to Zittel's long-outdated *Grundzüge der Paläontologie*. This volume of the *Traité* will be a valuable reference work for zoologists and geologists in general besides mammalian palæontologists in particular. The illustrations are plentiful and clearly reproduced, considering the diverse quality of many of the originals. The table of contents is very inadequate, just over one page in a work of more than 1,100 pages, and lack of systematic tabulations within the text will impair the work's ease of use. A stricter editorial policy would have made for more uniform treatment of subjects and more consistent revisions, for some parts give the impression of having been written a decade ago. The work will be used by many without a detailed knowledge of stratigraphy, yet it lacks a correlative table of stratigraphical terms.

Space does permit comment on each order. The editor is to be congratulated in obtaining the services of Orlov and Tchudinov to describe the Russian therapsid material, all too little known in the West. The therapsids are comprehensively treated, abundantly illustrated and the problems of their relationships, so much *sub judice* at present, are succinctly summarized.

A brief chapter is devoted to geographic and stratigraphic distribution of Tertiary mammals, with maps of each continent and lists of main sites; by a peculiarly Gallic twist of logic, Europe comprises only France, Western Germany and Spain. The palæontologist would have welcomed more maps and fewer illustrations of palæolithic cave art, so well dealt with elsewhere. The inclusion with each section of an account on brain-casts is imaginative and laudable.

In the section on carnivores, practically all genera up to 1945, except those the validity of which is suspect, are mentioned and their characteristics briefly noted. No less than fifty new genera of fossil carnivores have been described since 1945 (excluding Kretzoi's re-naming of known forms) and of these only eleven are mentioned. This omission of several important new faunas described within the past two decades is an unfortunate defect. Other groups are admirably up to date, as, for example, the Artiodactyla, where the treatment of this very large and complex order has been skilfully handled by Viret.

It is unfortunate that so useful a volume should be priced outside the reach of many individuals.

R. J. G. SAVAGE

THE DIVERSITY OF URBAN LIFE

British Towns
A Statistical Study of Their Social and Economic Differences. By C. A. Moser and Wolf Scott. (Centre for Urban Studies: Report No. 2.) Pp. xii + 169. (Edinburgh and London: Oliver and Boyd, Ltd., 1961.) 30s. net.

AT the 1951 census there were in England and Wales 157 urban areas with a population of not less than 50,000. Diversity was perhaps their most striking characteristic. In size they ranged from Harrogate with 50,000 to the Administrative County of London with 3·3 millions. The proportion of the population over 65 years varied from a mere 5 per cent in Dagenham to 25 per cent in Worthing. Over the two previous decades West Ham had declined in size by 42 per cent while in contrast Huyton had increased by 973 per cent. Annual retail sales per

head of population ranged from £38 in Huyton to £244 in Worcester. Using 57 variables and data relating mainly to 1951, Moser and Scott present an empirical study of the rich variety of urban life in these 157 centres of population. The variables embrace demographic characteristics, housing, economic activities, voting behaviour, indices of health, and some aspects of education. Chapters 2 and 3 describe this diversity in some detail. Chapter 4 considers the matrix of 1,596 zero order correlations between the variables taken in pairs. Chapter 5 uses multivariate analysis to extract four principal, orthogonal, components of the form: $\xi_i = \Sigma a_{ij} x_j$, where the x_j are the original variables in standard form, which together absorb 60 per cent of the variance. Chapter 6 considers each town as represented by a point in four-dimensional space with the ξ_i as co-ordinates. All but two of the points thus derived are grouped into an arbitrary number of clusters so that the mean distance of points in a cluster from their centre is less than the distance between clusters. This clustering is interpreted as a 14-point classification of the towns of England and Wales. The Administrative County of London and Huyton-with-Roby in Lancashire defy classification. Chapter 1 is a short summary of the volume, and the book closes with a series of appendixes on the original data and a brief comparison with Scotland.

The authors are scrupulously fair about the limitations of their method. The factors yielded by component analysis will depend on the selection of the original variables. That selection in turn depended in part on the authors' ideas of what was relevant to a description of the varied pattern of urban life, but perhaps more on the availability of comparable data. Some of the diversity will arise simply from the arbitrary nature of the boundaries of our towns. Carve out a slice of the low-status area of north Merseyside, label it 'Bootle', treat it as a separate urban area, and it must be expected that its characteristics will differ markedly from those of Liverpool with its rich mixture of all classes. Let Parliament re-draw the Local Government map and the method may yield quite different components. There is little even to suggest that similar results will follow from the use of data shortly to become available from the 1961 census. But the experiment must certainly be tried. If the same components again emerge then it is time to carry the investigation much further. As the authors themselves remark, this is a pilot study. It is perhaps best regarded as a meticulous set of laboratory notes, awaiting further evidence and, above all, awaiting a unifying theory.

H. SILCOCK

TERMS OF REFERENCE

The International Dictionary of Applied Mathematics
Editor-in-Chief: Prof. W. F. Freiberger. Pp. viii + 1173. (Princeton, N.J.: D. Van Nostrand Company. Inc.; London, D. Van Nostrand Company, Ltd., 1960.) 187s. 6d.

IN the preface to this considerable compilation, the editors state that the dictionary "defines the terms and describes the methods in the applications of mathematics to thirty-one fields of physical science and engineering". This is a fair claim, but a prospective reader may pertinently inquire for whose benefit