

reviews

IN the study of many subjects, including geography, psychology, statistics, eugenics and meteorology, the name of Francis Galton receives mention from time to time. But few, in their training, receive more than a glimpse of the life and work of this somewhat elusive man. Who was he? Where can one gain a comprehensive picture of him? A visit to the library soon leads to the biography by Karl Pearson, completed in 1930, but this work (2,000 pages) is too much for many readers to face. Thus, for many he is still not within reach. But now the position changes, with the timely publication of this book, and at last we have a manageable and readable account; and one which, although only one-sixth of the length of Pearson's work, is nevertheless much more objective.

The first chapter is concerned with the family background and the life of Galton up to the age of 22 (when his father died). Succeeding chapters describe Galton's years as an explorer, in Egypt, Syria and South West Africa, and contain some fascinating accounts of his experiences. One result of these explorations was the production of the famous book entitled *The Art of Travel*, a book which was of great practical value to those contemplating travel in unexplored territory.

After the years of exploration Galton had much to do with the Royal Geographical Society, and with the development of geography as an academic subject; and he played a large part in having the subject introduced at

Francis Galton: psychology of a polymath

Francis Galton: The Life and Work of a Victorian Genius. By D. W. Forrest. Pp. x+340+16 plates. (Elek: London, November 1974.) £5.50.

Oxford University. He also became interested in meteorology, and here he demonstrated his capacity for original scientific research. He studied weather data brought back from Africa by explorers and this led to the discovery of the anticyclone. In 1863 he published a book, *Meteorographica*, containing hundreds of diagrams of climatic conditions in Northern Europe during December, 1861.

By the mid 1860s Galton began to develop an interest in heredity (there is some evidence well documented in this book that the development coincided with a growing realisation that his marriage would probably be infertile). Two chapters carefully trace this interest.

Galton was to a large extent the father of present-day psychology, and several chapters cover in detail his many ideas and experiments in this

field. He was also a pioneer in the development of anthropometry and, at his own expense, set up an anthropometric laboratory as part of the International Health Exhibition held in 1884. His work in this field proceeded with much vigour during the following years and an outstanding development was the technique of personal identification using fingerprints. This work is treated in a chapter devoted to the subject. In 1883, Galton published his last important technical book, *Fingerprints*.

In May 1904 Galton delivered a lecture (at the London School of Economics) to the newly formed Sociological Society, entitled "Eugenics, its Definition, Scope and Aims". This was the birth of the subject of eugenics, and Galton contributed much to the development of this subject. He was by this time, however, into his eighties and his health was on the decline. He died in 1911 at the age of 89.

Professor Forrest's book will be of interest to students drawn from various disciplines. It includes a detailed account of Galton's inventions of various pieces of apparatus, and a bibliography of his published works. It reveals a great deal about the psychology of one who pioneered a good deal of modern psychology (especially with emphasis on the experimental approach), and also a lot about Victorian society in general. The book will be of interest to historians as well as psychologists, biologists and statisticians. **L. S. Goddard**

NUCLEAR form-factors measured in elastic electron-scattering experiments decrease with increasing momentum transfer at a rate determined by the nuclear size. If one looks instead at the inelastic region, where the electron loses large amounts of momentum, q , and energy, ν , the cross-section is dominated by quasi-elastic scattering from the individual nucleons in the nucleus, and the q -dependence is a measure of the proton size. In analogous experiments with a hydrogen target, Stanford physicists claimed that in this deep inelastic region they could 'see' the constituents of the proton itself; and the q -dependence indicated that these partons were point particles. Bjorken scaling was observed; apart from kinematic factors the cross-section in this region depended only upon ν/q^2 rather than the independent variables.

Kindergarten parton model

Theory of Lepton-Hadron Processes at High Energies: Partons, Scale Invariance, and Light-Cone Physics. (Oxford Studies in Physics.) By Roy Probur. Pp. x+172. (Clarendon: Oxford; Oxford University Press: London; February 1975.) £6.

Some five years later this "kindergarten parton model" is still very much with us, and Dr Roy's book is a description of these intuitive ideas with their experimental consequences, and the more formal concepts, of scale invariance and

light-cone algebra which have developed from them. The book is likely to be useful to second-year graduate students and 'above'; in the early part it requires knowledge of simple quantum electrodynamic calculations but towards the end the renormalisation group in field theory is called for.

Any introduction to a rapidly changing field can expect to be overtaken by events. Thus, if the author had written the book after the discovery of the ψ particles last November, he would doubtless have stressed the charm quantum number much more. Scaling has influenced the interpretation of deep inelastic proton-proton scattering, but the author has wisely confined himself to lepton scattering where a basic formalism exists and is likely to be of some lasting value.

Colin Wilkin