront themselves. But one can forgive his audacity because of his courage, his courage to stand by his beliefs even when swimming against the tide. These two personality traits pervade all his activities, his mathematics, his sport and his politics.

In mathematics, he has the audacity to let his intuition leap ahead of proof, and the courage to publish that intuition as bold conjectures. In sport, he has the audacity to tackle mountains and set sail across the oceans, and the courage to carry through with these achievements. In politics, he had the audacity to rebuke the Soviet Union on the steps of Moscow University for invading Hungary, and the courage to face the KGB afterwards if necessary; and in the same breath the audacity to rebuke his own country for invading Vietnam, and the courage to face the consequences afterwards of having to defend his funding against attacks by politicians. This week he had the audacity to refuse to have his broken ankle set in plaster, and the courage to endure the resulting pain so that he would not disappoint us at the Smalefest.

Of course, much of Steve's courage springs from Clara, who has always stood by him through thick and thin, giving him a secure harbour within which to anchor, and from which he could then sail out to conquer the world. It was she who introduced him to the collecting of minerals, to which he has devoted so much of his enthusiasm over the years. I would like to say specially to her tonight that we all include her in the celebrations. So I call upon you to drink a toast to Clara and Steve.