ulating or form regulating substance in neurosecretory granules, which is intimately involved in growth and regeneration. This view is based in part on the effect of neuropharmacological agents on regeneration, which I would regard as remarkably unimpressive and inconclusive. The most useful material in the book is the electron microscope observations, which provide a convenient and detailed structural description; the summarizing diagrams are particularly clear. There are also some interesting suggestions and observations on the control of nematocyst discharge.

For the research worker dealing with hydra this is quite a useful but uninspiring book. It cannot be recommended for other biologists. The many cell biology problems posed by hydra remain largely unexplored and even the problems of form, growth, regeneration, behaviour, communication and osmoregulation are undefined. If one is to write a book on a topic of considerable interest based mainly on one's own research work, then this work ought to be seminal, or at least well above average. The work described here is not.

L. WOLFERT

TRACKING BRITISH MAMMALS

Mammals of Britain

Their Tracks, Trails and Signs. By M. J. Lawrence and R. W. Brown. Pp. 223 + 32 plates. (London: Blandford Press, 1967.) 30s. net.

APPEARING SO SOON after the *Handbook of British Mammals*, a new book on the subject calls for some justification by way of fresh information and novel treatment. This useful book passes the test by reason of its concentration on drawings of the footprints and droppings of mammals and inclusion of many more drawings of skulls and teeth. The basic information about each species being less than is given in the *Handbook*, one still inevitably turns to the latter as a reference book, but Lawrence and Brown have produced a handy companion to the larger work. Another different feature is the distribution maps given for some (but not all) of the wild species (domestic animals are also included). These, I feel, do not always come off; some of them, such as otter, pine marten, Leisler's bat and mole, merely illustrate how very difficult it is to put imperfect information into map form. The authors are not, of course, to blame for the imperfection of the information, which is the fault of all British mammalogists, but they have tended to give an impression of precision where vagueness should have been the order of the day. And an attempt to show vagueness on a map usually ends in disaster.

I am also struck by how hard it is nowadays to produce a really up to date book on British wildlife. New facts are constantly emerging or being discovered, and no book can be completely up to date, even given perfect distribution of new knowledge. In this book, for instance, one naturally looks first to the mink, the grey long-eared bat and the coypu, and in each case events have moved on since the book was written, doubtless 18 months or so before it was published. But by the same token the authors are that much more up to date than the *Handbook*, published in 1964.

R. S. R. FITTER

another to arrange a discussion about a joint publication. His death came as a shock to his many friends who had seen him so relaxed and happy during recent years when, free from administrative duties, he was able to enjoy his laboratory work and pursue his many other interests.

Hinshelwood was recognized internationally as one of the finest intellects of our time, a polymath, a descendant of those men described in John Evelyn's diary as "My lords virtuosi"—the early Fellows of the newly born Royal Society, over which he was to preside with distinction. Born in 1897, he was educated at Westminster City School, went to Balliol College, Oxford, in 1919 with a Brackenbury scholarship, and gained distinction in the shortened post-war course in 1920. After a year as a fellow of Balliol, he became a fellow and tutor of Trinity, and in 1937 succeeded Professor F. Soddy as Dr Lee's professor of physical and inorganic chemistry. On retirement in 1964, he returned to his native London as a senior research fellow of Imperial College. During his professorship, physical chemistry at Oxford reached full bloom. The move was made from the cellars and out-houses of Trinity and Balliol to new laboratories, and among his staff were nine Fellows of the Royal Society leading research groups in diverse fields.

From 1916-19 he worked at the Queensferry Royal Ordnance factory on explosives, where his remarkable ability was quickly noticed. This work stimulated his interest in the mechanisms of chemical change, which was to be the main theme of nearly all his scientific research. Throughout, he showed a mastery in planning simple measurements to answer questions of great complexity. His earliest papers dealt with the velocity of decomposition of solid substances and of reactions of gases on metallic catalysts. He soon turned to homogeneous gas reactions with special reference to theories of molecular activation. In 1926 he interpreted some first order decompositions of organic molecules as quasi-unimolecular processes involving activation by collisional mechanisms. Soon afterwards, from kinetic measurements he established the main characteristics of thermal chain reactions. The discovery of critical explosion limits, similar to those found by Semenov in other systems at about the same time, led to new ideas about straight and branching chains. The effects of catalysts such as iodine on some of these gas reactions, of inhibitors such as nitric oxide or propylene, and of deuterium were used to clarify other details. In those early years, the origin and nature of the chain carriers were obscure, and Hinshelwood sought, with meticulous care, to establish their identity. His final account of the hydrogen-oxygen reaction, given in the Bakerian lecture (1946), was the culmination of a long exemplary application of the scientific method to disentangle the intricacies of this process. Later, he studied the mechanism of thermal decomposition of hydrocarbons, and the polymerization of some unsaturated compounds. Over many years, too, he examined the kinetics of a variety of reactions in non-aqueous solvents and in the liquid phase. Here again, the main aim was to establish the significance of the constants in the Arrhenius equation and the functional relationships between them. He analysed the different approach in his own work and that of others using the so-called transition state theory, but emphasized clearly the fundamental relationships between the different methods. His book on *The Kinetics of Chemical Change* appeared, in a kind of evolutionary way, in four editions between 1926 and 1940.

In 1938 he used the kinetic approach to study physico-chemical aspects of bacterial growth, and this subject perhaps remained his major love to the end. The influence of added substances on the different phases of the growth curve, the adaptation of bacteria and their resistance to drug action caused by changes of media, the take-up of alkali metals or of phosphorus and the effect of different carbon sources, were examined. The living cell was con-

OBITUARIES

Sir Cyril Hinshelwood

SIR CYRIL HINSHELWOOD died at his London home during the evening of October 9. A few hours earlier he had talked with one research student and had written to