CURRICULUM VITAE.

Name. Jeremy Dunning-Davies

Nationality. British.

Date of Birth. 21 - 1 - 41.

Education. 1951-59 Barry Boys' Grammar School,
Barry, Glamorgan.
1959-63 Liverpool University.
1963-66 University College, Cardiff.

Qualifications. 1962 - B.Sc. Mathematics, Class II(2), Liverpool.
1963 - Certificate in Education, Liverpool.
1966 - Ph.D. for thesis entitled
"The ideal relativistic quantum gas"
(University of Wales).

Positions. 1966-1968 Assistant Lecturer in Applied Mathematics.
1968-1981 Lecturer in Applied Mathematics.
1981-2002 Senior Lecturer in Applied Mathematics.
2002-2008 Senior Lecturer in Physics.
(All posts held at Hull University)

Prizes. 2008 Gold Medal of the Santilli-Galilei Association for Hadronic Mechanics.

Research Interests.

Having been a research student of Peter Landsberg at University College, Cardiff, it is hardly surprising that I should develop a deep and lasting interest in Thermodynamics. However, initially, my research was concerned with studying the statistical thermodynamics of the ideal relativistic quantum gases and it was this study which led to the award of my Ph.D. As may be seen from the attached list of publications, this study also led to several articles in the period 1966 - 68. Some general results concerning particle-number fluctuations also originated in this study of the ideal quantum gases and provided material for further publications. In the 1980's, attention again focussed on the ideal Bose-Einstein gas, - the interest being reawakened by the exploration, at that time, of the cosmological implications of a massive primordial photon gas and by the increased attention being paid to problems associated with quarks and quark confinement. Since one of the first papers to discuss ideal relativistic Bose condensation was by Peter Landsberg and myself, it seemed natural for us to collaborate on a further study of the Bose gases.

As far as Classical Thermodynamics is concerned, I became interested in the analytical approach to the subject initiated by Carathéodory, but revised and simplified by such as Turner, Buchdahl and Landsberg himself. My contributions have been concerned with the connection between the various forms of the Second Law of Thermodynamics and investigating the possible link between the Second and Third Laws. I have also been interested in negative absolute temperatures and particularly in the possibility of running Carnot cycles when one, or both, of the heat reservoirs have negative absolute temperatures. Most recently, I have returned to study the foundations of the subject after becoming aware of the confusion that exists – especially amongst undergraduates – about topics such as entropy. This has lead to my revisiting the work of Carnot and other 19^{th} century thermodynamicists, especially Tait.

More recently, my research has involved collaboration with Bernard Lavenda of the University of Camerino in Italy on a wide variety of problems in Thermodynamics and Statistical Thermodynamics. Initially, we worked on a probabilistic approach to thermodynamics and showed that physical statistics may be derived from error laws belonging to exponential families of distributions. Instead of using Boltzmann's principle to relate the entropy to what is called the "thermodynamic" probability, we found that the entropy determines the form of the error law. Where Stirling's approximation is applicable, the probability distribution is a function of the difference between the entropy and its maximum value at equilibrium for which the average and most probable values coincide. We have used this approach to establish that there are no intermediate statistics between the well-known Fermi and Bose statistics which are governed by the binomial and negative binomial distributions respectively. The work has continued over a number of years now and, as the publications list shows, the technique may be applied to a wide range of topics. Again, as the publications list shows, my interest in the Second Law of Thermodynamics has remained and this more recent work has reinforced the tremendously wide-ranging importance of this Law.

I have collaborated also with George Cole here at Hull. We are both interested in a wide range of problems in such areas as thermodynamics (especially ideas concerning entropy), astrophysics and relativity (even time travel has come in for discussion as is seen from the publications list). Our discussions led to my delivering an extremely well-received paper entitled "Qualms concerning relativity theory and some of its applications" at an international meeting on the Physical Interpretations of Relativity Theory held at Imperial College, London in September, 1996. At this meeting also, I met Professor R.M.Santilli. This meeting eventually lead to my work on the thermodynamics associated with his hadronic mechanics and finally lead to the thermodynamics associated with systems of anti-matter.

Finally, as my publications list shows, I was involved with collaborative research in electronic engineering with a friend and colleague here at Hull. This resulted in a number of publications, mainly dealing with problems associated with active filters.