

Introduction

This issue of the *Australian Journal of Physics* and the preceding Festschrift Symposium on ‘Electrons in Solids—The 1990s and Beyond’, held at Monash University on Friday 11th December 1992, honours the career of Geoffrey Charles Fletcher, a distinguished theoretical physicist who celebrated his 70th birthday earlier in 1992. Geoff Fletcher has contributed to solid state physics in Australia for thirty-five years, the first eight being spent in the Department of Applied Mathematics at Sydney University and the rest at the Physics Department of Monash University. In both centres, Geoff has been a stimulating and willing helper to many of us.

His earlier years were spent in London at Christ’s Hospital School and Latymer Upper School. Early in World War 2, Geoff joined the Royal Air Force to become a navigator in bombing missions over Europe and was shot down in 1941 to spend the rest of the war in a German POW (prisoner-of-war) camp. This proved to be an eventful period, to judge from Paul Brickhill’s book ‘The Great Escape’ which describes their efforts to tunnel to freedom. I do not recall whether the film version portrayed Geoff (or Charlie as he was called in the film) as a structural consultant or an active digger in the tunnel business but we rejoice in the fact that he survived.

After the war he was a student at Imperial College, London, taking first class honours in physics in 1948 and then in mathematics in 1949 before his researches began under Professor Harry Jones on the electron theory of metals. This work resulted in his two important papers on the band calculation of the density-of-states of nickel [*Phil. Mag.* **42**, 106 (1951) with Peter Wohlfarth and *Proc. Phys. Soc. A* **65**, 192 (1952)]. After his PhD, he became a Lecturer in Applied Mathematics at Exeter for about six years, continuing some band calculations and developing an interest in lattice dynamics of solids and associated thermodynamic properties. Then in 1957 he and Jeanne followed the good example set by discerning, selected Londoners of earlier days, to move to the ‘colonies’, to Sydney town and the University of Sydney as Senior Lecturer in the Department of Applied Mathematics.

While in Sydney he regularly visited the library of the adjoining CSIRO National Standards Laboratory and was able to give much-needed theoretical help to those of us at NSL who were measuring thermal expansions at liquid helium temperatures for the first time and discovering unusual patterns of behaviour in such materials as Invar and chromium. He was patient and generous of his time in explaining the significance of the shape of the density-of-states curve near the Fermi edge in determining the size and sign of the electron contribution to expansion.

Sadly, from my point of view, he later (1965) went south to Monash University whose Physics Department had quickly established a considerable reputation for research in magnetic metals under the guiding hands of Professors Bob Street and Jack Smith, who had come out from Sheffield when Monash opened its doors to students in 1960.

During his Monash years, Geoff gathered together the fruits of his computational experience of band structures in a major book, ‘The Electron Band Theory of

Solids' (North Holland, Amsterdam, 1971). His papers on band structure in this period included calculations on manganese, rhodium, Ni_3Al , Co_3Ga , Pd_3Fe and gold, some of which were probably stimulated by visiting periods at Queen Mary College, Westinghouse Research Laboratories in Pittsburgh, and Imperial College. His thermal expansion interests also continued with publications on electronic contributions to bulk modulus, heat capacity and expansion, as well as the pressure dependence of the Néel temperature of chromium. One which was significant to John Collins and me was on the electronic Grüneisen parameter for the transition metals [G. C. Fletcher and M. Yahaya, *J. Phys. F: Metal Phys.* **9**, 1529–40 (1979)] which generalised the Lang–Ehrenreich–Heine model to produce specific values of γ_e including the effects of electron–phonon interaction.

Just as Geoff himself covered a very wide field of physics encompassing lattice dynamics, magnetism, band theory and superconductivity, so this Symposium and Festschrift issue range over electrons in a wide variety of environments: electronic centres in diamond and silicon, structure of graphite layers, electrons in a gravitational field, emission of photoelectrons, electron coupling in superconductors and in itinerant magnets. 'Thank You' to the local organisers at Monash University—John Pilbrow, Trevor Finlayson, Tuck Choy and Michael Morgan—for your successful efforts in arranging this Symposium and to the *Australian Journal of Physics* for the dedication of this volume as a tribute to a respected and generous colleague.

Guy White

CSIRO Division of Applied Physics, Lindfield