Biological Journal of the Linnean Society (1987) *31:* 193–246. With 6 figures

Interspecific allometry of population density in mammals and other animals: the independence of body mass and population energy-use

JOHN DAMUTH

Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington D.C. 20560, U.S.A.

Received 23 October 1986, accepted for publication 30 January 1987

Global regressions of ecological population densities on body mass for mammals and for terrestrial animals as a whole show that local population energy-use is approximately independent of adult body mass—over a body mass range spanning more than 11 orders of magnitude. This independence is represented by the slope of the regressions approximating −0.75, the reciprocal of the way that individual metabolic requirements scale with body mass. The pattern still holds for mammalian primary consumers when the data are broken down by geographic area, by broad habitat-type and by individual community. Slopes for mammalian secondary consumers are also not statistically distinguishable from −0.75. For any given body mass temperate herbivores maintain on average population densities of 1.5 to 2.0 times those of tropical ones, though slopes do not differ. Terrestrial animals of all sizes exhibit approximately the same range of population energy-use values. These results agree with those reported for population energy-budgets. It is suggested that rough independence of body mass and the energy-use of local populations is a widespread rule of animal ecology and community structure.

KEY WORDS:—population density – allometry — energy flow – body mass – energy budget – mammals – terrestrial animals – aquatic animals – metabolism.

CONTENTS

0024-4066/87/070193+54 $03.00/0

INTRODUCTION

Among animal species, a large number of physiological and ecological characteristics can be related to body mass by an equation of the form $X = aM^b$, where M is body mass, X the characteristic of interest, and a and b are constants (e.g. Kleiber, 1932; Hemmingsen, 1950, 1960; McNab, 1963; Jarman, 1974; Jerison, 1973; Blueweiss, Fox, Kudzma *et al.*, 1978; Damuth, 1981a, 1981b; Eisenberg, 1981; McMahon & Bonner, 1983; Peters, 1983; Schmidt-Nielsen, 1984; Calder, 1984). The exponent, b, is also the slope of the line expressing the linear relationship between the log-transformed variables: $\log(X) = \log(a) + b[\log(M)]$.

Large animals are typically less abundant locally than are small animals (b is negative). For herbivorous mammals, it has been shown that population density decreases with body mass according to an interspecific allometric relation, the exponent of which is approximately the negative of the exponent by which metabolic rates increase with body mass (Damuth, 1981a). The amount of energy used by the local population of a particular species is its population density multiplied by individual metabolic requirements. Relating this quantity to body mass involves summing the exponents of the density and metabolic-rate relations, which cancel for mammalian primary consumers (Damuth, 1981a):

$$[\text{Energy-use}] \propto M^{[b \text{ for density}] + [b \text{ for metabolism}]} \simeq M^0 = 1.$$

This means that the amount of trophic energy used by the local population of any herbivore species is essentially independent of its body mass. Further, it was shown that this global relationship also roughly characterizes that found within local communities (Damuth, 1981a; in press). Approximate independence of body mass and population energy-use will be the case in any group of species where the exponent for population density scaling is approximately equal to the negative of that for individual metabolic requirements.

Subsequent work has attempted to characterize population density scaling in other groups of animals, and to examine the scaling in herbivorous mammals in more detail (Gittleman, 1983; Peters, 1983; Peters & Wassenberg, 1983; MacMahon & Bonner, 1983; Peters & Raelson, 1984; Robinson & Redford, 1986; Brown & Maurer, 1986; Juanes, 1986). While describing some relationships of interest, none of these studies (except that of Robinson & Redford) have been strictly comparable to that of Damuth (1981a). This is because the studies have either mixed dietary categories (Gittleman), mixed metabolic types (i.e. endothermy and ectothermy; Peters & Wassenberg; MacMahon & Bonner), used crude (rather than ecological) densities (Peters *et al.*), used seasonal (rather than year-round) densities (Brown & Maurer, Juanes), used a small body-size range (Brown & Maurer, Juanes), or used a small sample size for some groups (Robinson & Redford, in part). The present contribution reports analyses based upon ecological densities for 467 species of mammals and for 200 species of other vertebrate and invertebrate taxa, which constitute the largest and most extensive data set used to date (see Appendix).

MATERIALS AND METHODS

Data sources and analytical techniques

I collected dietary information, mean adult body-mass, and population density data from the published literature (see Appendix). For the mammals,

data were obtained from approximately 115 journals surveyed completely for the years 1950–1979 (if applicable), and from the numerous books. Coverage since 1979 is not as comprehensive. The data represent the contents of over 600 articles, mostly primary literature. The mammal data include only terrestrial, non-volant mammal species. For poikilothermic vertebrates and for invertebrates, the data are taken from approximately 130 articles spanning the same time period. The data on poikilothermic organisms are not intended to represent a complete literature review, but are considered to be representative for the groups included.

Birds were not included because many species migrate over long distances, and most reports in the literature are of breeding densities only (e.g. Brown & Maurer, 1986; Juanes, 1986). It is therefore difficult to obtain from the literature estimates of population density that are comparable to those available for other animals.

Dietary information for mammals was obtained from the same sources as were the density and body-mass data, and from general works dealing with mammalian natural history (Burt & Grossenheider, 1964; Van Den Brink, 1968; Collins, 1973; Hunsaker, 1977; Haltenorth & Diller, 1977). Non-mammals have not been analysed here by dietary groupings.

Body masses are mean adult values, based upon the mean of both sexes if there is size dimorphism. Where only a range of values was available, I used the midpoint of the range to approximate a mean value. For some invertebrate species that exhibit indeterminate growth biomass values were given over a growing season; I thus had available densities at different body sizes. In such cases I used the geometric (rather than the arithmetic) mean for both body mass and density, because there was commonly an allometric relationship between these variables for such species. Otherwise, vertebrates and invertebrates were treated in the same way.

Population density for each species is the mean value over all of the localities for which densities were reported for that species. When there was more than one locality for a species, within-locality means were calculated first (by year, if appropriate), then the mean of means over all localities (this prevents bias caused by there being different numbers of censuses of the same population). The data are thus time-averaged over whatever length of time the original studies covered (in the majority of cases at least 1 year—especially for small mammals); for species known to 'cycle' (e.g. many microtine rodents) the densities are averaged over at least one cycle. This requirement was relaxed for many invertebrate species for which there were no data on densities over a dormant season. I excluded reports of outbreaks or population crashes, most island populations of mainland species, and other work likely to be recording unusual situations. I accepted data based on most methods current researchers employ, but excluded relative measures and most reports based upon kill-trapping, unless it was clear that the total number of individuals had been removed and/or that migration had been negligible. In all cases I attempted to take into account the comments of the authors concerning the reliability and comparative value of their own estimates.

'Ecological' densities refer to those over the area of habitat actually used by the animals, as opposed to 'crude' densities, which report the number of individuals occupying some arbitrarily-chosen area, only part of which the animals under study may occupy (frequently a total park area, or a political or

administrative district). While of importance in conservation practice, crude densities are obviously not suitable for ecological comparisons among species. Many references explicitly reported ecological densities. However, for many species the detailed patterns of habitat-use are not well-known. Nevertheless, most authors expressed some awareness of the degree to which their study organisms occupied or traversed the area sampled, and it was therefore possible to distinguish those data that in all probability constituted or closely approximated ecological densities from those that did not. I cannot claim that every one of the data points is a bona fide ecological density, but every effort was made to achieve this, and extremely misleading crude densities have been excluded by this means. (The reference lists in the Appendix occasionally include some papers containing unreliable or otherwise inappropriate data that nevertheless gave useful comparative information, but the listed values are based only upon reliable data.)

I transformed the data to logarithms, and used standard linear regression techniques for statistical analysis. Over the range of body masses studied, error in the estimation of body mass for individual species is relatively small and has a negligible effect upon the regression coefficients. Felsenstein (1985) has cautioned that a degree of unrecognized statistical dependence among the data values will cause an overestimation of the degrees of freedom involved in statistical hypothesis-testing. In a large and diverse data set such as this one this effect will ordinarily be minor; however, it is not possible to guarantee that the data values reported in the literature are distributed completely independently with regard to all relevant variables. Thus, the 'real' standard errors of the regression statistics reported here may be somewhat larger than the listed values.

Dietary groupings

It is expected that diet will have an effect upon population density values. This is not only because of the trophic 'pyramid' (Elton, 1927), but also because different types of foods may typically be present in different abundances, and the qualities of different foods may impose different ecological or physiological limitations on their potential for exploitation by particular consumers. Furthermore, dietary differences are related to differences in levels of basal metabolism in mammals (McNab, 1986a), and these differences in energetics may influence ecological variables, including population density. It would be ideal to compare in a single regression only those mammals that differ in body size but that have identical diets. However, too fine a division of dietary categories is not practical in such an analysis. This is because diet itself is related to body mass (Bell, 1970; Jarman, 1974; Clutton-Brock & Harvey, 1977; Eisenberg, 1981), and variation in population density for a given body mass is typically such that a range of body mass of at least three orders of magnitude is required for density regressions to be statistically meaningful (Damuth, 1981a). Therefore, the mammal data have been grouped into rather broad dietary divisions. 'Primary consumers' include all species that obtain a majority of their yearly energy requirements from plant material. This grouping thus includes a number of rodent species that are often classified as 'omnivorous' (e.g. Landry, 1970). Such species frequently consume animal matter opportunistically, particularly in the season of highest insect abundance, but the rest of the year

they depend primarily on plant foods (e.g. for *Peromyscus* see Whittaker, 1966; Flake, 1973; Meserve, 1976). Rodent species known to be insectivorous specialists (e.g. *Onychomys, Rhinosciurus*) have been included among the 'invertebrate-consumers'. Invertebrate-consumers include specialist insectivores of all sizes, but this is a somewhat heterogeneous grouping, since the larger species are almost all myrmecophagous, as opposed to the more generalized insectivory of the smaller species. Vertebrate-consumers have been separated from invertebrate-consumers because the body-mass range differs between the two groupings, and because the latter were observed to have, on average, higher densities. A regression calculated on the combined data would reflect these differences as well as the relationship of interest.

ALLOMETRY OF METABOLIC REQUIREMENTS

It has long been known that basal and standard metabolic rates of homeothermic, poikilothermic and unicellular organisms scale as body mass raised to the 0.75 power (Kleiber, 1932; Hemmingsen, 1950, 1960). Recently McNab (1986a, b) has shown that much of the variation in mammalian basal rates not explained by size can be explained by differences in diet. (Of course, the actual causal factors responsible for this correlation may be other, unknown characteristics with which diet and phylogenetic relationships are correlated; e.g. Elgar & Harvey, in press.) Grazing mammals and those feeding on vertebrate flesh exhibit high rates of basal metabolism, and those feeding on invertebrates, fruit and leaves exhibit low rates. However, within the dietary groupings used in this study, basal rates for primary consumers and for vertebrate-consumers still scale with b equal to approximately 0.75 (Table 1).

Invertebrate-consumers as a group exhibit a significantly lower slope. At small body-sizes eutherian mammals elevate their metabolic rates in order to maintain endothermy, but marsupials do not (McNab, 1983, 1986b). Even with the eutherians of less than 100 g removed from the analysis, the slope is less than 0.75 (0.60). Myrmecophagous mammals, which make up most of the large invertebrate-consumers, encounter particular problems in energy acquisition at large size owing to the nature of their food source, and this may be in part

Table 1. Mammalian metabolic-rate scaling

Trophic group	Slope	S.E.	Intercept	r	N
Primary consumers	0.72	0.012	0.59	0.98	200
Invertebrate-consumers	0.55	0.030	0.93	0.91	78
Invertebrate-consumers, excluding eutherians < 100 g	0.60	0.044	0.78	0.88	56
Vertebrate-consumers	0.74	0.042	0.61	0.97	23

Regressions are for $\log_{10}$ metabolic rate (O_2 consumption in $cm^3\ h^{-1}$) regressed on $\log_{10}$ body mass (g). The data are combined from Hayssen & Lacy (1985) and McNab (1986), and include only the terrestrial, non-volant therian mammal species. S.E. = standard error of the slope; r = correlation coefficient; N = sample size (number of species).

responsible for the difference in scaling in this somewhat heterogeneous grouping (McNab, 1984).

Metabolic rates of active, free-ranging mammals in nature are much less well known. Available evidence indicates that active metabolic rates roughly parallel basal rates, varying between approximately 1.5 to 3.0 times basal values at all body sizes (Brody, 1945; Chew & Chew, 1970; Mullen, 1971; Mullen & Chew, 1973; McKay, 1973; Moen, 1973; Gessaman, 1973; King, 1974; Schreiber, 1978; Nagy & Milton, 1979; Damuth, 1982; Peters, 1983; Nagy, 1987). A similar range is reported for poikilothermic organisms (Peters, 1983). Thus, metabolic requirements in nature can be considered for most purposes to scale approximately as mass to the 0.75 power (see also Farlow, 1976, for metabolic requirements of captive vertebrates). Furthermore, since assimilation efficiency is independent of body size (Kleiber, 1975; Peters, 1983), the scalding of metabolic requirements also represents the scalding of energy-consumption in nature.

ALLOMETRY OF POPULATION DENSITY

Mammals—primary consumers

For the set of mammalian primary consumers, population density scales as body mass to the -0.73 power (Table 2, Fig. 1). This value is statistically indistinguishable from -0.75, and agrees with previous results (Damuth, 1981a). Table 3 shows the data broken down by geographic region and by broad habitat-type. Choice of categories was limited by the need to have both a large enough sample size and a sufficiently large body-mass range for the regressions to be meaningful. There are no statistically significant differences in slope among any of the appropriate comparisons (analysis of covariance and t-tests, all $P > 0.05$), and none of the slopes are significantly different from -0.75. (Robinson & Redford, 1986, reported a somewhat shallower slope in their comparable sample of Neotropical herbivores.) However, there are differences in the elevations of the lines: tropical species, in both open and forest habitats, have significantly lower population densities than do their non-tropical counterparts (as Peters & Raelson, 1984, found for a sample of herbivore crude

Table 2. Population density regressed on body mass for mammals

Trophic group	Slope	S.E.	Intercept	r	N
Primary consumers	-0.73	0.024	4.15	-0.84	368
Invertebrate-consumers	-0.81	0.082	3.65	-0.82	50
Invertebrate-consumers, excluding eutherians < 100 g	-0.76	0.124	3.38	-0.79	25
Vertebrate-consumers	-0.96	0.106	3.47	-0.82	42
All mammals	-0.78	0.027	4.06	-0.80	467

Regressions are for $\log_{10}$ population density (number of individuals per km^2) regressed on $\log_{10}$ body mass (g). Symbols and abbreviations as in Table 1.

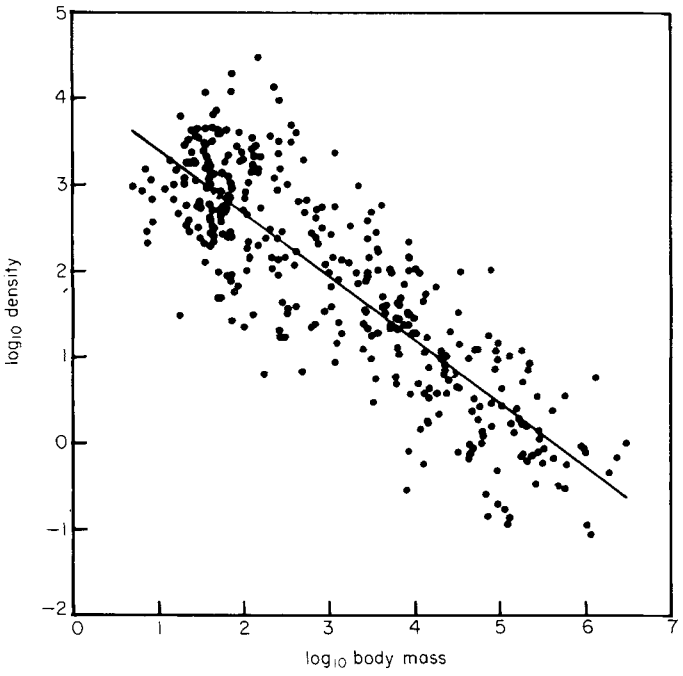

Figure 1. Population density regressed on body mass for mammalian primary consumers. Each point represents one species. Data in the Appendix. Regression equation in Table 2.

densities). The average temperate herbivore maintains a population density approximately 1.5 to 2.0 times that of a tropical herbivore of the same size. Because in this sample the body-size range is the same for both tropical and non-tropical species, the global regression exhibits a similar slope to that of the subsets, in spite of this difference between tropical and non-tropical densities.

Table 3. Mammmalian primary-consumer regressions, by geography and habitat-type

Grouping	Slope	s.e.	Intercept	r	N
Geography					
Tropics	−0.73	0.031	4.08	−0.85	203
Non-tropics	−0.79	0.051	4.51	−0.84	97
North America	−0.75	0.057	4.33	−0.82	84
East Africa	−0.73	0.056	4.13	−0.85	68
South & Central America (tropics)	−0.70	0.086	4.06	−0.80	40
Habitat					
Grasslands & Savanna	−0.80	0.039	4.46	−0.88	124
Tropical	−0.76	0.043	4.20	−0.89	83
Non-tropical	−0.78	0.100	4.62	−0.78	41
Forests	−0.72	0.035	4.14	−0.85	165
Tropical	−0.67	0.047	3.91	−0.80	120
Non-tropical	−0.72	0.060	4.31	−0.88	45

Regressions are of $\log_{10}$ population density (number of individuals per km^2) regressed on $\log_{10}$ body mass (g). Species from desert areas in both the tropics and temperate zones were excluded from these calculations. Symbols and abbreviations as in Table 1.

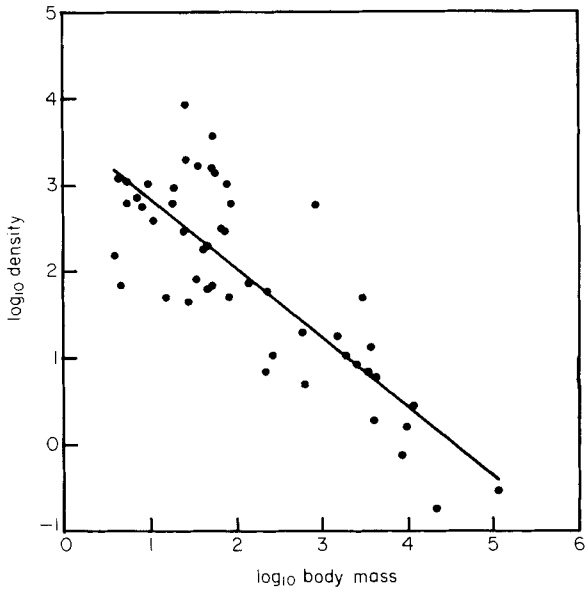

Figure 2. Population density regressed on body mass for mammalian insect-consumers. Each point represents one species. Data in the Appendix. Regression equation in Table 2.

Mammals—secondary consumers

The slopes for invertebrate-consumers and vertebrate-consumers are not significantly different from that for herbivores ($P > 0.40$ and $P > 0.05$, respectively), nor are they different from -0.75 (Table 2, Figs 2–3). The elevations of the secondary-consumer lines are lower than that for primary

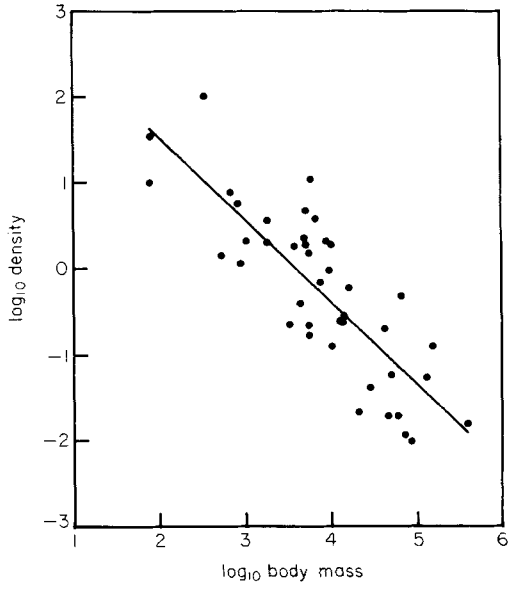

Figure 3. Population density regressed on body mass for mammalian vertebrate-consumers. Each point represents one species. Data in the Appendix. Regression equation in Table 2.

Table 4. Population density regressed on body mass for the Animalia

Grouping	Slope	S.E.	Intercept	r	N
All Animalia	−1.05	0.015	5.11	−0.94	667
Aquatic animals	−0.87	0.036	6.11	−0.90	140
Terrestrial animals	−0.95	0.018	4.68	−0.92	527
Terrestrial animals, adjusted for metabolism	−0.76	0.018	3.98	−0.88	527

Regressions are of $\log_{10}$ population density (number of individuals per km^2) regressed on $\log_{10}$ body mass (g). Symbols and abbreviations as in Table 1. For adjustment for metabolism, see text.

consumers. The secondary consumer data sets have not been broken down further for analysis because of the small sample size within each geographic and habitat category.

When small eutherians are removed from the invertebrate-consumer regression the slope drops from −0.81 to −0.76. This means that the small

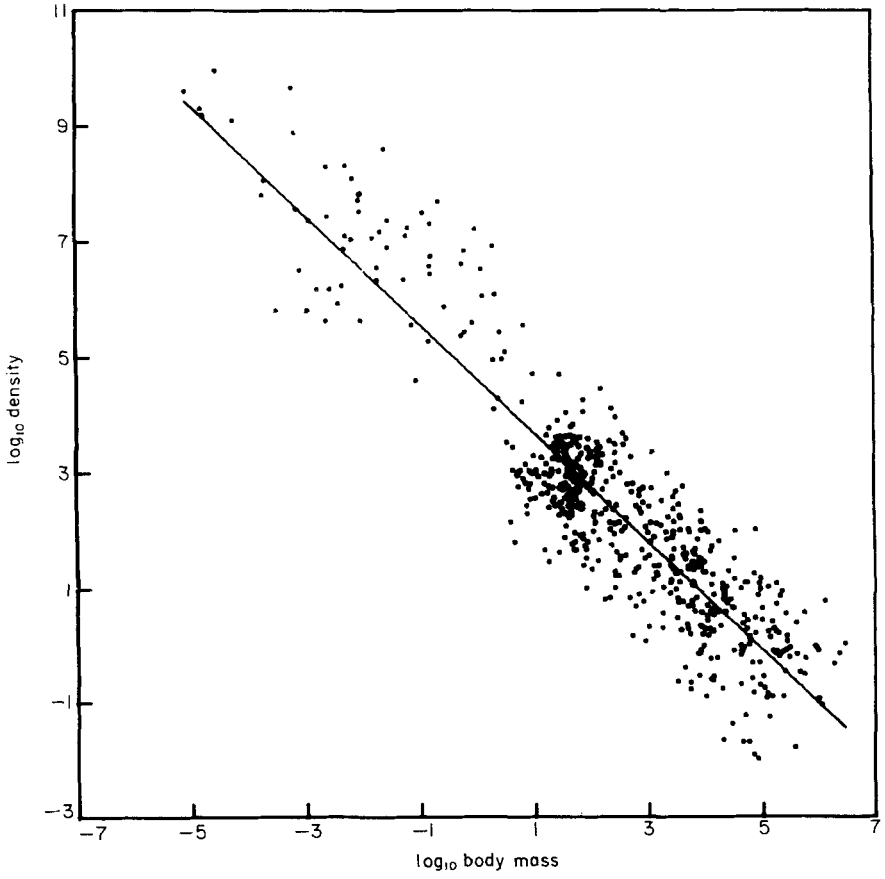

Figure 4. Population density regressed on body mass for terrestrial animals (unmodified data). Each point represents one species. Data in the Appendix. Regression equation in Table 4.

insectivores that exhibit high metabolic rates are also exhibiting high population densities, which is somewhat unexpected (see discussion).

Terrestrial animals

Adding data on terrestrial invertebrates and poikilothermic vertebrates to the data for mammals yields a regression for terrestrial organisms. All trophic levels and dietary types have been combined for this analysis. The slope (−0.95) is significantly steeper than −0.75, as Peters & Wassenberg (1983) reported for a similar regression (Table 4, Fig. 4). However, in such regressions (including that of Fig. 4) poikilothermic ectotherms and homeothermic endotherms have been included in the same analysis. Homeothermic individuals use energy at a rate that is approximately 30 times that of poikilotherms of the same size (Hemmingsen, 1950, 1960; Peters, 1983). Thus, in this data set, differences in population density for a given size do not necessarily directly reflect corresponding differences in population energy-use. We can crudely correct for this difference in metabolic level by dividing all poikilothermic population densities by a factor of 30. Each data point will then be comparable in the way that it represents rate of energy-use. The resulting regression exhibits a slope of −0.76, showing that in the terrestrial biota energy use is independent of body mass over 11 orders of magnitude (Table 4, Fig. 5).

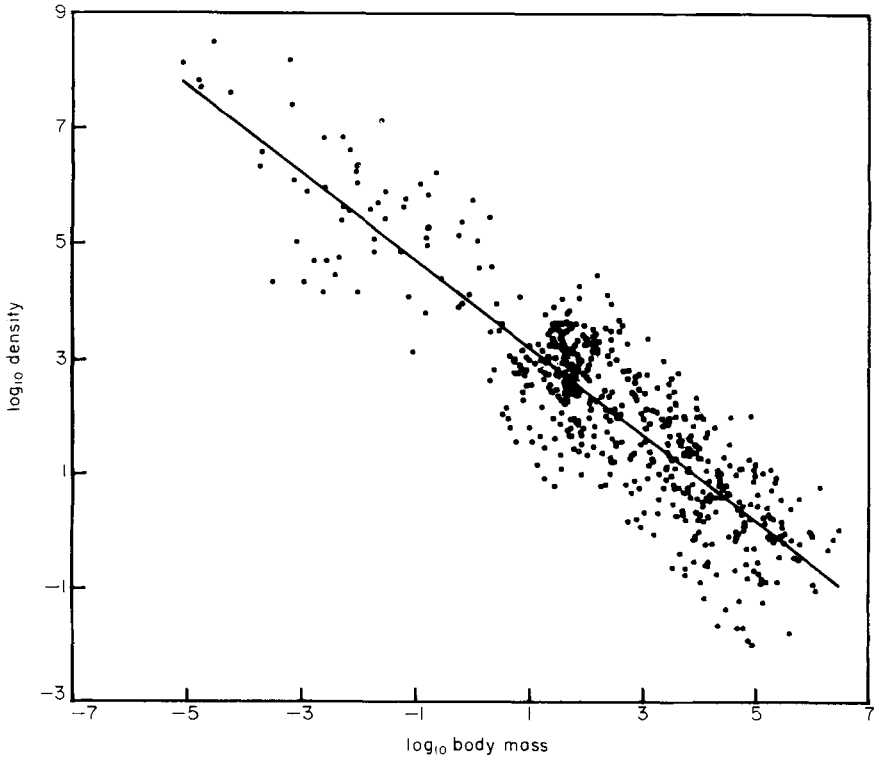

Figure 5. Population density regressed on body mass for terrestrial animals (corrected for metabolic level; see text). Each point represents one species. Data in the Appendix. Regression equation in Table 4.

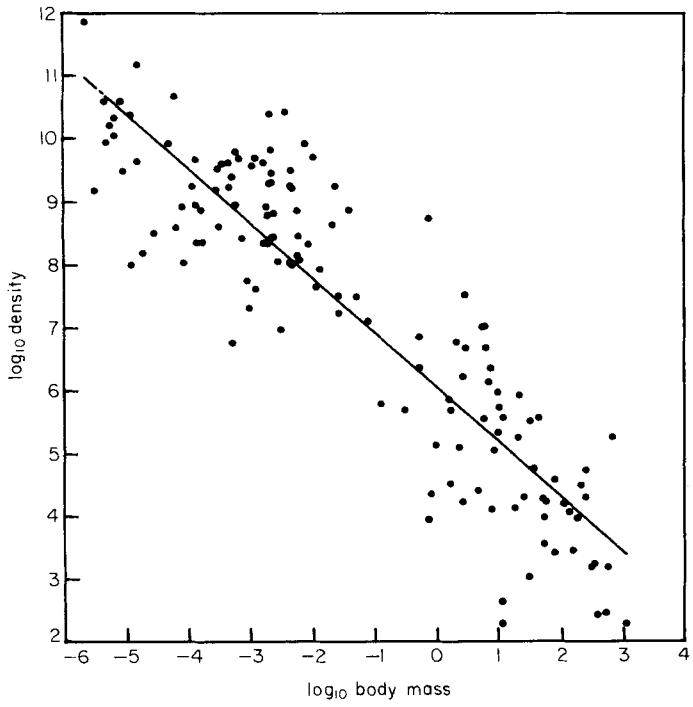

Figure 6. Population density regressed on body mass for aquatic animals. Each point represents one species. Data in the Appendix. Regression equation in Table 4.

Aquatic animals

All aquatic organisms in the data set are poikilothermic ectotherms, and so can be compared directly. The slope (−0.87) is significantly steeper than −0.75 (Table 4, Fig. 6).

ALLOMETRY OF ENERGY BUDGETS

The independence of body mass and energy-use can be examined directly through the scaling of energy-budgets. Odum (1971) and Ricklefs (1973) have suggested that population energy budgets of different-sized species are often very similar. Humphreys (1981) has compiled estimates of yearly population energy budgets for 89 non-avian animal species. For both aquatic and terrestrial

Table 5. Regressions of population assimilation-rate on body mass

Grouping	Slope	Intercept	r	N
Terrestrial animals	0.072	−0.278	0.15	63
Aquatic animals	−0.058	1.97	−0.18	26
All combined	−0.080	1.16	−0.15	89

Data consist of all non-avian data reported per species in Humphreys (1981). Assimilation rate is in kcal m^{-2} year, body mass in grams. None of the slopes are significantly different from 0 ($P > 0.10$). Symbols and abbreviations as in Table 1.

organisms the slopes of the regressions of population assimilation-rate on body mass are approximately zero (Table 5).

DISCUSSION

Population density decreases approximately as body mass to the −0.75 power among mammalian primary and secondary consumers, and among terrestrial organisms as a whole (when adjusted for differences in metabolic level). There is thus a reciprocal relationship between the scaling of population density and that of individual metabolic requirements (which scale approximately as body mass to the +0.75 power). This strongly suggests that within a trophic level or dietary category local population energy-use is independent of body mass. This interpretation is in agreement with the scaling of population energy budgets among both aquatic and terrestrial animals, where no relationship is observed between body mass and population assimilation rate. Thus, on an ecological time scale, no terrestrial organism has an overall advantage in obtaining energy solely as a result of its size.

These relationships hold over body-mass ranges of from 3 to 11 orders of magnitude. On a smaller scale, size differences among close competitors or guild members may have an effect on competitive or evolutionary success (e.g. Morse, 1974; Roughgarden, 1983; Persson, 1985; Pregill, 1986; Brown & Maurer, 1986; Martin, 1986). This is not a contradiction, as Brown & Maurer (1986) assert, but rather a contrast involving processes of different scope that probably act on different time scales. It may usually be to a species' advantage, relative to its fellow guild members, to be the largest member of its guild, but at the same time it may be no advantage to belong to a guild of large rather than small species. For example, within a guild of ungulates it may be advantageous to be large enough to displace members of other guild-species from resources. But the overall scaling relationships analysed here show that the population energy-use of the largest, most successful ungulate species of this guild will not on average exceed that of the most successful member of a guild of rodents (or herbivorous insects). We should not be surprised that the combined effects of the many and diverse factors moulding community structure and faunal diversity give rise to different patterns and relationships at different scales of observation. At the scale of comparison discussed here body mass has no effect upon the level of energy-consumption or energetic dominance attained by a local population.

A possible exception occurs among insectivorous mammals. While among most insectivorous mammals population density scales approximately as body mass to the −0.75 power, small eutherians exhibit both unusually high metabolic rates and high population densities. Their populations thus appear to be using energy at a high rate. It may be significant that the highest population densities attained by small primary consumer species are among grazing microtines, which also have high metabolic rates (McNab, 1980, 1986a). Ordinarily, one would expect that higher individual metabolic rates would reduce the average population density that could be maintained by a species. If McNab (1980, 1986a, 1986b) is correct in arguing that in eutherians higher basal metabolic rates lead to higher rates of growth and population increase, it may be that these small insectivores are able to recover rapidly from population lows, and thus maintain high average densities. Alternatively, it may be that the

prevalence of daily torpor in many small mammal species (McNab, 1983) or other size-dependent differences in activity levels cause extrapolations from measured metabolic rates to overestimate actual daily metabolic intake for the smallest forms.

Another exception may be aquatic organisms, where population density scaling would suggest that there is a slight energetic advantage to small size. However, the 26 population assimilation-rates for aquatic species show no such relationship. One explanation for this discrepancy may be that density estimates for freshwater plankton (the small end of the sample) and for fish (the large end) may not be comparable, because of differences in estimation techniques. Also, the assumption that active metabolic rates scale parallel to standard rates, based largely upon data for medium-sized and large terrestrial species, may not be strictly applicable in the case of all aquatic organisms.

Not only is average population energy-use conserved across body size, but inspection of the figures reveals that the range of variation about the regression line is approximately the same at all body masses. Terrestrial animals as different in size and ecological characteristics as elephants and phytophagous insects exhibit the same range of population energy-consumption values. This suggests that the limits to the levels of energy-use that a species may evolve to attain are set to a large degree by biological interactions among species in evolutionary time (Damuth, in press).

Since population density and energy-use data are derived from local populations, the patterns revealed in these global regressions also imply that similar patterns should be observed in local communities; this has been found to be true in a sample of various herbivorous mammal communities (Damuth, 1981a, in press). Thus, available evidence shows that on a number of different scales approximate independence of body mass and local population energy-consumption is an extremely widespread ecological regularity.

ACKNOWLEDGEMENTS

I thank Paul Harvey and Susan J. Mazer for comments on the manuscript, and James R. Griesemer for computer facilities. This research was supported by a Thorne Research Fellowship (American Museum of Natural History) and by NSF grant BSR 8408030.

REFERENCES

BELL, R. H. V., 1970. The use of the herb layer by grazing ungulates in the Serengeti. In A. Watson (Ed.), *Animal Populations in Relation to Their Food Resources:* 111–124. Oxford: Blackwell.

BLUEWEISS, L., FOX, H., KUDZMA, V., NAKASHIMA, D., PETERS, R. & SAMS, S., 1978. Relationships between body size and some life history parameters. *Oecologia (Berlin), 37:* 257–272.

BRODY, S., 1945. *Bioenergetics and Growth.* New York: Reinhold.

BROWN, J. H. & MAURER, B. A., 1986. Body size, ecological dominance and Cope's rule. *Nature, London, 324:* 248–250.

BURT, W. H. & GROSSENHEIDER, R. P., 1964. *A Field Guide to the Mammals,* 2nd edition. Boston: Houghton Mifflin.

CALDER, W. A., III, 1984. *Size, Function and Life History.* Cambridge, Massachusetts: Harvard University Press.

CHEW, R. M. & CHEW, A. E., 1970. Energy relationships of the mammals of a desert shrub (*Larrea tridentata*) community. *Ecological Monographs, 40:* 1–21.

CLUTTON-BROCK, T. H. & HARVEY, P. H., 1977. Species differences in feeding and ranging behaviour in primates. In T. H. Clutton-Brock (Ed.), *Primate Ecology: Studies of Feeding and Ranging Behaviour of Lemurs, Monkeys and Apes:* 557–584. London: Academic Press.

COLLINS, L. R., 1973. *Monotremes and Marsupials: a Reference for Zoological Institutions.* Washington: Smithsonian Institution Press.

DAMUTH, J., 1981a. Population density and body size in mammals. *Nature, 290:* 699–700.

DAMUTH, J., 1981b. Home range, home range overlap, and species energy use among herbivorous mammals. *Biological Journal of the Linnean Society, 15:* 185–193.

DAMUTH, J., 1982. *The evaluation of the degree of community structure preserved in assemblages of fossil mammals.* Unpublished Ph.D. dissertation, University of Chicago, Chicago, Illinois.

DAMUTH, J., in press. Patterns in community structure and species interactions over evolutionary time. In N. Chr. Stenseth (Ed.), *Evolution in Ecosystems and the Red Queen's Hypothesis.* Cambridge: Cambridge University Press.

EISENBERG, J. F., 1981. *The Mammalian Radiations.* Chicago: University of Chicago Press.

ELGAR, M. A. & HARVEY, P. H., in press. Basal metabolic rates in mammals: allometry, phylogeny and ecology. *Functional Ecology.*

ELTON, C., 1927. *Animal Ecology.* New York: Macmillan.

FARLOW, J. O., 1976. A consideration of the trophic dynamics of a Late Cretaceous large-dinosaur community. *Ecology, 57:* 841–857.

FELSENSTEIN, J., 1985. Phylogenies and the comparative method. *American Naturalist, 125:* 1–15.

FLAKE, L. D., 1973. Food habits of four species of rodents on a short-grass prairie in Colorado. *Journal of Mammalogy, 54:* 636–647.

GESSAMAN, J. A., 1973. Methods of estimating the energy cost of free existence. In J. A. Gessaman (Ed.), *Ecological Energetics of Homeotherms:* 3–31. Logan, Utah: Utah State University Press.

GITTLEMAN, J. A., 1983. *The Behavioural Ecology of Carnivores.* Unpublished Ph.D. dissertation, University of Sussex.

HALTENORTH, T. & DILLER, H., 1977. *Säugetiere Afrikas und Madagaskars.* Munivh: BLV Verlagsgesellschaft.

HEMMINGSEN, A. M., 1950. The relation of standard (basal) energy metabolism to total fresh weight of living organisms. *Reports of the Steno Memorial Hospital and the Nordisk Insulinlaboratorium, 4:* 7–38.

HEMMINGSEN, A. M., 1960. Energy metabolism as related to body size and respiratory surfaces, and its evolution. *Reports of the Steno Memorial Hospital and the Nordisk Insulinlaboratorium, 9:* 1–110.

HUMPHREYS, W. F., 1981. Towards a simple index based on live weight and biomass to predict assimilation in natural populations. *Journal of Animal Ecology, 50:* 543–561.

HUNSAKER, D., II, 1977. Ecology of New World marsupials. In D. Hunsaker, II (Ed.), *The Biology of Marsupials:* 95–156. New York: Academic Press.

JARMAN, P. J., 1974. The social organisation of antelope in relation to their ecology. *Behaviour, 58:* 215–267.

JERISON, H. J., 1973. *Evolution of the Brain and Intelligence.* New York: Academic Press.

JUANES, F., 1986. Population density and body size in birds. *American Naturalist, 128:* 921–929.

KING, J. R., 1974. Seasonal allocation of time and energy resources in birds. In R. A. Paynter, Jr. (Ed.), *Avian Energetics:* 4–85. Cambridge, Massachusetts: Publications of the Nuttall Ornithological Club, 15.

KLEIBER, M., 1932. Body size and metabolism. *Hilgardia, 6:* 315–353.

KLEIBER, M., 1975. *The Fire of Life,* 2nd edition. New York: Krieger.

LANDRY, S. O., 1970. The Rodentia as omnivores. *Quarterly Review of Biology, 45:* 351–372.

McKAY, G. M., 1973. Behavior and ecology of the Asiatic elephant in southern Ceylon. *Smithsonian Contributions to Zoology, 25:* 1–86.

McMAHON, T. A. & BONNER, J. T., 1983. *On Size and Life.* New York: Freeman.

McNAB, B. K., 1963. Bioenergetics and the determination of home range size. *American Naturalist, 97:* 133–140.

McNAB, B. K., 1980. Food habits, energetics, and the population biology of mammals. *American Naturalist, 116:* 106–124.

McNAB, B. K., 1983. Energetics, body size, and the limits to endothermy. *Journal of Zoology (London), 199:* 1–29.

McNAB, B. K., 1984. Physiological convergence amongst ant-eating and termite-eating mammals. *Journal of Zoology (London), 203:* 485–510.

McNAB, B. K., 1986a. The influence of food habits on the energetics of eutherian mammals. *Ecological Monographs, 56:* 1–19.

McNAB, B. K., 1986b. Food habits, energetics, and the reproduction of marsupials. *Journal of Zoology (London), 208A:* 595–614.

MARTIN, R. A., 1986. Energy, ecology, and cotton rat evolution. *Paleobiology, 12:* 370–382.

MESERVE, P. L., 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. *Journal of Mammalogy, 57:* 300–319.

MOEN, A. N., 1973. *Wildlife Ecology: An Analytical Approach.* San Francisco: Freeman.

MORSE, D. H., 1974. Niche breadth as a function of social dominance. *American Naturalist, 108:* 818–830.

MULLEN, R. K., 1971. Energy metabolism and body water turnover rates of two species of free-living kangaroo rats, *Dipodomys merriami* and *Dipodomys microps. Comparative Biochemistry and Physiology, 39A:* 379–390.

MULLEN, R. K. & CHEW, R. M., 1973. Estimating the energy metabolism of free-living *Perognathus formosus*: a comparison of direct and indirect methods. *Ecology, 54:* 633–637.

NAGY, K. A., 1987. Field metabolic rate and food requirement sealing in mammals and birds. *Ecological Monographs, 57:* 111–128.
NAGY, K. A. & MILTON, K., 1979. Energy metabolism and food consumption by wild howler monkeys (*Alouatta palliata*). *Ecology, 49:* 110–123.
ODUM, E. P., 1971. *Fundamentals of Ecology,* 3rd edition. Philadelphia: Saunders.
PERSSON, L., 1985. Assymetrical competition: are larger animals competitively superior? *American Naturalist, 126:* 261–266.
PETERS, R. H. 1983. *The Ecological Implications of Body Size.* Cambridge: Cambridge University Press.
PETERS, R. H. & RAELSON, J. V., 1984. Relations between individual size and mammalian population density. *American Naturalist, 24:* 498–517.
PETERS, R. H. & WASSENBERG, K., 1983. The effect of body size on animal abundance. *Oecologia (Berlin), 60:* 89–96.
PREGILL, G., 1986. Body size of insular lizards: a pattern of Holocene dwarfism. *Evolution, 40:* 997–1008.
RICKLEFS, R. E., 1973. *Ecology.* Portland, Oregon: Chiron Press.
ROBINSON, J. G. & REDFORD, K. H., 1986. Body size, diet and population density of Neotropical forest mammals. *American Naturalist, 128:* 665–680.
ROUGHGARDEN, J., 1983. Coevolution between competitors. In D. Futuyma & M. Slatkin (Eds), *Coevolution:* 383–403. Sunderland, Massachusetts: Sinauer.
SCHMIDT-NIELSEN, K., 1984. *Scaling: Why Is Animal Size So Important?* Cambridge: Cambridge University Press.
SCHREIBER, R. K., 1978. Bioenergetics of the Great Basin pocket mouse, *Perognathus parvus. Acta Theriologica, 23:* 469–487.
VAN DEN BRINK, F. H., 1968. *A Field Guide to the Mammals of Britain and Europe.* Boston: Houghton Mifflin.
WHITTAKER, J. O., 1966. Food of *Mus musculus, Peromyscus maniculatus bairdi* and *Peromyscus leucopus* in Vigo County, Indiana. *Journal of Mammalogy, 47:* 473–486.

APPENDIX: POPULATION DENSITY AND BODY MASS DATA

Species	Mass (g)	References	Density	References
MAMMALS—Primary consumers				
Primates:				
Alouatta caraya	7250	123	25	486
Alouatta palliata	6550	123	51	181, 185
Alouatta seniculus	7250	123	74	181, 486
Aotus trivirgatus	960	123	100	714
Ateles belzebuth	6000	123	13.5	181
Ateles geoffroyi	6000	123	45	181
Avahi laniger	1070	39	150	111, 562
Callicebus moloch	680	123	255	181
Callicebus torquatus	1200	181	15	361
Callithrix jacchus	241	182	900	181
Cebus albifrons	2520	147, 181	37	147
Cebus capucinus	2600	123, 124, 181	80	26, 181
Cebus olivaceous	2600	123	35	183
Cercocebus albigena	8000	123	33	106, 685, 686
Cercocebus galeritus	6000	123	45	124, 550
Cercopithecus aethiops	4050	123	53	160, 165, 240, 273, 636, 637, 638
Cercopithecus ascanius	3550	123	108	639
Cercopithecus campbelli	3600	123	20	68
Cercopithecus cephus	3500	123	20	243, 550
Cercopithecus mitis	4500	123	42	123, 124
Cercopithecus neglectus	4350	123	34	123, 124
Cercopithecus nictitans	4950	123	22.5	550
Cercopithecus pogonias	2700	123	22.5	550
Cheirogaleus intermedius	177	39	250	109
Colobus badius	8150	123	230	123, 124
Colobus guereza	9850	123	112	166, 360, 725
Colobus satanas	9500	124	30	124
Erythrocebus patas	7800	124	0.3	124
Euoticus elegantulus	300	109, 124	17.5	109
Galago alleni	260	109, 124	17.5	109
Gorilla gorilla	127 000	123	1.8	124
Hylobates agilis	5900	123	5.1	124

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Primates (*cont.*)				
Hylobates klossi	5800	123	30	124
Hylobates lar	5800	123	6.2	445
Hylobates muelleri (= *moloch*)	6100	123	22	705
Indri indri	12 500	123	12	540, 541
Lepilemur mustelinus	600	123	288	111
Lemur catta	2700	123	250	562
Lemur fulvus	2100	123	1030	643, 656
Lemur mongoz	1700	39, 124	350	562
Macaca fascicularis	5000	123	25	124, 425, 445, 622, 705
Macaca mulatta	7850	123	35	294, 485
Macaca nemestrina	9100	123	20	124, 425, 445
Macaca sinica	5150	123	100	124
Microcebus coquereli	385	526	121	525, 526
Microcebus murinus	725	526	215	525, 526
Miopithecus talapoin	1250	123	26.2	242
Pan paniscus	22 700	534	4	384
Pan troglodytes	45 000	123	2.5	124
Papio anubis	19 500	123	10.3	116, 165, 261, 285, 578, 675
Papio cynocephalus	17 500	123	4	124
Papio hamadryas	13 900	123	1.8	382
Papio papio	19 500	123	12.5	172
Papio ursinus	18 600	123	2.3	124, 145
Perodicticus potto	1150	109	9	108, 109
Phaner furcifer	425	276	675	525
Pithecia pithecia	1024	182	40	181
Pongo pygmaeus	53 000	123	2	424, 425
Presbytis aygula	6250	123	29	124, 425
Presbytis entellus	12 800	123	57	124
Presbytis cristatus	8350	123	150	123
Presbytis johni	8150	123	107	123
Presbytis melalophos	6300	123	42	123, 445, 622
Presbytis obscurus	8350	123	33	123, 445, 622
Presbytis rubicunda	6300	123	11.4	705
Presbytis senex	8150	123	154	124
Propithecus verreauxi	3600	123	175	562
Saguinus midas	315	123	33	726
Saguinus oedipus	600	181	23	181
Saimiri sciureus	665	123	25	181
Saimiri oerstedi	665	123	25	181
Symphalangus syndactylus	10 700	123	5.2	117, 425, 445, 622
Theropithecus gelada	17 100	123	69.5	164, 165
Artiodactyla:				
Adenota kob	83 400	261, 327, 396, 495	7.76	66, 67, 194, 198, 208, 245, 261
Aepyceros melampus	52 400	160, 300, 301, 327, 386, 463, 495, 568, 681, 727	13.1	66, 67, 141, 142, 160, 223, 224, 265, 293, 298, 326, 368, 386, 404, 463, 569, 609, 626
Alcelaphus buselaphus	158 000	261, 327, 495, 681, 727	2.06	57, 66, 160, 223, 224, 261, 265, 293, 368, 386, 404, 576, 609, 631, 675

Species	Mass (g)	References	Density	References
Alces alces	403 000	93, 226, 593, 674	0.72	4, 74, 199, 319, 335, 343, 367, 374, 468, 518, 532, 535, 603, 728
Ammodorcas clarkei	31 000	327	0.83	597
Antidorcas marsupialis	31 800	144, 327, 495, 681, 727	4.65	144, 440
Antilocapra americana	46 500	93	0.93	40, 82, 85, 271, 511, 730
Antilope cervicapra	29 800	184, 260	4.8	184
Axis axis	48 100	184, 294	13	184, 294, 465
Axis porcinus	31 000	184	35	184
Bison bison	551 000	93, 274	0.32	235, 236
Bison bonasus	850 000	674	1.0	64, 373, 374
Blastocerus dichotomus	125 000	683	0.146	591
Bos banteng	263 000	184	0.85	184, 305, 528
Bos gaurus	568 000	184	0.61	184, 353, 465
Boselaphus tragocamelus	149 000	184	2.7	184
Bubalus bubalis	274 000	184	1.2	184, 528, 669
Capra hircus	75 000	674	3.1	89, 589, 590
Capra waalie	100 000	164	4.6	164
Capreolus capreolus	21 700	674, 683	8.6	4, 64, 89, 374, 549
Cephalophus natalensis	14 000	327	8.0	153
Cephalophus rufilatus	12 500	327	4.0	675
Cervus canadensis	310 000	93	0.93	306, 366, 423, 730
Cervus elaphus	175 000	674, 683	5.48	37, 62, 64, 89, 107, 365, 374, 415, 416, 489, 549, 628
Cervus duvauceli	170 000	184	12.7	184, 303, 587
Cervus unicolor	138 000	184	1.42	184, 305, 465, 528
Connochaetes taurinus	203 000	160, 299, 301, 327, 386, 397, 495, 568, 681, 727	7.59	66, 69, 153, 160, 223, 224, 293, 298, 492, 521, 569, 631, 682
Damaliscus dorcas	70 000	327, 681, 727	18.8	144, 171
Damaliscus lunatus	122 000	327, 681, 727	11.0	66, 67, 261, 265, 293, 368, 463, 609, 626 630, 631
Gazella granti	58 800	327, 386, 495, 681	1.06	57, 66, 223, 224, 293, 386, 404, 576, 631
Gazella thomsoni	21 000	326, 396, 495, 681	6.64	57, 66, 223, 224, 293, 631, 651
Giraffa camelopardalis	912 000	386, 681, 727	0.937	57, 66, 67, 139, 179, 198, 222, 223, 224, 265, 293, 298, 386, 402, 404, 493, 576, 609, 631, 675

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Artiodactyla (*cont.*)				
Hippotragus equinus	225 000	160, 261, 327, 495, 681	0.774	67, 160, 198, 261, 368, 537, 569, 626, 675
Hippotragus niger	197 000	160, 327, 495, 681	0.66	160
Hyemoschus aquaticus	13 300	162	17.9	162
Kobus defassa	211 000	160, 261, 327, 397, 495, 681	9.11	66, 67, 160, 192, 194, 208, 223, 224, 261, 265, 293, 385, 463, 609, 625, 626
Kobus ellipsiprymus	194 000	295, 327, 463, 681	1.69	66, 67, 295, 298, 386, 404, 675
Kobus leche	90 600	13, 47, 327, 495, 568, 569, 681	15.5	13, 47, 569, 586
Kobus vardoni	69 300	17, 160, 327, 568, 681	0.15	160
Lama guanacoe	89 000	458	0.51	225
Litocranius walleri	42 000	327, 397, 495	1.03	404, 729
Madoqua kirkii	4940	327, 663, 681	111	293, 386, 663
Mazama americana	20 000	182	10	183
Muntiacus muntjak	14 200	184	3.53	36, 184, 294, 528, 529
Odocoileus hemionus	89 300	93, 730	10	50, 118, 180, 279, 306, 423, 594, 649, 650, 730
Odocoileus virginianus	85 100	93	12.6	6, 100, 132, 190, 218, 275, 319, 343, 378, 389, 417, 433, 451, 502, 658, 672
Oreotragus oreotragus	14 300	164, 327, 495, 681	4.6	66, 164, 293
Oryx gazella	167 000	327, 495	0.75	404, 631
Ourebia ourebi	13 600	160, 261, 327, 463, 495, 501, 568, 681	1.9	67, 160, 261, 293, 368, 446, 463, 464, 501, 569, 626, 675
Ovibos moschatus	250 000	93, 311, 700	0.36	206, 228, 311, 453, 454, 455, 624
Ovis canadensis	75 900	93, 246	1.68	84, 246, 401, 604
Pelea capreolus	24 000	327, 494, 501	5.71	144, 446, 501
Phacochoerus aethiopicus	60 900	160, 261, 301, 386, 397, 463, 568, 681, 727	1.30	66, 67, 69, 153, 160, 193, 194, 198, 208, 223, 224, 261, 293, 298, 386, 404, 463, 626, 675
Potamochoerus porcus	65 700	160, 568, 681, 727	0.27	66, 153, 160

Species	Mass (g)	References	Density	References
Rangifer tarandus	100 000	87, 93, 260, 414	2.88	27, 227, 238, 288, 292, 324, 340, 349, 400, 414, 453, 454, 455, 503, 509, 513, 560, 602, 610, 659, 676, 699
Raphicerus campestris	12 300	327, 495	0.60	66, 153, 293
Raphicerus sharpei	8210	160, 327, 568, 681	0.85	160
Redunca arundinum	59 400	160, 327, 495, 568, 681, 727	1.46	69, 160, 569
Redunca fulvorufula	28 000	327, 495, 681, 727	6.69	317, 318, 501
Redunca redunca	43 500	261, 327, 495	0.81	66, 67, 198, 208, 261, 293, 304, 368, 463, 626, 675
Saiga tatarica	42 500	674	0.80	28
Sus scrofa	55 300	184, 294, 305, 674	2.84	4, 184, 287, 294, 529, 536, 549
Sylvicapra grimmia	11 300	160, 164, 261, 327, 350, 357, 495, 568, 681	1.53	66, 67, 153, 160, 164, 261, 293, 357, 626, 675
Syncerus caffer	544 000	160, 261, 327, 386, 463, 495, 568, 681	3.81	66, 67, 69, 160, 192, 195, 208, 261, 293, 326, 348, 403, 404, 463, 493, 533, 576, 626, 631, 651
Taurotragus oryx	453 000	160, 327, 386, 463, 495, 568, 681, 727	0.345	57, 66, 67, 160, 223, 224, 265, 293, 404, 463, 493, 569, 576, 609, 626, 631, 651, 670
Tayassu tajacu	21 700	93, 683	7.46	52, 191, 601, 723
Tragelaphus angasi	90 600	301, 327, 727	0.209	153
Tragelaphus imberbis	110 000	327, 386, 397, 681	0.182	386, 404
Tragelaphus scriptus	40 800	160, 164, 301, 327, 495, 568, 681, 707	10.3	14, 67, 160, 164, 192, 208, 261, 293, 323, 675
Tragelaphus spekei	74 800	327, 495, 681	110	505
Tragelaphus strepsiceros	171 000	160, 326, 327, 495, 681, 706, 727	1.79	66, 153, 160, 298, 326, 569
Tragulus memmina	3200	184	3.1	184
Vicugna vicugna	47 500	458	3.5	370, 458
Perissodactyla:				
Ceratotherium simum	2 220 000	204, 727	0.74	67, 69, 204, 680

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Perissodactyla (*cont.*)				
Diceros bicornis	952 000	301, 386, 681	0.84	66, 69, 255, 256, 293, 300, 326, 386, 404, 431, 473, 493, 577, 631, 651, 675, 697
Dicerorhinus sumatrensis	1 120 000	184	0.093	459, 635
Equus burchelli	259 000	160, 301, 386, 463, 568, 681, 727	3.74	66, 67, 69, 160, 179, 223, 224, 293, 298, 404, 463, 493, 569, 576, 626, 630, 631, 651
Equus grevyi	390 000	159, 396	2.57	630, 631
Equus zebra	270 000	159	1.5	336
Rhinoceros unicornis	1 255 000	184	6.27	184
Rhinoceros sondaicus	997 000	184	0.12	184, 305
Tapirus bairdii	300 000	185	0.63	660
Tapirus terrestris	175 000	182	0.8	183
Proboscidea:				
Elephas maximus	1 810 000	184	0.49	184, 351, 352, 353, 465, 472, 529
Loxodonta africana	2 860 000	160, 293, 386, 523, 681	1.09	7, 66, 67, 86, 95, 103, 160, 179, 192, 193, 198, 207, 208, 254, 261, 293, 326, 404, 493, 533, 538, 576, 618, 631, 651, 675, 692, 693, 708
Hyracoidea:				
Dendrohyrax validus	2430	358	25.6	383
Lagomorpha:				
Lepus americanus	1360	93	141	5, 10, 154, 156, 355, 713
Lepus californicus	2420	93, 263	13.0	115, 216, 266, 289, 730
Lepus capensis	3030	96, 187, 398, 674	9.97	555
Lepus nigricollis	2710	184	101	184
Lepus timidus	3020	219, 674	18.6	219, 691
Lepus townsendi	3400	93	5.84	216, 730
Ochotona princeps	154	93, 341, 434	558	75, 88, 452
Oryctolagus cuniculus	1640	398, 674	131	170, 712
Sylvilagus auduboni	854	93, 115, 260, 296	35.4	115, 209, 216, 730
Sylvilagus bachmani	692	93	544	131
Sylvilagus floridanus	1130	93, 260	588	575, 667
Sylvilagus nuttalli	1020	93	68.8	422
Rodentia:				
Acomys subspinosus	22	732	3450	563
Aethomys hindei	146	500	1590	500
Aethomys namaquensis	42	557, 647	3300	563
Agouti paca	8200	182	25	183
Akodon olivaceus	29.1	233, 497	3626	233, 515

Species	Mass (g)	References	Density	References
Ammospermophilus harrisi	127	93, 115	32	115
Apodemus agrarius	20	674	1240	16, 113, 333, 719
Apodemus flavicollis	36	398, 552	949	16, 22, 60, 61, 113, 280, 474, 715
Apodemus sylvaticus	33	398	2550	79, 217, 270, 280, 457, 496, 654, 715
Arvicanthus abyssinicus	70	475	12400	475
Arvicanthus niloticus	103	151, 309, 519, 607	862	150, 546, 657
Arvicola terrestris	143	674	30900	8, 9, 467
Auliscomys micropus	71	515	257	515
Baiomys taylori	7	93, 291	1550	522, 632
Callomyscus bailwardi	22.5	683	400	232
Callosciurus caniceps	257	580, 731	21	287
Callosciurus nigrovittatus	170	408, 580, 731	6.5	287
Callosciurus notatus	210	408, 580, 731	111	287
Calomys callosus	40	497	400	497
Calomys expulsus	40	497	1350	497
Calomys musculinus	40	497	286	497
Cavia aperea	487	398	2040	570
Citellus fulvus	1020	496, 732	278	354
Citellus pygmaeus	222	1	1250	1, 221
Clethrionomys gapperi	27	93	1160	83, 470, 584
Clethrionomys glareolus	23	398, 412, 582, 674	1890	3, 16, 22, 23, 60, 61, 113, 280, 281, 325, 435, 444, 474, 520, 551, 611, 654, 715
Clethrionomys occidentalis	31	732	556	241
Clethrionomys rutilus	28	93, 582	4600	702
Coendu prehensalis	4000	110	40.3	110, 183
Cricetulus migratorius	30.5	490	250	232
Cryptomys hottentotus	68.7	247, 607, 617	741	247
Ctenomys opimus	241	516	247	497, 516
Ctenomys peruanus	400	497	4200	497, 516
Cynomys ludovicianus	1130	93	2470	369
Dasymys incomptus	88	18, 151, 283, 398, 553, 607, 617	1940	48, 148, 150, 461, 606
Dasyprocta leporina	2700	182	90	183
Dasyprocta punctata	2000	185	100	212, 619
Delanymys brooksi	5	151	985	149, 150
Dendromus mesomelas	13.5	149, 151, 553	1980	148, 150, 461
Dendromus mystacalis	8.2	149, 151	1170	150, 461
Desmodillus auricularis	55	617	1429	119
Dicrostonyx groenlandicus	56	87, 237	585	205, 237, 375
Dipodomys agilis	60	93, 260	504	120, 418, 449
Dipodomys deserti	108	76, 93	469	41, 42
Dipodomys elator	145	732	1450	567
Dipodomys heermanni	72	93	950	129
Dipodomys merriami	38.5	93, 115, 260, 346, 347, 620	1209	41, 42, 56, 114, 115, 120, 599, 620, 701
Dipodomys microps	65	76, 93, 346, 347	1310	41, 42

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Rodentia (*cont.*)				
Dipodomys ordii	53	76, 93	449	56, 229, 522, 599, 701
Dipodomys spectabilis	145	93	205	598, 701
Echimys chrysurus	475	269	7	269
Echimys semivillosus	400	497	40	183
Eothenomys smithi	35	134, 732	1610	653
Erethizon dorsatum	8620	93	3.9	547
Eutamias minimus	39	76, 93, 677	1700	677
Eutamias townsendi	97	93	531	241
Gerbillurus paeba	26	617	1950	119
Glaucomys volans	69	93, 429	293	429
Heteromys anomalus	69	427	1090	183, 497, 572
Heteromys desmarestianus	65	215	695	212, 215
Hybomys trivirgatus	63	282	91	282
Hydrochaerus hydrochaerus	32 800	398, 683	104	183, 184, 733
Irenomys tarsalis	44.5	515	325	515
Lagurus curtatus	30	93	666	379
Lemmus trimucronatus	81	87, 93	2900	87, 375
Lemniscomys griselda	54	607, 617	387	648
Lemniscomys striatus	65	151, 282, 398, 553	777	48, 112, 149, 150, 398, 461
Liomys pictus	44	182	1380	127
Liomys salvini	39	215	620	215
Makalata armatus	400	110	175	110
Malacomys edwardsi	64	126, 283	256	283, 284
Marmota flaviventris	3400	93	296	21, 645
Marmota marmota	3950	398, 674	616	721
Melomys cervinipes	65	33, 97, 574	667	33, 34, 711
Meriones persicus	116	398	150	232
Microcavia australis	250	570	2390	570
Microtus agrestis	36	582, 674	2200	280, 281, 477
Microtus arvalis	27	398, 399, 674	3770	22, 161, 520
Microtus californicus	71	93	19 900	38, 376, 406
Microtus longicaudatus	47	93	7500	130
Microtus mexicanus	35	93	3000	130
Microtus montanus	43	93, 677	6750	210, 677
Microtus ochrogaster	35	93	12 000	377, 436, 437, 448
Microtus oeconomus	49	93, 582	4500	244, 272, 702
Microtus pennsylvanicus	49	93	4040	55, 83, 249, 257, 377, 584
Mus bufo	8.6	151, 553	380	148, 150
Mus minutoides	6.4	18, 151, 290, 553, 607, 617	868	48, 112, 148, 150, 461
Mus musculoides	8.5	282	699	282
Mus triton	11.8	20, 151, 553, 607	919	112, 148, 150, 461
Mylomys dybowskii	108	151, 553	189	48, 112
Myomys daltoni	34	283	3170	283
Neacomys guianae	17.8	269	31	269
Neofiber alleni	254	54, 683	9880	54
Neotoma floridana	250	291	140	31
Neotoma fuscipes	248	77, 93	93	418
Neotoma lepida	130	77, 78, 93, 600	1610	58, 78, 418
Neotoma micropus	260	93	1600	556, 701
Ochrotomys nuttalli	21	93	351	410, 616
Octodon degus	218	233, 394	14 000	394
Oenomys hypoxanthus	86	19, 151, 553	4220	148, 150, 461

Species	Mass (g)	References	Density	References
Oryzomys bauri	65	121	2300	121
Oryzomys bicolor	49	269	50.2	183, 269, 497
Oryzomys capito	42	201, 212	532	183, 201, 212, 213, 269
Oryzomys concolor	35	110	129	110, 183, 269
Oryzomys eliurus	40	497	1050	497
Oryzomys longicaudatus	30	233	620	233
Oryzomys macconnelli	76.5	269	58.8	269
Oryzomys nigripes	24.1	679	2455	497, 679
Oryzomys oniscus	40	497	200	497
Oryzomys palustris	59	93	1900	614
Oryzomys simplex	40	497	1700	497
Oryzomys subflavus	50	269	100	269
Otomys angoniensis	136	20, 607, 617	2970	657
Otomys irroratus	121	146, 151	2700	148, 150, 461
Pelomys fallax	112	553, 606, 607, 617	1110	148, 150
Perognathus flavus	7.4	93, 115	294	115, 522, 701
Perognathus intermedius	17	93	480	701
Perognathus longimembris	7.5	76, 93, 346, 347	214	114, 449
Perognathus parvus	20	76, 93	2970	379
Perognathus penicillatus	15	76, 93, 115	701	701
Peromyscus boylii	28	93	585	80, 127
Peromyscus californicus	42	93, 291	4790	447, 449
Peromyscus eremicus	23	93, 291	293	115, 418, 449, 701
Peromyscus gossypinus	35	53, 93, 291	4650	53, 614, 616
Peromyscus leucopus	21	93, 291	1890	286, 419, 478, 615, 633, 701
Peromyscus maniculatus	20	76, 93, 291, 677	1060	38, 118, 203, 229, 241, 379, 418, 449, 470, 522, 527, 558, 581, 615, 640, 677, 701
Peromyscus polionotus	15	291	1040	143, 499
Peromyscus truei	24	76, 93	4450	447
Phyllotis darwini	52	233	4090	233
Phyllotis osilae	39	157, 516	434	157, 516
Phyllotis pictus	44	157	263	157
Praomys erythroleucus	53	309, 310, 398	876	309
Praomys natalensis	50	151, 283, 479, 553, 606, 607, 617, 648	777	112, 148, 150, 283, 606, 648, 657
Praomys tullbergi	38	186, 282, 398	1900	283, 284
Proechimys guyannensis	316	201	1060	201
Proechimys semispinosus	800	185, 253	583	212, 213
Psammomys obesus	70	260	79	140
Rattus cremoriventer	72	408, 580	27	287
Rattus exulans	62	408, 709	4480	173, 287, 652, 703, 709
Rattus fuscipes	125	33, 71, 574	1770	33, 34, 711
Rattus muelleri	321	407, 408, 580, 717	38	287
Rattus rattus	122	151, 260, 408, 491, 553, 607	3650	652
Rattus tiomanicus	112	408	227	287
Rattus villosissimus	251	45	3350	101
Rattus whiteheadi	54	408, 580	50	287

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Rodentia (*cont.*)				
Reithrodon auritus	85	497	69	497
Reithrodontomys fulvescens	21	93	598	337, 506, 522
Reithrodontomys megalotis	16	76, 93, 115	1530	38, 118, 418, 449, 522, 701
Rhabdomys pumilio	44	20, 617, 648,	224	119
Rhipidomys mastacalis	115	497, 734	144	183
Saccostomus campestris	45	18, 151, 607, 617	870	648
Sciurus carolinensis	530	93	701	32, 65, 220, 466, 471, 673
Sciurus granatensis	275	497	45	183
Sciurus griseus	680	93	431	316
Sciurus langsdorffi	275	497	300	497
Sigmodon fulviventer	120	25, 93, 329	1460	522
Sigmodon hispidus	129	93, 291, 338, 498	2220	118, 211, 337, 498, 522, 595, 614, 632, 701
Sigmomys alstoni	50	497	50	183
Spermophilus armatus	350	93	5130	612
Spermophilus franklini	500	93	500	476
Spermophilus richardsonii	351	93, 720	3280	720
Spermophilus spilosoma	107	93, 115	105	115, 701
Spermophilus tridecemlineatus	200	93	318	200, 229
Spermophilus undulatus	800	93	330	99
Stochomys longicaudatus	71	282, 398, 553	94	283
Sundasciurus tenuis	100	580, 731	23	287
Synaptomys cooperi	27	239	1850	239
Tachyoryctes splendens	200	359, 553, 554	3822	148, 150, 554
Tamias striatus	97	93, 260	2060	646, 716
Tamiasciurus hudsonicus	207	93, 155	148	345, 392, 724
Tatera kempii	101	283	725	48, 283
Taterillus gracilis	51	283, 309, 310	528	283
Taterillus pygargus	62	310	550	544, 545
Thamnomys dolichurus	42	151, 359, 553	343	148, 150, 461
Thomomys bottae	154	51, 93	2200	308, 512
Thomomys talpoides	93	93, 677	2480	278, 559, 677
Uranomys ruddi	34	282	214	48, 283
Zapus hudsonicus	18	93	6430	584
Zapus princeps	29	93	330	81
Zygodontomys brevicauda	56	734	279	183, 497
Carnivora:				
Ailuropoda melanoleuca	118 000	683	0.121	605
Edentata:				
Bradypus infuscatus	2700	182	407	182, 183
Choloepus hoffmanni	3500	182	190	182
Marsupialia:				
Caluromys philander	300	110	150	110
Lasiorhinus latifrons	25 000	695	20.8	695
Macropus parryi	12 000	182	47	182
Macropus robustus	31 900	655	15	174, 175
Megaleia rufa	41 400	152	0.7	104, 487, 488
Phascolarctos cinereus	11 000	182	100	182
Potorous apicalis	1360	182, 268	19.6	363
Pseudocheirus peregrinus	872	182, 655	125	182, 661
Schoinobates volans	1250	671	83	671
Setonix brachyurus	3000	167, 182	511	182, 363
Trichosurus caninus	2800	35	150	182

Species	Mass (g)	References	Density	References
Trichosurus vulpecula	2080	167, 655	75	136, 168, 169, 621
Vombatus ursinus	22 500	182, 683	11	421
Wallabia agilis	10 000	182	20	182
MAMMALS—Secondary consumers ('Insect-eaters')				
Insectivora:				
Blarina brevicauda	17.8	39, 93	621	616
Crocidura bicolor	3.8	20, 607	153	148
Crocidura hildegardeae	10.6	39	392	148
Crocidura occidentalis	33.4	20, 39, 607	81.7	148
Elephantulus edwardii	55	276	1400	563
Erinaceus europeaus	805	39, 735	600	621
Sorex araneus	9.3	39, 582	1046	280, 281, 621, 736, 737, 738, 739
Sorex arcticus	8	93	564	83, 736
Sorex cinereus	4.2	93	1207	83, 741
Sorex longirostris	4.5	93	69	616
Sorex minutus	5.3	39	621	280, 281, 738, 739
Sorex vagrans	7	93	717	674
Sylvisorex lunaris	18.5	39	949	148
Sylvisorex megalura	5.3	39	1103	148
Talpa europea	76	39	1045	621, 740
Tupaia glis	134	39, 580	74	287
Primates:				
Arctocebus calabarensis	210	109	7	109
Loris tardigradus	220	39, 109	59	524
Rodentia:				
Akodon azarae	25	291	8670	497
Akodon longipilis	51.4	233	3815	233
Akodon urichi	45	497	200	183
Bolomys amoenus	25.4	157, 158, 516	2020	157, 516
Lophuromys flavopunctatus	50	125, 151	1610	149, 150, 277, 461
Lophuromys sikapusi	64	151, 282, 290, 398	319	48, 112, 283
Notiomys valdivianus	27.1	515	45	515
Notiomys macronyx	70.9	515	297	515
Onychomys torridus	23.8	115	294	56, 115, 522, 701
Oxymycterus rutilans	85	497	620	497
Rhinosciurus laticaudatus	253	731	10.8	287
Zelotomys hildegardeae	51	18, 151	69	112, 607
Carnivora:				
Conepatus semistriatus	1800	183	10.75	183
Meles meles	10 900	479	2.82	380, 479
Mephitis mephitis	2404	678	8.5	202, 678
Melursus ursinus	105 000	642	0.29	135, 390, 642
Mungos mungo	1430	571, 579	18.1	571
Nasua narica	9070	93	1.6	387
Otocyon megalotis	3750	276	1.88	687
Proteles cristatus	8000	276, 579	0.75	687
Spilogale putorius	595	93	5	202
Vulpes pallida	3250	276	6.9	545
Pholidota:				
Manis tricuspis	2800	182	50	182

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
Edentata:				
Dasypus novemcinctatus	3500	182	13.3	182
Myrmecophaga tridactyla	20 000	182	0.18	183
Tamandua tetradactyla	4000	182	6	183
Marsupialia:				
Antechinus stuartii	35	33, 71, 182	1689	33, 34, 182
Isoodon obesulus	560	182	19.8	182
Marmosa cinerea	80	110, 183	51	110, 183
Marmosa murina	45	110	63	110
Marmosa robinsoni	40	182	180	183, 214
Sminthopsis crassicaudata	15	742	50	742
MAMMALS—Secondary consumers ('Vertebrate-flesh-eaters')				
Marsupialia:				
Philander opossum	338	110, 128, 269, 314	105	110, 214
Sarcophilus harrisii	5700	182	11.6	182
Carnivora:				
Acinonyx jubatus	50 000	276	0.0601	160, 176, 202, 259, 588
Alopex lagopus	5500	46, 93,	0.175	676
Bassariscus astutus	1020	93	2.2	666
Canis adustus	5440	160	0.23	160
Canis aureus	12 500	276	0.258	293, 545
Canis latrans	14 000	46, 93, 252	0.296	98, 122, 202, 482, 664
Canis lupus	45 600	46, 93, 260	0.02	202, 230, 234, 335, 509, 710
Canis simensis	10 000	276	2	469
Crocuta crocuta	65 000	160, 276	0.506	160, 588, 687, 698
Cryptoprocta ferox	9500	11	1	11
Cuon alpinus	16 000	46, 305	0.625	330
Dusicyon thous	6500	70	4	183
Eira barbara	5000	539	2	183
Felis concolor	59 500	93, 267, 665	0.02	267, 306, 371
Felis onca	85 500	93, 260	0.01	372
Felis pardalis	13 600	93, 182	0.25	183
Felis sylvestris	4380	267, 276, 579	0.414	545, 592, 687
Felis yagouaroundi	7480	93	0.73	183
Fossa fossana	1800	11	3.85	11
Galictis vittata	4800	183	2.4	183
Galidia elegans	820	11	6	11
Genetta genetta	1780	276	2.13	545, 687
Herpestes sanguineus	525	276, 573, 579, 617	1.5	573
Ichneumia albicauda	3700	276, 579	1.93	687
Lutra perspillata	5000	294	5	294
Lycaon pictus	20 700	46, 276, 568	0.022	588
Lynx canadensis	10 200	93	0.13	510
Lynx lynx	28 600	267	0.043	202, 267, 320
Martes americana	883	93	1.2	623
Martes pennanti	3250	547, 548	0.235	547, 548
Mungotictis decemlineata	670	11, 12	8.2	11, 12
Mustela erminea	78.9	608	10.53	608
Mustela nivalis	80	197, 356	36	197, 257, 356, 413
Panthera leo	150 000	160, 267, 588	0.13	69, 160, 172, 189, 202, 223, 588, 626

Species	Mass (g)	References	Density	References
Panthera pardus	41 400	160, 177, 568, 743	0.21	160, 177, 293, 465
Panthera tigris	130 000	267, 294, 305	0.056	63, 294, 465
Panthera uncia	71 700	267	0.012	321
Taxidea taxus	8620	93	2.2	450, 480
Ursus maritimus	386 000	93	0.0162	388
Vulpes vulpes	5440	93, 411	1.6	411
MAMMALS—Diets unclassifiable				
Carnivora:				
Canis mesomelas	8160	276, 579	2.26	153, 588, 687
Potos flavus	2490	110, 182	14.4	110, 183
Procyon lotor	10 700	93	3.4	202, 231
Procyon cancrivorus	7050	183	7.1	183
Ursus americanus	153 000	93	0.818	44, 135, 196, 334, 344, 395, 409, 420, 718
Ursus arctos	233 000	93, 362	0.129	44, 362, 438, 514
Marsupialia:				
Didelphis marsupialis	1070	110, 182, 269, 744	69	110, 182, 183, 744
AMPHIBIA				
Desmognathus fuscus	1.56	94	34 800	94
Eurycea bislineata	0.12	94	657 000	94
Gyrinophilus porphyriticus	4.4	94	27 500	94
Plethodon cinereus	0.63	94	289 000	94
REPTILIA				
Agama agama	16	696	4820	696
Agama rupelli	35.2	696	400	696
Ameiva quadrilineata	58.4	745	3100	30
Anolis angusticeps	2.76	745	98 300	596
Anolis bonairensis	3.15	49	131 800	49
Anolis carolinensis	9.44	629	56 400	596
Anolis distichus	1.93	596	95 700	596
Anolis sagrei	6.53	629	391 000	596
Bassiliscus vittatus	182	745	750	30
Cnemidophorus murinus	27.7	49	55 600	49
Eremias spekei	2.3	696	21 000	696
Eumeces fasciatus	6.05	662	18 500	662
Gonatodes antillensis	0.843	49	420 000	49
Hemidactylus brookii	4.1	696	3000	696
Holodactylus sp.	5.7	696	1200	696
Latastia longicauda	13.3	696	467	696
Lygodactylus picturatus	3.22	696	3580	696
Mabuya brevicollis	34.0	696	700	696
Mabuya buettneri	129	745	1528	29
Mabuya maculilabris	58.4	745	891	29
Mabuya quinquetaeniata	26.6	696	200	696
Pachydactylus tuberculosus	9.75	696	2133	696
Panaspis nimbaensis	17.9	745	272	29
Riopa sundevalli	10.8	696	1200	696
Sceloporus olivaceus	25	732	3090	662
Uromastix acanthinurus	2170	262	181	262
Uta stansburiana	1.96	662	13 600	662
Varanus exanthematicus	1500	696	26.7	696
Varanus komodoensis	12 000	629	2	30
Varanus niloticus	750	696	50	696

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
PISCES				
Abramis brama	238	43, 302	21 400	43, 302
Acerina cernua	9.1	302	234 000	302
Acerina schratser	11	302	450	302
Alburnus alburnus	1.95	302, 441	6.39×10^6	302, 441
Aspius aspius	17	302	14 400	302
Barbus barbus	1100	302	200	302
Blicca bjoerkna	7.75	302	120 000	302
Chaenobryttus coronarius	51.4	248	10 200	248
Chondrostoma nasus	24	302	21 600	302
Cottus gobio	5	137, 432	1.13×10^7	137, 432
Cyprinus carpio	175	302	10 000	302
Esox lucius	549	302	1639	302
Gasterosteus aculeatus	0.5	432	2.50×10^6	432
Gobio albipinnatus	11	302	200	302
Gobio gobio	2.48	302, 441	18 100	302, 441
Hippoglossoides platessoides	200	426	33 400	426
Ictalurus natalis	151	248	3020	248
Ictalurus nebulosus	300	248	1630	248
Lepomis gibbosus	29.6	248	1140	248
Lepomis macrochirus	30	248	355 000	248
Lepomis microlophus	48.7	248	20 500	248
Leuciscus cephalus	54.5	302	18 200	302
Leuciscus idus	74.7	302	41 100	302
Leuciscus leuciscus	2.17	302, 441	133 000	302, 441
Micropterus dolomieui	130	508	12 500	508
Nemacheilus barbatula	11	432	400 000	432
Notemigonus crysoleucas	0.7	105	9200	105
Perca flavescens	1.57	105	524 000	105
Perca fluviatalis	34.6	302	62 000	302
Phoxinus phoxinus	2.5	432	1.80×10^6	432
Pimephales promelas	0.289	105	523 000	105
Pomoxis negromaculatus	105	248	16 900	248
Rutilus rutilus	9.46	43, 302, 441	586 000	43, 302, 441
Salmo gairdnerii	239	302	58 500	302
Salmo salar	41	432	400 000	432
Salmo trutta	19	138, 302, 432, 746	193 000	138, 302, 432, 746
Salvelinus fontinalis	7.22	105, 585	13 600	105, 585
Scardinius erythropthalamus	51.6	302	3830	302
Semotilus atromaculatus	0.766	105	23 900	105
Semotilus margarita	0.922	105	143 000	105
Stizostedion lucioperca	379	302	279	302
Stizostedion vitreum	335	684	1880	684
Tinca tinca	525	302	300	302
Vimba vimba	76.6	302	2800	302
TERRESTRIAL ARTHROPODS				
Anomma nigricans	0.00917	405	3.49×10^7	405
Armadillidium vulgare	0.024	583	4.30×10^8	583
Bootettix punctatus	0.086	460	42 560	460
Camponotus acvapimensis	0.0051	405	2.20×10^8	405
Carabodes minusculus	0.0000284	59	9.70×10^9	59
Chamobates schützi	0.0000083	59	4.20×10^9	59
Leptopterna dolabrata	0.0183	428	2.29×10^6	428
Ligidium hypnorum	0.0069	627	1.30×10^8	627
Ligidium japonicum	0.0087	583	5.50×10^7	583
Nanhermannia nana	0.0000172	59	1.59×10^9	59
Narceus americanus	2.5	564	290 000	564
Neophilaenus lineatus	0.00254	297	2.94×10^7	297

Species	Mass (g)	References	Density	References
Olodiscus minima	0.0000156	59	2.10×10^{9}	59
Orchelimum fidicinium	0.156	613	2.21×10^{7}	613
Philoscia muscorum	0.00241	641, 644	2.12×10^{8}	641, 644
Platynothrus peltifer	0.000056	59	1.30×10^{9}	59
Pogonomyrmex badius	0.0066	72, 258	1.16×10^{7}	72, 258
Porcellio scaber	0.009	583	7.00×10^{7}	583
Tetramorium caespitum	0.000603	73	4.87×10^{9}	73
Trichoniscus pusillus	0.000664	530, 644	8.11×10^{8}	530, 644
Tracheoniscus rathkei	0.021	564	1.61×10^{7}	564
Trimerotopsis saxatalis	0.144	163	201 250	163
OTHER TERRESTRIAL INVERTEBRATES				
Acanthinula aculeata	0.00943	439	7.15×10^{7}	439
Agriolimax laevis	0.0737	328	380 000	328
Agriolimax reticulatus	2.07	328	1.29×10^{6}	328
Allolobophora caliginosa	0.218	531	5.39×10^{7}	531
Allolobophora chlorotica	0.153	531	2.97×10^{6}	531
Allolobophora longa	1.18	531	3.58×10^{6}	531
Allolobophora muldali	0.0155	531	1.24×10^{7}	531
Allolobophora rosea	0.116	531	3.44×10^{7}	531
Arianta arbustorum	0.554	439	4.40×10^{6}	439
Arion ater	1.25	328	1.21×10^{6}	328
Arion fasciatus	0.158	328	6.13×10^{6}	328
Arion hortensis	0.155	328	5.88×10^{6}	328
Arion intermedius	0.0638	328	1.90×10^{7}	328
Arion subfuscus	0.272	328	790 000	328
Carychium tridentatum	0.0002	439	1.20×10^{8}	439
Cepaea nemoralis	0.15	704	4.03×10^{6}	704
Clausilia bidentata	0.00947	439	450 000	439
Cochlicopa lubrica	0.00383	439	900 000	439
Columella edentula	0.000837	439	3.37×10^{6}	439
Dendrobaena mammalis	0.0282	531	2.54×10^{7}	531
Dendrobaena rubida	0.0529	531	2.31×10^{6}	531
Discus rotundatus	0.00519	439	1.35×10^{7}	439
Ena obscura	0.0184	439	3.82×10^{6}	439
Euconulus fulvus	0.00166	439	1.57×10^{6}	439
Hygromia hispida	0.00112	439	670 000	439
Hygromia striolata	0.0281	439	8.54×10^{6}	439
Lehmannia marginata	0.544	328	250 000	328
Lumbricus castaneus	0.0585	531	1.36×10^{7}	531
Lumbricus terrestris	1.86	531	9.09×10^{6}	531
Marpessa laminata	0.0045	439	1.80×10^{6}	439
Millsonia anomala	0.944	391	1.80×10^{7}	391
Octolasion cyaneum	0.606	531	7.51×10^{6}	531
Punctum pygmaeum	0.000186	439	6.72×10^{7}	439
Pupilla muscorum	0.000314	439	670 000	439
Retinella nitidula	0.00488	439	7.86×10^{6}	439
Retinella pura	0.00123	439	2.47×10^{7}	439
Retinella radiatula	0.00240	439	450 000	439
Vallonia pulchella	0.00112	439	670 000	439
Vitrea contracta	0.000717	439	3.91×10^{7}	439
Vitrea pellucida	0.00275	439	1.57×10^{6}	439
AQUATIC INVERTEBRATES				
Alona quadrangularis	4.78×10^{-6}	264	9.27×10^{9}	264
Ampelisca brevicornis	0.0126	364	9.15×10^{7}	364
Anatopynia goetghebueri	0.0000476	264	8.93×10^{9}	264
Anodonta anatina	5.53	481	1.17×10^{7}	481
Anodonta minima	5.39	481	388 000	481

Appendix (*cont.*)

Species	Mass (g)	References	Density	References
AQUATIC INVERTEBRATES (*cont.*)				
Anodonta piscinalis	6.47	668	1.49×10^{6}	668
Asellus aquaticus	0.000939	331, 430	2.19×10^{7}	331, 430
Arthripsodes ancylus	0.0005	561	6.00×10^{6}	561
Baetis rhodani	0.00216	722	2.90×10^{8}	722
Baetis vagans	0.000486	688	2.68×10^{9}	688
Bithynia tentaculata	0.0255	331, 443	1.84×10^{7}	331, 443
Calospecta dives	0.00198	564	2.66×10^{10}	564
Chaoborus flavicans	0.00446	331	1.75×10^{9}	331
Chironomus anthracinus	0.00722	331	8.95×10^{9}	331
Chironomus longistylus	0.000166	264	2.44×10^{8}	264
Chironomus plumosus	0.00455	430, 542	1.07×10^{8}	430, 542
Cladotanytarsus mancus	0.000128	542	9.40×10^{8}	542
Corixa germari	0.0222	137	1.91×10^{9}	137
Crangonyx richmondensis	0.000715	442	2.83×10^{8}	442
Cryptochironomus supplicans	0.000301	430	4.28×10^{8}	430
Cypria opthalmica	5.56×10^{-6}	264	1.71×10^{10}	264
Daphnia cucullata	6.52×10^{-6}	322	1.19×10^{10}	322
Daphnia hyalina	6.52×10^{-6}	322	2.27×10^{10}	322
Ephemerella subvarica	0.0021	690	3.06×10^{9}	690
Erpobdella octoculata	0.00423	188, 430	1.17×10^{8}	188, 430
Eurycercus lamellatus	0.0000119	24, 331	1.05×10^{8}	24, 331
Ferrissia rivularis	0.00229	92	7.03×10^{8}	92
Gammarus tigrinus	0.00424	43	3.40×10^{9}	43
Glyptotendipes glaucus	0.000112	264	1.87×10^{9}	264
Glyptotendipes paripes	0.0021	430, 542	2.17×10^{9}	430, 542
Gyraulus deflectus	0.00114	251	5.37×10^{9}	251
Gyraulus parvus	0.000864	178	6.00×10^{7}	178
Hedriodiscus truquii	0.075	634	1.40×10^{7}	634
Helobdella stagnalis	0.00186	331, 393, 430	2.33×10^{8}	331, 393, 430
Heterotrissocladius oliveri	0.00027	694	1.64×10^{9}	694
Hexagenia limbata	0.011	307	4.74×10^{7}	307
Hyalella azteca	0.00418	15, 133, 442, 564	1.91×10^{9}	15, 133, 442, 564
Hydra oligactis	0.0000629	430	4.13×10^{8}	430
Hydrozetes lacustris	4.46×10^{-6}	264	4.10×10^{10}	264
Ilyocryptus sordidus	8.87×10^{-6}	264	3.22×10^{9}	264
Ilyodrilus hammoniensis	0.00978	331	5.50×10^{9}	331
Isoplastis monilis	0.0000281	264	3.33×10^{8}	264
Lacuna vincta	0.003	91	1.00×10^{7}	91
Limnephilus lunatus	0.00119	264	4.40×10^{7}	264
Limnocalanus macrurus	0.0000118	565	2.55×10^{10}	565
Limnochironomus pulsus	0.000556	430, 542	9.55×10^{8}	430, 542
Littorina saxatalis	0.00158	91	2.36×10^{8}	91
Lumbriculus variegatus	0.00181	430	6.58×10^{8}	430
Lymnaea palustris	0.0366	178, 315	8.00×10^{8}	178, 315
Melampus lineatus	0.006	91	1.29×10^{8}	91
Microtendipes chloris	0.000128	339	4.95×10^{9}	339
Microtendipes sp.	0.00171	542	8.95×10^{8}	542
Modiolus demissus	0.49	381	7.80×10^{6}	381
Monodacna pontica	1.49	668	786 000	668
Mytilus edulus	0.02	91	4.71×10^{8}	91
Nassarius obsoletus	0.025	91	3.50×10^{7}	91
Neanthes virens	2.75	342	5.19×10^{6}	342
Oligophleboides sigma	0.00154	517	4.50×10^{9}	517
Orconectes virilis	9	462	1.02×10^{6}	462
Otomesostoma auditivum	0.000133	430	2.40×10^{8}	430
Pacifastacus lenuisculus	20	2	925 000	2
Parachironomus tener	0.000156	542	7.78×10^{8}	542
Pentaneura monilis	0.0000184	430	1.63×10^{8}	430

Species	Mass (g)	References	Density	References
Physa gyrina	0.0054	251	7.78×10^{8}	251
Physa integra	0.0057	178	3.11×10^{8}	178
Pisaster ochraceus	629	507	200 000	507
Pisidium casertanum	0.000633	264, 331	5.20×10^{9}	264, 331
Pisidium compressum	0.00102	251	4.00×10^{9}	251
Potamophylax cingulatus	0.0486	504	3.38×10^{7}	504
Potamothrix hammoniensis	0.00348	332	2.90×10^{10}	332
Pristina idrensis	0.000059	264	5.05×10^{10}	264
Procladius choreus	0.000439	430, 542	1.83×10^{9}	430, 542
Procladius pectinatus	0.00233	331	3.00×10^{8}	331
Procladius sagittalis	0.0000776	264	8.89×10^{8}	264
Pseudodiamensa arctica	0.0027	694	1.22×10^{8}	694
Psilotanypus rufovittatus	0.000556	542	6.70×10^{9}	542
Rhitrogena semicolorata	0.00819	722	2.32×10^{8}	722
Scobicularia plana	0.000083	312, 313, 564,	1.14×10^{8}	312, 313, 564
Sialis lutaria	0.0056	250, 264	1.53×10^{8}	250, 264
Skistodiaptomus oregonensis	0.000015	566	1.57×10^{11}	566
Strongylocentrotus droebachensis	2.64	456	3.68×10^{7}	456
Tanytarsus eminulus	0.000015	264	4.60×10^{9}	264
Tanytarsus holochlorus	0.000334	542	4.31×10^{9}	542
Tanytarsus inopterus	0.000284	542	3.59×10^{9}	542
Tanytarsus jucundus	0.00205	15	7.19×10^{9}	15
Tanytarsus lugens	0.000426	542	4.51×10^{9}	542
Tegula funebralis	0.702	564	6.00×10^{8}	564
Thermocyclops hyalinus	2.22×10^{-6}	90	7.54×10^{11}	90
Triplya sp.	3.13×10^{-6}	264	1.56×10^{6}	264
Unio pictorum	5.84	481, 668	5.26×10^{6}	481, 668
Unio tumidus	6.97	481, 668	2.50×10^{6}	481, 668
Valvata humeralis	0.00192	251	2.09×10^{9}	251
Vejdovskyella comata	8.23×10^{-6}	264	4.19×10^{10}	264

Mass is in grams, density in number of individuals per square kilometre. Reference numbers refer to the Appendix bibliography.

APPENDIX REFERENCES

1. ABATUROV, B. D. & SEREDNEVA, T. A., 1973. The role of the little suslik in the formation of biological production in semiarid land. *Soviet Journal of Ecology, 4:* 515–518.
2. ABRAHAMSON, S. A. A. & GOLDMAN, C. R., 1970. Distribution, density and production of the crayfish *Pacifasticus leniusculus* Dana in Lake Tahoe, California-Nevada. *Oikos, 21:* 83–91.
3. ADAMCZYK, K. & RYSZKOWSKI, L., 1968. Estimation of the density of a rodent population using stained bait. *Acta Theriologica, 13:* 295–311.
4. ADAMOVITCH, V. L. & VATOLIN, B. A., 1973. Distribution of elk in the Bryansk region and damage to forests by it. *Soviet Journal of Ecology, 4:* 426–430.
5. ADAMS, L., 1959. An analysis of a population of snowshoe hares in northwestern Montana. *Ecological Monographs, 29:* 141–170.
6. ADAMS, W. H., JR., 1960. Population ecology of white-tailed deer in northeastern Alabama. *Ecology, 41:* 706–715.
7. AFOLAYAN, T. A., 1975. Effects of elephant activities on forest plantations in the Kilimanjaro forest-game reserve in northern Tanzania. *Oikos, 26:* 405–410.
8. AIROLDI, J. P., 1976. Expériences de capture et recapture chez le campagnol de terrestre, *Arvicola terrestris scherman* Shaw (Mammalia—Rodentia). *La Terre et La Vie, 30:* 31–51.
9. AIROLDI, J. P., 1978. Étude par capture et recapture d'une population de campagnols terrestres, *Arvicola terrestris scherman* Shaw (Mammalia—Rodentia). *La Terre et La Vie, 32:* 3–45.
10. ALAIN, G. & MOISAN, G., 1968. Le domaine vital de *Lepus americanus* dans la région de Québec. *La Terre et La Vie, 22:* 57–68.

11. ALBIGNAC, R., 1973. Mammifères carnivores. *Faune de Madagascar, 36:* 1–208.
12. ALBIGNAC, R., 1976. L'écologie de *Mungotictis decemlineata* dans les forêts décidues de l'ouest de Madagascar. *La Terre et La Vie, 30:* 347–376.
13. ALLEN, L. D. C., 1963. The Lechwe (*Kobus leche smithemani*) of the Bangweulu swamps. *The Puku, 1:* 1–8.
14. ALLSOPP, R., 1978. Social biology of bushbuck (*Tragelaphus scriptus* Pallas 1776) in the Nairobi National Park, Kenya. *East African Wildlife Journal, 16:* 153–165.
15. ANDERSON, R. O. & HOOPER, F. F., 1956. Seasonal abundance and production of littoral bottom fauna in a southern Michigan lake. *Transactions of the American Microscopical Society, 75:* 259–270.
16. ANDRZEWSKI, R., 1963. Processes of incoming, settlement, and disappearance of individuals and variations in the numbers of small rodents. *Acta Theriologica, 7:* 170–213.
17. ANSELL, W. F. H., 1964. Addenda and corrigenda to "Mammals of Northern Rhodesia". *The Puku, 2:* 14–52.
18. ANSELL, W. F. H., 1973a. Addenda and corrigenda to "Mammals of Northern Rhodesia". No. 4. *The Puku, 7:* 1–20.
19. ANSELL, W. F. H., 1973b. A further *Oenomys hypoxanthus* from Tanzania. *The Puku, 7:* 192.
20. ANSELL, W. F. H. & ANSELL, P. D. H., 1973. Mammals of the north-eastern montane areas of Zambia. *The Puku, 7:* 21–69.
21. ARMITAGE, K. B., 1962. Social behaviour of a colony of the yellow-bellied marmot (*Marmota flaviventris*). *Animal Behaviour, 10:* 319–331.
22. AULAK, W., 1967. Estimation of small-mammal density in three forest biotopes. *Ekologia Polska, 15:* 755–778.
23. AULAK, W., 1973. Production and energy requirements in a population of the Bank Vole, in a deciduous forest of Circeo-alnetum type. *Acta Theriologica, 18:* 167–190.
24. BABITSKIY, V. A., 1970. Biology and production of *Eurycercus lamellatus* (O. F. M.) along the shores of Lake Narach. *Hydrobiological Journal, 6:* 26–32.
25. BAKER, R. H., 1969. Cotton rats of the *Sigmodon fulviventer* group. *University of Kansas Museum of Natural History, Miscellaneous Publications, 51:* 177–232.
26. BALDWIN, J. D. & BALDWIN, J., 1972. The ecology and behavior of squirrel monkeys (*Saimiri oerstedi*) in a natural forest in Western Panama. *Folia Primatologica, 18:* 161–184.
27. BANFIELD, A. W. F. & TENER, J. S., 1958. A preliminary study of the Ungara caribou. *Journal of Mammalogy, 39:* 560–573.
28. BANNIKOV, A.-G., 1961. L'écologie de *Saiga tatarica* L. en Eurasie, sa distribution et son exploitation rationnelle. *La Terre et La Vie, 15:* 77–85.
29. BARBAULT, R., 1976. Population dynamics and reproductive patterns of three African skinks. *Copeia, 76:* 483–490.
30. BARBAULT, R., 1983. Reptiles in savanna ecosystems. In F. Bourlière (Ed.), *Ecosystems of the World. Vol. 13. Tropical Savannas.* (Series editor D. W. Goodall): 325–336. Amsterdam: Elsevier.
31. BARBOUR, D. B. & HUMPHREY, S. R., 1982. Status and habitat of the Key Largo woodrat and cotton mouse (*Neotoma floridana smalli* and *Peromyscus gossypinus allapaticola*). *Journal of Mammalogy, 63:* 144–148.
32. BARKALOW, F. S., Jr., HAMILTON, R. B. & SOUTS, R. F., Jr., 1970. The vital statistics of an unexploited gray squirrel population. *Journal of Wildlife Management, 34:* 489–500.
33. BARNETT, J. L., HOW, R. A. & HUMPHRIES, W. F., 1977. Small mammal populations in pine and native forests in north-eastern New South Wales. *Australian Wildlife Research, 4:* 233–240.
34. BARNETT, J. L., HOW, R. A. & HUMPHRIES, W. F., 1978. The use of habitat components by small mammals in eastern Australia. *Australian Journal of Ecology, 3:* 277–285.
35. BARNETT, J. L., HOW, R. A. & HUMPHRIES, W. F., 1982. Habitat effects on organ weights, longevity, and reproduction in the mountain brushtail possum, *Trichosurus caninus* (Ogilby). *Australian Journal of Zoology, 30:* 23–32.
36. BARRETTE, C., 1977. Some aspects of the behaviour of muntjacs in Wilpattu National Park. *Mammalia, 41:* 1–34.
37. BATCHELER, C. L., 1975. Development of a distance method for deer census from pellet groups. *Journal of Wildlife Management, 39:* 641–652.
38. BATZLI, G. O., 1968. Dispersion patterns of mice in California annual grassland. *Journal of Mammalogy, 49:* 239–250.
39. BAUCHOT, R. & STEPHAN, H., 1966. Données nouvelles sur l'encéphalisation des insectivores et des prosimiens. *Mammalia, 30:* 160–196.
40. BAYLESS, S. R., 1969. Winter food habits, range use, and home range of antelope in Montana. *Journal of Wildlife Management, 33:* 538–551.
41. BEATLEY, J. C., 1976a. Rainfall and fluctuating plant populations in relation to distributions and numbers of desert rodents in southern Nevada. *Oecologia (Berlin), 24:* 21–42.
42. BEATLEY, J. C., 1976b. Environments of kangaroo rats (*Dipodomys*) and effects of environmental change on populations in southern Nevada. *Journal of Mammalogy, 57:* 67–93.
43. BEATTIE, M., BROMLEY, H. J., CHAMBERS, M., GOLDSPINK, R., VIJVERBERG, J., VAN ZALINGE, N. P. & GOLTERMAN, H. L., 1972. Limnological studies on Tjeukemeer—a typical

Dutch "polder reservoir". In Z. Kajak & A. Hillbricht-Ilkowska (Eds), *Productivity Problems of Freshwaters:* 421–446. Warsaw: Polish Scientific Publishers.
44. BEECHAM, J. J., 1983. Population characteristics of black bears in west central Idaho. *Journal of Wildlife Management, 47:* 405–412.
45. BEGG, R. J., 1976. Aggressiveness, body weight and injuries in long-haired rats (*Rattus villosissimus*). *Australian Zoologist, 19:* 35–43.
46. BEKOFF, M. & JAMIESON, R., 1975. Physical development in coyotes (*Canis latrans*), with a comparison to other canids. *Journal of Mammalogy, 56:* 685–692.
47. BELL, R. H. V. & GRIMSDELL, J. J. R., 1973. The persecuted black lechwe of Zambia. *Oryx, 12:* 77–92.
48. BELLIER, L., 1967. Recherches écologiques dans la savane de Lamto (Côte d'Ivoire): densités et biomasses des petits mammifères. *La Terre et La Vie, 21:* 319–329.
49. BENNETT, A. F. & GORMAN, G. C., 1979. Population density and energetics of lizards on a tropical island. *Oecologia, 42:* 339–358.
50. BERTRAM, R. C. & REMPEL, R. D., 1977. Migration of the North Kings deer herd. *California Fish and Game, 63:* 157–169.
51. BEST, T. L., 1973. Ecological separation of three genera of pocket gophers (Geomyidae). *Ecology, 54:* 1311–1319.
52. BIGLER, W. J., 1974. Seasonal movements and activity patterns of the collared peccary. *Journal of Mammalogy, 55:* 851–855.
53. BIGLER, W. J. & JENKINS, J. H., 1975. Population characteristics of *Peromyscus gossypinus* and *Sigmodon hispidus* in tropical hammocks of South Florida. *Journal of Mammalogy, 56:* 633–644.
54. BIRKENHOLZ, D. E., 1963. A study of the life history and ecology of the round-tailed muskrat (*Neofiber alleni* True) in north-central Florida. *Ecological Monographs, 33:* 255–280.
55. BLAIR, W. F., 1940. Home ranges and populations of the meadow vole in southern Michigan. *Journal of Wildlife Management, 4:* 149–161.
56. BLAIR, W. F., 1943. Populations of the deermouse and associated small mammals in the mesquite association of southern New Mexico. *University of Michigan Contributions of the Laboratory of Vertebrate Biology, 21:* 1–40.
57. BLANKENSHIP, L. H. & FIELD, C. R., 1972. Factors affecting the distribution of wild ungulates on a ranch in Kenya. A preliminary report. *Zoologica Africana, 7:* 281–302.
58. BLEICH, V. C. & SCHWARTZ, O. A., 1975. Observations on the home range of the desert woodrat, *Neotoma lepida intermedia. Journal of Mammalogy, 56:* 518–519.
59. BLOCK, W., 1966. Seasonal fluctuations and distribution of mite populations in moorland soils, with a note on biomass. *Journal of Animal Ecology, 35:* 487–503.
60. BOBEK, B., 1969. Survival, turnover, and production of small rodents in a beech forest. *Acta Theriologica, 14:* 191–210.
61. BOBEK, B., 1971. Influence of population density upon rodent production in a deciduous forest. *Annales Zoologici Fennici, 8:* 137–144.
62. BOPP, P., 1958. Zur Frage der Hirschpopulation im Schweizerischen Nationalpark. *Revue Suisse de Zoologie, 65:* 305–311.
63. BORNER, M., 1978. Status and conservation of the Sumatran tiger. *Carnivore, 1:* 97–102.
64. BOROWSKI, S., KRASIŃSKI, Z. & MILKOWSKI, L., 1967. Food and role of the European bison in forest ecosystems. *Acta Theriologica, 12:* 367–376.
65. BOUFFARD, S. H. & HEIN, D., 1978. Census methods for eastern gray squirrels. *Journal of Wildlife Management, 42:* 550–557.
66. BOURLIÈRE, F., 1962. Les populations des ongulés sauvages Africains: caractéristiques écologiques et implications économiques. *La Terre et La Vie, 16:* 150–160.
67. BOURLIÈRE, F., 1965. Densities and biomasses of some ungulate populations in eastern Congo and Rwanda, with notes on population structure and lion/ungulate ratios. *Zoologica Africana, 1:* 199–207.
68. BOURLIÈRE, F., BERTRAND, M. & HUNKELER, C., 1969. L'écologie de la mone de Lowe (*Cercopithecus campbelli lowei*) en Côte d'Ivoire. *La Terre et La Vie, 23:* 135–163.
69. BOURQUIN, O., VINCENT, J. & HITCHINS, P. M., 1971. The vertebrates of the Hluhluwe Game Reserve—Corridor (state land)—Umfolozi Game Reserve complex. *The Lammergeyer, 14:* 5–58.
70. BRADY, C. A., 1979. Observations on the behavior of the crab-eating fox (*Cerdocyon thous*). In J. F. Eisenberg (Ed.), *Vertebrate Ecology in the Northern Neotropics:* 161–171. Washington, D.C.: Smithsonian Institution Press.
71. BRAITHWAITE, R. W., COCKBURN, A. & LEE, A. K., 1978. Resource partitioning by small mammals in lowland heath communities of south-eastern Australia. *Australian Journal of Ecology, 3:* 423–445.
72. BRIAN, M. V., ELMES, G. & KELLEY, A. F., 1967. Populations of the ant *Tetramorium caespitum. Journal of Animal Ecology, 36:* 337–342.
73. BRIAN, M. V., HIBBLE, J. & STRADLING, D. J., 1965. Ant pattern and density in a southern English heath. *Journal of Animal Ecology, 34:* 545–555.
74. BRIEDERMAN, L., 1971. Die Migrationen des Elches (*Alces alces* L. 1758) in Mitteleuropa von 1957 bis ende 1966. *Lynx (Praha), n. s., 12:* 5–24.

75. BROADBROOKS, H. E., 1965. Ecology and distribution of pikas of Washington and Alaska. *American Midland Naturalist, 73:* 299–335.
76. BROWN, J. H., 1973. Species diversity of seed-eating desert rodents in sand dune habitats. *Ecology, 54:* 775–787.
77. BROWN, J. H. & LEE, A. K., 1969. Bergmann's Rule and climatic adaptation in woodrats. *Evolution, 23:* 329–338.
78. BROWN, J. H. & LIEBERMAN, G. A., 1972. Woodrats and cholla: dependence of a small mammal population on the density of cacti. *Ecology, 53:* 310–313.
79. BROWN, L. E., 1969. Field experiments on the movements of *Apodemus sylvaticus* L. using trapping and tracking techniques. *Oecologia (Berlin), 2:* 198–222.
80. BROWN, L. N., 1964. Dynamics in an ecologically isolated population of the brush mouse. *Journal of Mammalogy, 45:* 436–442.
81. BROWN, L. N., 1970. Population dynamics of the western jumping mouse (*Zapus princeps*) during a four-year study. *Journal of Mammalogy, 51:* 651–658.
82. BRUNS, E. H., 1977. Winter behavior of pronghorns in relation to habitat. *Journal of Wildlife Management, 41:* 560–571.
83. BRUCKNER, C. H., 1957. Population studies on small mammals of southeastern Manitoba. *Journal of Mammalogy, 38:* 87–97.
84. BUECHNER, H. K., 1960. The bighorn sheep in the United States, its past, present, and future. *Wildlife Monographs, 4:* 1–174.
85. BUECHNER, H. K., 1961. Regulation of numbers of pronghorn antelope in relation to land use. *La Terre et La Vie, 15:* 266–285.
86. BUECHNER, H. K., BUSS, I. O., LONGHURST, W. M., & BROOKS, A. C., 1963. Numbers and migration of elephants in Murchison Falls National Park, Uganda. *Journal of Wildlife Management, 27:* 36–53.
87. BUNNELL, F. L., MACLEAN, S. F., JR., & BROWN, J., 1975. Barrow, Alaska. In T. Rosswall & O. W. Heal (Eds), *Structure and Function of Tundra Ecosystems. Ecological Bulletin (Stockholm), 20:* 73–124.
88. BUNNELL, S. D. & JOHNSON, D. R., 1974. Physical factors affecting pika density and dispersal. *Journal of Mammalogy, 55:* 866–869.
89. BURCKHARDT, D., KUSTER, A. & SCHLOETH, R., 1961. Recherches suisses sur les ongulés-gibier. *La Terre et La Vie, 15:* 101–109.
90. BURGIS, M. J., 1974. Revised estimates for the biomass and production of zooplankton in Lake George, Uganda. *Freshwater Biology, 4:* 535–541.
91. BURKE, M. V. & MANN, K. H., 1974. Productivity and production: biomass ratios of bivalve and gastropod populations in an Eastern Canadian estuary. *Journal of the Fisheries Research Board of Canada, 31:* 167–177.
92. BURKEY, A. J., 1971. Biomass turnover, respiration and interpopulation variation in the stream limpet, *Ferrissia rivularis* (Say). *Ecological Monographs, 41:* 235–251.
93. BURT, W. M. & GROSSENHEIDER, R. P., 1964. *A Field Guide to the Mammals,* 2nd edition. Boston: Houghton Mifflin.
94. BURTON, T. M. & LIKENS, G. E., 1975. Salamander populations and biomass in the Hubbard Brook Experimental Forest, New Hampshire. *Copeia, 75:* 541–546.
95. BUSS, I. O. & SAVIDGE, J. M., 1966. Change in population number and reproductive rate of elephants in Uganda. *Journal of Wildlife Management, 30:* 791–809.
96. CABON-RACZYŃSKA, K., 1974. Variability of the body weight of European hares. *Acta Theriologica, 19:* 69–80.
97. CALABY, J. H. & KIETH, K., 1974. Mammals. In H. J. Frith & J. H. Calaby (Eds), *Fauna Survey of the Port Essington District, Coburg Peninsula, Northern Territory of Australia. CSIRO Division of Wildlife Research Technical Paper, 28:* 179–208.
98. CAMENZIND, F. J., 1978. Behavioral ecology of coyotes on the National Elk Refuge, Jackson, Wyoming. In M. Bekoff (Ed.), *Coyotes: Biology, Behavior, and Management:* 267–294. New York: Academic Press.
99. CARL, E. A., 1971. Population control in Arctic ground squirrels. *Ecology, 52:* 395–413.
100. CARROLL, B. K. & BROWN, D. L., 1977. Factors affecting neonatal faun survival in south-central Texas. *Journal of Wildlife Management, 41:* 63–69.
101. CARSTAIRS, J. L., 1976. Population dynamics and movements of *Rattus villosissimus* (Waite) during the 1966–1969 plague at Brunette Downs, N.T. *Australian Journal of Wildlife Research, 3:* 1–9.
103. CAUGHLEY, G. & GODDARD, J., 1975. Abundance and distribution of elephants in the Luangwa Valley, Zambia. *East African Wildlife Journal, 13:* 39–48.
104. CAUGHLEY, G., SINCLAIR, R. G. & WILSON, G. R., 1977. Numbers, distribution and harvesting rate of kangaroos on the inland plains of New South Wales. *Australian Wildlife Research, 4:* 99–108.
105. CHADWICK, E. M. P., 1976. Ecological fish production in a small Precambrian shield lake. *Environmental Biology of Fishes. 1:* 13–60.
106. CHALMERS, N. R., 1968. Group composition, ecology, and daily activities of free living mangabeys in Uganda. *Folia Primatologica, 8:* 247–262.

107. CHARLES, W. N., McGOWAN, D. & EAST, K., 1977. Selection of upland swards by red deer (*Cervus elaphus* L.) on Rhum. *Journal of Applied Ecology, 14:* 55–64.
108. CHARLES-DOMINIQUE, P., 1974. Vie sociale de *Perodicticus potto* (Primates, Lorisidés). Étude de terrain en forêt équitoriale de l'ouest africain au Gabon. *Mammalia, 38:* 355–379.
109. CHARLES-DOMINIQUE, P., 1977. *Ecology and Behaviour of Nocturnal Primates: Prosimians of Equatorial West Africa.* R. D. Martin (trans.). London: Duckworth.
110. CHARLES-DOMINIQUE, P., ARAMENTOWICZ, M., CHARLES-DOMINIQUE, M., GÉRARD, H., HLADIK, A., HLADIK, C. M. & PRÉVOST, M. F., 1981. Les mammifères frugivores arboricoles nocturnes d'une forêt Guyanaise: inter-relations plantes-animaux. *La Terre et La Vie, 35:* 341–435.
111. CHARLES-DOMINIQUE, P. & HLADIK, C. M., 1971. Le *Lepilemur* du sud de Madagascar: écologie, alimentation et vie sociale. *La Terre et La Vie, 25:* 3–66.
112. CHEESEMAN, C. L. & DELANY, M. J., 1979. The population dynamics of small rodents in a tropical African grassland. *Journal of Zoology (London), 188:* 451–475.
113. CHEŁKOWSKA, H. & RYSZKOWSKI, L., 1966. Relationship between the size of the sampling area and the average time of residency and the abundance of *Clethrionomys glareolus* Schreb., *Apodemus agrarius* Pall., and *Apodemus flavicollis* (Melch.). *Bulletin de l'Academie Polonaise des Sciences, série Biologique, 14:* 117–121.
114. CHEW, R. M. & BUTTERWORTH, B. B., 1964. Ecology of rodents in Indian Cove (Mojave Desert), Joshua Tree National Monument, California. *Journal of Mammalogy, 45:* 203–225.
115. CHEW, R. M. & CHEW, A. E., 1970. Energy relationships of the mammals of a desert shrub (*Larrea tridentata*) community. *Ecological Monographs, 40:* 1–21.
116. CHILD., G. S., 1974. An ecological survey of the Borgu Game Reserve, Nigeria. *Kainji Lake Research Project, Technical Report, 4, (FAO, Rome):* 1–130.
117. CHIVERS, D. J., 1974. *The siamang in Malaya: a field study of a primate in a tropical forest. Contributions to Primatology, 5.* Basel: Karger.
118. CHOATE, J. R. & FLEHARTY, E. D., 1975. Synopsis of native, Recent mammals of Ellis County, Kansas. *Museum of Texas Tech University, Occasional Papers, 37:* 1–80.
119. CHRISTIAN, D. P., 1979. Comparative demography of three Namib Desert rodents: responses to the provision of supplementary water. *Journal of Mammalogy, 60:* 679–690.
120. CHRISTOPHER, E. A., 1973. Sympatric relationships of the kangaroo rats, *Dipodomys merriami* and *Dipodomys agilis. Journal of Mammalogy, 54:* 317–326.
121. CLARK, D. B., 1980. Population ecology of an endemic neotropical island rodent: *Oryzomys baueri* of Santa Fe Island, Galapagos, Ecuador. *Journal of Animal Ecology, 49:* 185–198.
122. Clark, F. W., 1972. Influence of jackrabbit density on coyote population change. *Journal of Wildlife Management, 36:* 343–356.
123. CLUTTON-BROCK, T. H. & HARVEY, P. H., 1977a. Primate ecology and social organization. *Journal of Zoology (London), 183:* 1–39.
124. CLUTTON-BROCK, T. H. & HARVEY, P. H., 1977b. Species differences in feeding and ranging behaviour in primates. In T. H. Clutton-Brock (Ed.), *Primate Ecology: Studies of Feeding and Ranging Behaviour in Lemurs, Monkeys, and Apes:* 557–584. London: Academic Press.
125. COE, M. J. & FOSTER, J. B., 1972. The mammals of the northern slopes of Mt. Kenya. *Journal of the East African Natural History Society, 131:* 1–18.
126. COLE, L. R., 1972. A comparison of *Malacomys longipes* and *Malacomys edwardsi* (Rodentia: Muridae) from a single locality in Ghana. *Journal of Mammalogy, 53:* 616–619.
127. COLLETT, S. F., SÁNCHES HERNÁNDEZ, C., SHUM, K. A., Jr., TESKA, W. R. & BAKER, R. H., 1975. Algunas características poblaciones demográficos de pequeños mamíferos en dos habitats Mexicanos. *Anales del Instituto de Biologia, Universidad Nacional Autónoma de México. Serie Zoología, 46:* 101–124.
128. COLLINS, L. R., 1973. *Monotremes and Marsupials: a Reference for Zoological Institutions.* Washington, D.C.: Smithsonian Institution Press.
129. CONGDON, J. & ROEST, A., 1975. Status of the endangered Morro Bay kangaroo rat. *Journal of Mammalogy, 56:* 679–683.
130. CONLEY, W., 1976. Competition between *Microtus*: a behavioral hypothesis. *Ecology, 57:* 224–237.
131. CONNELL, J. H., 1954. Home range and mobility of brush rabbits in California chaparral. *Journal of Mammalogy, 36:* 392–405.
132. COOK, R. S. & HALE, J. B., 1961. Deer on the Bad River Indian Reservation. *Transactions of the North American Wildlife and Natural Resources Conference, 26:* 448–459.
133. COOPER, W. E., 1965. Dynamics and production of a natural population of a freshwater amphipod, *Hyallella azteca. Ecological Monographs, 35:* 377–394.
134. CORBETT, G. B., 1978. *The Mammals of the Palearctic Region: a taxonomic review.* London and Ithaca: British Museum (Natural History) and Cornell University Press.
135. COWAN, I. M., 1972. The status and conservation of bears (Ursidae) of the world—1970. In S. Herrero (Ed.), *Bears—Their Biology and Management:* 343–367. Morges, Switzerland: International Union for the Conservation of Nature.
136. CRAWLEY, M. C., 1973. A live-trapping study of Australian brush-tailed possums, *Trichosurus vulpecula* (Kerr), in the Orongorongo Valley, Wellington, New Zealand. *Australian Journal of Zoology, 21:* 75–90.

137. CRISP, D. T., 1962. Estimates of the annual production of *Corixa germari* (Fieb.) in an upland reservoir. *Archiv für Hydrobiologie, 58:* 210–223.
138. CRISP, D. T., MANN, R. H. K. & McCORMACK, J. C., 1974. The populations of fish at Cow Green, Teesdale, before impoundment. *Journal of Applied Ecology, 11:* 969–996.
139. DAGG, A. I. & FOSTER, J. B., 1976. *The Giraffe: Its Biology, Behavior, and Ecology.* New York: Van Nostrand Reinhold.
140. DALY, M. & DALY, S., 1974. Spatial distribution of a leaf-eating Saharan gerbil (*Psammomys obesus*) in relation to its food. *Mammalia, 38:* 591–603.
141. DASMANN, R. F. & MOSSMAN, A. S., 1962a. Population studies of impala in Southern Rhodesia. *Journal of Mammalogy, 43:* 375–395.
142. DASMANN, R. F. & MOSSMAN, A. S., 1962b. Abundance and population structure of wild ungulates in some areas of Southern Rhodesia. *Journal of Wildlife Management, 26:* 262–269.
143. DAVENPORT, L. B., Jr., 1964. Structure of two *Peromyscus polionotus* populations in old-field ecosystems at the AEC Savannah River Plant. *Journal of Mammalogy, 45:* 95–113.
144. DAVID, J. H. M., 1978. Observations on social organization of springbok, *Antidorcas marsupialis*, in the Bontebok National Park, Swellendam. *Zoologica Africana, 13:* 115–122.
145. DAVIDGE, C., 1978. Ecology of baboons (*Papio ursinus*) at Cape Point. *Zoologica Africana, 13:* 329–350.
146. DAVIS, R. M., 1972. Behaviour of the vlei rat, *Otomys irroratus* (Brandts, 1827). *Zoologica Africana, 7:* 119–140.
147. DEFLER, T. R., 1979. On the ecology and behavior of *Cebus albifrons* in eastern Colombia: I. Ecology. *Primates, 20:* 475–490.
148. DIETERLEN, F., 1967. Ökologische Populationstudien an Muriden des Kivugebietes (Congo). Teil I. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere, 94:* 369–426.
149. DIETERLEN, F., 1969. *Dendromus kahuziensis* (Dendromurinae; Cricetidae; Rodentia)—eine neue Art aus Zentralafrika. *Zeitschrift für Säugetierkunde, 34:* 348–353.
150. DELANY, M. J., 1972. The ecology of small rodents in tropical Africa. *Mammal Review, 2:* 1–42.
151. DELANY, M. J. & NEAL, B. R., 1966. A review of the Muridae (Order Rodentia) of Uganda. *Bulletin of the British Museum of Natural History (Zoology), 13:* 297–395.
152. DENNY, M. J. S., 1975. Mammals of Sturt National Park, Tibooburra, New South Wales. *Australian Zoologist, 18:* 179–195.
153. DIXON, J. E. W., 1964. Preliminary notes on the mammal fauna of the Mkuzi Game Reserve. *The Lammergeyer, 3:* 40–58.
154. DOLBEER, R. A., 1972. The snowshoe hare in the western United States: its status and potential as a game animal. *Proceedings of the Annual Conference of the Western Association of State Game and Fish Commissioners, 52:* 331–342.
155. DOLBEER, R. A., 1973. Reproduction in the red squirrel (*Tamiasciurus hudsonicus*) in Colorado. *Journal of Mammalogy, 54:* 536–540.
156. DOLBEER, R. A. & CLARK, W. R., 1975. Population ecology of snowshoe hares in the central Rocky Mountains. *Journal of Wildlife Management, 39:* 535–549.
157. DORST, J., 1971. Nouvelles recherches sur l'écologie des rongeurs des hauts plateaux Peruviens. *Mammalia, 35:* 515–547.
158. DORST, J., 1972. Morphologie de l'estomac et régime alimentaire de quelques rongeurs des hauts Andes du Pérou. *Mammalia, 36:* 647–656.
159. DORST, J. & DANDELOT, P., 1970. *Säugetiere Afrikas.* Hamburg: Paul Parey.
160. DOWSETT, R. J., 1966. Wet season game populations and biomass in the Ngoma area of the Kafue National Park. *The Puku, 4:* 135–145.
161. DUB, M., 1971. Movements of *Microtus arvalis* Pall. and a method of estimating its numbers. *Zoologicé Listy, 20:* 1–14.
162. DUBOST, G., 1978. Un aperçu sur l'écologie du chevrotain africain *Hyemoschus aquaticus* Ogilby, Artiodactyle Tragulide. *Mammalia, 42:* 1–62.
163. DUKE, K. M. & CROSSLEY, D. A., Jr., 1975. Population energetics and ecology of the rock grasshopper, *Trimerotopsis saxatalis. Ecology, 56:* 1106–1117.
164. DUNBAR, R. I. M., 1978. Competition and niche separation in a high altitude herbivore community in Ethiopia. *East African Wildlife Journal, 16:* 183–199.
165. DUNBAR, R. I. M. & DUNBAR, E. P., 1974. Ecological relations and niche separation between sympatric terrestrial primates in Ethiopia. *Folia Primatologica, 21:* 36–60.
166. DUNBAR, R. I. M. & DUNBAR, E. P., 1975. Guereza monkeys: will they become extinct in Ethiopia? *Walia, 6:* 14–15.
167. DUNNETT, G. M., 1956a. A population study of the quokka, *Setonix brachyurus* Quoy & Gaimard (Marsupialia). *CSIRO Wildlife Research, 1:* 73–78.
168. DUNNETT, G. M., 1956b. A live-trapping study of the brush-tailed possum *Trichosurus vulpecula* Kerr (Marsupialia). *CSIRO Wildlife Research, 1:* 1–18.
169. DUNNETT, G. M., 1964. A field study of local populations of the brush-tailed possum *Trichosurus vulpecula* in eastern Australia. *Proceedings of the Zoological Society of London, 142:* 665–695.
170. DUNSMORE, J. D., 1974. The rabbit in subalpine southeastern Australia. I. Population structure and productivity. *Australian Wildlife Research, 1:* 1–16.

171. DU PLESSIS, S. S., 1972. Ecology of blesbok with special reference to productivity. *Wildlife Monographs, 30:* 1–70.
172. DUPUY, A. R. & VERSCHUREN, J., 1977. Wildlife and parks in Senegal. *Oryx, 14:* 36–46.
173. DWYER, P. D., 1978. A study of *Rattus exulans* (Peale) (Rodentia: Muridae) in the New Guinea highlands. *Australian Wildlife Research, 5:* 221–248.
174. EALEY, E.-H.-M., 1964. L'euro, ou kangourou des collines, *Macropus robustus*, dans le nord-ouest d'Australie. *La Terre et La Vie, 19:* 3–19.
175. EALEY, E. H. M., 1967. Ecology of the euro, *Macropus robustus* (Gould), in north-western Australia. I. The environment and changes in euro and sheep populations. *CSIRO Wildlife Research, 12:* 9–25.
176. EATON, R. L., 1974. *The Cheetah: The Biology, Ecology, and Behavior of an Endangered Species.* New York: Van Nostrand Reinhold.
177. EATON, R. L., 1978. The conservation of the leopard in Africa: towards an authentic philosophy of conservation. *Carnivore, 1:* 82–150.
178. ECKBLAD, J. W., 1973. Population studies of three aquatic gastropods in an intermittent backwater. *Hydrobiologia, 41:* 199–219.
179. EDROMA, E. L., 1975. Wildlife count in Uganda National Park. *Oryx, 13:* 176–178.
180. EDWARDS, O. T., 1942. Survey of winter deer range, Malheur National Forest, Oregon. *Journal of Wildlife Management, 6:* 210–220.
181. EISENBERG, J. F., 1979. Habitat, economy, and society: some correlations and hypotheses for the neotropical primates. In I. S. Bernstein & E. O. Smith (Eds), *Primate Ecology and Human Origins: Ecological Influences on Social Organization:* 216–262. New York: Garland STPM Press.
182. EISENBERG, J. F., 1981. *The Mammalian Radiations: An Analysis of Trends in Evolution, Adaptation, and Behavior.* Chicago: University of Chicago Press.
183. EISENBERG, J. F., O'CONNELL, M. A. & AUGUST, P. V., 1979. Density, productivity, and distribution of mammals in two Venezuelan habitats. In J. F. Eisenberg (Ed.), *Vertebrate Ecology in the Northern Neotropics*: 187–207. Washington, D.C.: Smithsonian Institution Press.
184. EISENBERG, J. F. & SEIDENSTICKER, J., 1976. Ungulates in southern Asia: a consideration of biomass estimates for selected habitats. *Biological Conservation, 10:* 293–308.
185. EISENBERG, J. F. & THORINGTON, R. W., 1973. A preliminary analysis of a neotropical mammal fauna. *Biotropica, 5:* 150–161.
186. EISENTRAUT, M., 1970. Die Verbreitung der Muriden-Gattung *Praomys* auf Fernando Po und West-Kamerun. *Zeitschrift für Säugetierkunde, 35:* 1–15.
187. ELEY, T. J., JR., 1970. Stomach contents, weights, and volumes of Cape hare. *East African Wildlife Journal, 8:* 202.
188. ELLIOTT, J. M., 1973. The life cycle and production of the leech *Erpobdella octoculata* (L.) (Hirudinea: Erpobdellidae) in a lake district stream. *Journal of Animal Ecology, 42:* 435–448.
189. ELLIOTT, J. P. & COWAN, I. M., 1978. Territoriality, density, and prey of the lion in Ngorogoro Crater, Tanzania. *Canadian Journal of Zoology, 56:* 1726–1734.
190. ELLISOR, J. E., 1969. Mobility of white-tailed deer in South Texas. *Journal of Wildlife Management, 33:* 220–222.
191. ELLISOR, J. E. & HARWELL, W. F., 1969. Mobility and home range of collared peccary in southern Texas. *Journal of Wildlife Management, 33:* 425–427.
192. ELTRINGHAM, S. K., 1974. Changes in the large mammal community of Mweya Peninsula, Rwenzori National Park, Uganda, following removal of hippopotamus. *Journal of Applied Ecology, 11:* 855–865.
193. ELTRINGHAM, S. K., 1977. The number and distribution of elephant *Loxodonta africana* in the Rwenzori National Park and Chambura Game Reserve, Uganda. *East African Wildlife Journal, 15:* 19–39.
194. ELTRINGHAM, S. K. & DIN, N. A., 1977. Estimates of the population size of some ungulate species in the Rwenzori National Park, Uganda. *East African Wildlife Journal, 15:* 305–316.
195. ELTRINGHAM, S. K. & WOODFORD, M. H., 1973. The numbers and distribution of buffalo in the Rwenzori National Park, Uganda. *East African Wildlife Journal, 11:* 151–164.
196. ERICKSON, A. W. & PETRIDES, G. A., 1964. Population structure, movements, and mortality of tagged black bears in Michigan. *Michigan State University Research Bulletin, 4:* 46–67.
197. ERLINGE, S., 1974. Distribution, territoriality and numbers of the weasel *Mustela nivalis* in relation to prey abundance. *Oikos, 25:* 308–314.
198. ESSER, J. D. & VAN LAVIEREN, L. P., 1979. Importance, répartition, et tendance évolutive des populations de grands herbivores et de l'autruche dans le Parc National de Waza, Cameroun. *La Terre et La Vie, 33:* 3–26.
199. EVANS, C. D., TROYER, W. A. & LENSINK, C. J., 1966. Aerial census of moose by quadrat sampling units. *Journal of Wildlife Management, 30:* 767–776.
200. EVANS, F. C., 1951. Notes on a population of the striped ground squirrel (*Citellus tridecemlineatus*) in an abandoned field in Michigan. *Journal of Mammalogy, 32:* 437–449.
201. EVERARD, C. O. R. & TIKASINGH, E. S., 1973. Ecology of the rodents *Proechimys guyannensis trinitatis* and *Oryzomys capito velutinus* on Trinidad. *Journal of Mammalogy, 54:* 875–886.
202. EWER, R. F., 1973. *The Carnivores.* Ithaca, New York: Cornell University Press.
203. FAIRBAIRN, D. J., 1977. The spring decline in deer mice: death or dispersal? *Canadian Journal of Zoology, 55:* 84–92.

204. FEELY, J. M. & PLAYER, I. C., 1960. A preliminary report on the square-lipped rhinoceros *Ceratotherium simum simum. The Lammergeyer, 1:* 3–24.
205. FEIST, D. D., 1975. Population studies of lemmings in the coastal tundra of Prudhoe Bay, Alaska. In J. Brown (Ed.), *Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska. Biological Papers of the University of Alaska, Special Report, 2:* 135–143. Fairbanks, Alaska.
206. FERNS, P. N., 1977. Muskox abundance in the southern part of the range in east Greenland. *Arctic, 30:* 52–60.
207. FIELD, C. R., 1971. Elephant ecology in the Queen Elizabeth National Park, Uganda. *East African Wildlife Journal, 9:* 99–123.
208. FIELD, C. R. & LAWS, R. M., 1970. The distribution of the larger herbivores in the Queen Elizabeth National Park, Uganda. *Journal of Applied Ecology, 7:* 273–294.
209. FITCH, H. S., 1947. Ecology of a cottontail rabbit (*Sylvilagus auduboni*) population in central California. *California Fish and Game, 33:* 159–184.
210. FITZGERALD, B. M., 1977. Weasel predation on a cyclic population of the montane vole (*Microtus montanus*) in California. *Journal of Animal Ecology, 46:* 367–397.
211. FLEHARTY, E. D. & CHOATE, J. R., 1973. Bioenergetic strategies of the cotton rat, *Sigmodon hispidus. Journal of Mammalogy, 54:* 680–692.
212. FLEMING, T. H., 1970. Notes on the rodent faunas of two Panamanian forests. *Journal of Mammalogy, 51:* 473–490.
213. FLEMING, T. H., 1971. Population ecology of three species of neotropical rodents. *Museum of Zoology of the University of Michigan, Miscellaneous Publications, 143:* 1–77.
214. FLEMING, T. H., 1972. Aspects of the population dynamics of three species of opossums in the Panama Canal Zone. *Journal of Mammalogy, 53:* 619–623.
215. FLEMING, T. H., 1974. The population ecology of two species of Costa Rican heteromyid rodents. *Ecology, 55:* 493–510.
216. FLINDERS, J. T. & HANSEN, R. M., 1973. Abundance and dispersion of leporids within a shortgrass ecosystem. *Journal of Mammalogy, 54:* 287–291.
217. FLOWERDEW, J. R., 1972. The effect of supplementary food on a population of wood mice (*Apodemus sylvaticus*). *Journal of Animal Ecology, 41:* 553–566.
218. FLOYD, T. J., MECH, L. D. & NELSON, M. E., 1979. An improved method of censusing deer in deciduous-coniferous forests. *Journal of Wildlife Management, 43:* 258–261.
219. FLUX, J. E. C., 1970. Life history of the mountain hare (*Lepus timidus scoticus*) in north-east Scotland. *Journal of Zoology (London), 161:* 75–123.
220. FLYGER, V. F., 1960. Movements and home range of the gray squirrel *Sciurus carolinensis*, in two Maryland woodlots. *Ecology, 41:* 365–369.
221. FORMOZOV, A. N. & KODACHOVA, K. S., 1961. Les rongeurs vivant en colonies dans la steppe Eurasienne et leur influence sur les sols et la végétation. *La Terre et La Vie, 15:* 116–129.
222. FOSTER, J. B., 1966. The giraffe of Nairobi National Park: home range, sex ratios, the herd, and food. *East African Wildlife Journal, 4:* 139–148.
223. FOSTER, J. B. & KEARNEY, D., 1967. Nairobi National Park game census, 1966. *East African Wildlife Journal, 5:* 112–120.
224. FOSTER, J. B. & McLAUGHLIN, R., 1968. Nairobi National Park game census, 1967. *East African Wildlife Journal, 6:* 152–154.
225. FRANKLIN, W. L., 1975. Guanacos in Peru. *Oryx, 13:* 191–202.
226. FRANZMANN, A. W., LERESCHE, R. E., RAUSCH, R. A. & OLDEMEYER, J. L., 1978. Alaskan moose measurements and weights and measurement–weight relationships. *Canadian Journal of Zoology, 56:* 298–306.
227. FREDDY, D. J. & ERICKSON, A. W., 1975. Status of the Selkirk Mountain caribou. In J. R. Luick, P. C. Lent, D. R. Klein & R. G. White (Eds), *Proceedings of the First International Reindeer and Caribou Symposium. Biological papers of the University of Alaska, Special Report, 1:* 221–227. Fairbanks, Alaska.
228. FREEMAN, M. M. R., 1971. Population characteristics of muskoxen in the Jones Sound region of the Northwest Territories. *Journal of Wildlife Management, 35:* 103–108.
229. FRENCH, N. R. & GRANT, W. E., 1974. Summary report of small mammal project grid live-trapping data. *US/IBP Grassland Biome Technical Report, 258:* 1–27. Fort Collins, Colorado: Colorado State University.
230. FRITTS, S. H. & MECH, L. D., 1981. Dynamics, movements, and feeding ecology of a newly protected wolf population in northwestern Minnesota. *Wildlife Monographs, 80:* 1–79.
231. FRITZELL, E. K., 1978. Aspects of raccoon (*Procyon lotor*) social organization. *Canadian Journal of Zoology, 56:* 260–271.
232. FULK, G. W. & KHOKHAR, A. R., 1980. Observations on the natural history of a pika (*Ochotona rufescens*) from Pakistan. *Mammalia, 44:* 51–58.
233. FULK, G. W., 1975. Population ecology of rodents in the semiarid shrublands of Chile. *Museum of Texas Tech University, Occasional Papers, 33:* 1–40.
234. FULLER, T. K. & KEITH, L. B., 1980. Wolf population dynamics and prey relationships in northeastern Alberta. *Journal of Wildlife Management, 44:* 583–602.

235. FULLER, W. A., 1950. Aerial census of northern bison in Wood Buffalo Park and vicinity. *Journal of Wildlife Management, 14:* 445–451.
236. FULLER, W. A., 1961. The ecology and management of the American bison. *La Terre et La Vie, 15:* 286–304.
237. FULLER, W. A., MARTELL, A. M., SMITH, R. F. C. & SPELLER, S. W., 1977. Biology and secondary production of *Dicrostonyx groenlandicus* on Truelove Lowland. In L. C. Bliss (Ed.), *Truelove Lowland, Devon Island, Canada: A High Arctic Ecosystem:* 437–459. Edmonton: University of Alberta Press.
238. GAARE, E. & SKOGLAND, T., 1975. Wild reindeer food habits and range use at Hardangervidda. In F. E. Wiegolaski (Ed.), *Fennoscandian Tundra Ecosystems. Part 2. Animals and Systems Analysis. Ecological Studies, 17:* 15–215. Berlin: Springer Verlag.
239. GAINES, M. S., ROSE, R. K. & McCLENAGHAN, L. R., Jr., 1977. The demography of *Synaptomys cooperi* populations in eastern Kansas. *Canadian Journal of Zoology, 55:* 1584–1594.
240. GALAT, G. & GALAT-LUONG, A., 1976. La colonisation de la mangrove par *Cercopithecus aethiops sabaeus* au Sénégal. *La Terre et La Vie, 30:* 3–30.
241. GASHWILER, J. S., 1959. Small mammal study in west-central Oregon. *Journal of Mammalogy, 40:* 128–139.
242. GAUTIER-HION, A., 1971. L'écologie du talapoin du Gabon. *La Terre et La Vie, 25:* 427–490.
243. GAUTIER-HION, A. & GAUTIER, J.-P., 1974. Les associations polyspécifiques de cercopithèques du Plateau de M'parsa (Gabon). *Folia Primatologica, 21:* 134–177.
244. GEBCZYŃSKA, Z., 1970. Bioenergetics of a root vole population. *Acta Theriologica, 15:* 33–66.
245. GEERLING, C. & BOKDAM, J., 1971. The Senegal kob, *Adenota kob kob* (Erxleben), in the Comoe National Park, Ivory Coast. *Mammalia, 35:* 17–24.
246. GEIST, V., 1971. *Mountain Sheep: A Study in Behavior and Evolution.* Chicago: University of Chicago Press.
247. GENELLY, R. E., 1965. Ecology of the common mole-rat (*Cryptomys hottentotus*) in Rhodesia. *Journal of Mammalogy, 46:* 647–665.
248. GERKING, S. D., 1962. Production and food utilization in a population of bluegill sunfish. *Ecological Monographs, 32:* 31–78.
249. GETZ, L., 1960. A population study of the vole, *Microtus pennsylvanicus. American Midland Naturalist, 64:* 392–405.
250. GIANI, N. & LAVILLE, H., 1973. Cycle biologique et production de *Sialis lutaria* L. (Megaloptera) dans le lac de Port-Biell (Pyrénées Centrales). *Annales de Limnologie, 9:* 45–61.
251. GILLESPIE, D. M., 1969. Population studies of four species of molluscs in the Madison River, Yellowstone National Park. *Limnology and Oceanography, 14:* 101–114.
252. GIPSON, P. S., 1978. Coyotes and related *Canis* in the southeastern United States with a comment on Mexican and Central American *Canis*. In M. Bekoff (Ed.), *Coyotes: Biology, Behavior, and Management:* 191–208. New York: Academic Press.
253. GLIWICZ, J., 1973. A short characteristic of a population of *Proechimys semispinosus* (Tomes, 1860)—a rodent species of the tropical rain forest. *Bulletin de l'Academie Polonaise des Sciences, série Biologique, 21:* 413–418.
254. GLOVER, J., 1963. The elephant problem at Tsavo. *East African Wildlife Journal, 1:* 30–39.
255. GODDARD, J., 1967. Home range, behaviour, and recruitment rates of two black rhinoceros populations. *East African Wildlife Journal, 5:* 133–150.
256. GODDARD, J., 1969. Aerial census of black rhinoceros using stratified random sampling. *East African Wildlife Journal, 7:* 105–114.
257. GOLLEY, F. B., 1960. Energy dynamics of a food chain in an old-field community. *Ecological Monographs, 30:* 187–206.
258. GOLLEY, F. B. & GENTRY, J. B., 1964. Bioenergetics of the southern harvester ant *Pogonomyrmex badius. Ecology, 45:* 217–225.
259. GRAHAM, A., 1966. East African Wildlife Society cheetah survey: extracts from the report by Wildlife Services. *East African Wildlife Journal, 4:* 50–55.
260. GREEGOR, D. H., Jr., 1975. Renal capabilities of an Argentine desert armadillo. *Journal of Mammalogy, 56:* 626–632.
261. GREEN, A. A., 1979. Density estimate of the larger mammals of Arli National Park, Upper Volta. *Mammalia, 43:* 59–70.
262. GRENOT, C. & VERNET, R., 1973. Sur une population d'*Uromastix acanthinurus* Bell isolée au milieu du Grand Erg Occidental (Sahara algérien). *Comptes Rendus de l'Academie des Sciences, Paris, Série D, 276:* 1349–1352.
263. GRIFFING, J. P., 1974. Body measurements of black-tailed jackrabbits of southeastern New Mexico with implications of Allen's Rule. *Journal of Mammalogy, 55:* 674–678.
264. GRIFFITHS, D., 1973. The structure of an acid moorland pond community. *Journal of Animal Ecology, 42:* 263–283.
265. GRIMSDELL, J. J. R., 1979. Changes in populations of resident ungulates. In A. R. E. Sinclair & M. Norton-Griffiths (Eds), *Serengeti: Dynamics of an Ecosystem.* Chicago: University of Chicago Press.
266. GROSS, J. E., STODDART, L. C. & WAGNER, F. H., 1974. Demographic analysis of a northern Utah jackrabbit population. *Wildlife Monographs, 40:* 1–68.

267. GUGGISBERG, C. A. W., 1975. *Wild Cats of the World.* London: David and Charles.
268. GUILER, E. R., 1971. Food of the potoroo (Marsupialia, Macropodidae). *Journal of Mammalogy, 52:* 232.
269. GUILLOTIN, M., 1982. Place de *Proechimys cuvieri* (Rodentia, Echimyidae) dans les peuplements micromammaliens terrestres de la forêt guyanaise. *Mammalia, 46:* 299–318.
270. GURNELL, J., 1978. Seasonal changes in numbers and male behavioural interaction in a population of wood mice, *Apodemus sylvaticus. Journal of Animal Ecology, 47:* 741–755.
271. HAILEY, T. L., THOMAS, J. W. & ROBINSON, R. M., 1966. Pronghorn die-off in Trans-Pecos Texas. *Journal of Wildlife Management, 30:* 488–496.
272. HAGEN, A., ØSTBYE, E. & SKAR, H.-J., 1975. Energy budget of a population of the root vole [*Microtus oeconomus* (Pall.)] in a high mountain habitat, Hardangervidda. In F. E. Wiegolaski (Ed.), *Fennoscandian Tundra Ecosystems. Part 2. Animals and Systems Analysis. Ecological Studies, 17:* 170–173. Berlin: Springer Verlag.
273. HALL, K. R. L. & GARTLAN, J. S., 1965. Ecology and behaviour of the vervet monkey, *Cercopithecus aethiops*, Lolui Island, Lake Victoria. *Proceedings of the Zoological Society of London, 145:* 37–56.
274. HALLORAN, A. F., 1957. Live and dressed weights of American bison. *Journal of Mammalogy, 38:* 139.
275. HALLORAN, H. F., 1943. Management of deer and cattle on the Arkansas National Wildlife Refuge, Texas. *Journal of Wildlife Management, 7:* 203–216.
276. HALTENORTH, T. & DILLER, H., 1977. *Säugetiere Afrikas und Madagaskars.* Munich: BLV Verlagsgesellschaft.
277. HANNEY, P., 1964. The harsh-furred rat in Nyasaland. *Journal of Mammalogy, 45:* 345–358.
278. HANSEN, R. M. & REMMENGA, E. E., 1961. Nearest neighbor concept applied to pocket gopher populations. *Ecology, 42:* 812–814.
279. HANSON, W. R. & MCCULLOCH, C. Y., 1955. Factors influencing mule deer on Arizona brushlands. *Transactions of the North American Wildlife Conference, 20:* 568–588.
280. HANSSON, L., 1971. Estimates of the productivity of small mammals in a south Swedish spruce plantation. *Annales Zoologici Fennici, 8:* 118–126.
281. HANSSON, L., 1975. Comparison between small mammal sampling with small and large removal quadrats. *Oikos, 26:* 398–404.
282. HAPPOLD, D. C. D., 1974. The small rodents of the forest–savanna–farmland association near Ibadan, Nigeria, with observations on reproduction biology. *Revue de Zoologie et de Botanique Africain, 88:* 814–836.
283. HAPPOLD, D. C. D., 1975. The effects of climate and vegetation on the distribution of small rodents in western Nigeria. *Zeitschrift für Säugetierkunde, 40:* 221–242.
284. HAPPOLD, D. C. D., 1977. A population study on small rodents in the tropical rainforest of Nigeria. *La Terre et La Vie, 31:* 385–458.
285. HARDING, R. S. O., 1976. Ranging patterns of a troop of baboons (*Papio anubis*) in Kenya. *Folia Primatologica, 25:* 143–185.
286. HARLAND, R. M., BLANCHER, P. J. & MILLAR, J. S., 1979. Demography of a population of *Peromyscus leucopus. Canadian Journal of Zoology, 57:* 323–328.
287. HARRISON, J. L., 1969. The abundance and population density of mammals in Malayan lowland forests. *Malayan Nature Journal, 22:* 174–178.
288. HAUKIOJA, E. & KOPONEN, S., 1975. Birch herbivores and herbivory at Kevo. In F. E. Wiegolaski (Ed.), *Fennoscandian Tundra Ecosystems. Part 2. Animals and Systems Analysis. Ecological Studies, 17:* 181–194. Berlin: Springer Verlag.
289. HAYDEN, P., 1966. Seasonal occurrence of jackrabbits on Jackass Flat, Nevada. *Journal of Wildlife Management, 30:* 835–838.
290. HEIM DE BALSAC, H. & AELLEN, V., 1965. Les Muridae de basse Côte-d'Ivoire. *Revue Suisse de Zoologie, 72:* 695–753.
291. HELM, J. D., 1975. Reproductive biology of *Ototylomys* (Cricetidae). *Journal of Mammalogy, 56:* 575–590.
292. HEMMING, J. E., 1975. Population growth and movement patterns of the Nelchina caribou herd. In J. R. Luick, P. C. Lent, D. R. Klein & R. G. White (Eds), *Proceedings of the First International Reindeer and Caribou Symposium. Biological Papers of the University of Alaska, Special Report, 1:* 162–169. Fairbanks, Alaska.
293. HENDRICHS, H., 1970. Schätzungen der Huftierbiomasse in der Dornbuschsavanne nördlich und westlich der Serengetisteppe in Ostafrika nach einem neuen Verfahren und Bemerkungen zur Biomasse der anderen pflanzenfressenden Tierarten. *Säugetierkundliche Mitteilungen, 18:* 237–255.
294 HENDRICHS, H., 1975. The status of the tiger *Panthera tigris* (Linné 1758) in the Sundarbans mangrove forest (Bay of Bengal). *Säugetierkundliche Mitteilungen, 23:* 161–199.
295. HERBERT, H. J., 1972. *The population dynamics of the waterbuck* Kobus ellipsiprymnus *(Ogilby, 1833) in the Sabi-Sand Wildtuin. Mammalia Depicta.* Hamburg: Paul Parey.
296. HINDS, D. S., 1973. Acclimatization of thermoregulation in the desert cottontail, *Sylvilagus audubonii. Journal of Mammalogy, 54:* 709–728.
297. HINTON, J. M., 1971. Energy flow in a natural population of *Neophilaenus lineatus* (Homoptera). *Oikos, 22:* 155–171.
298. HIRST, S. M., 1975. Ungulate-habitat relationships in a South African woodland/savanna ecosystem. *Wildlife Monographs, 44:* 1–60.

299. HITCHINS, P. M., 1966. Body weights and dressed carcass yields of impala and wildebeest in Hluhluwe Game Reserve. *The Lammergeyer, 6:* 20–23.
300. HITCHINS, P. M., 1968a. Some preliminary findings on the population structure and status of the black rhinceros *Diceros bicornis* in the Hluhluwe Game Reserve, Zululand. *The Lammergeyer, 9:* 26–28.
301. HITCHINS, P. M., 1968b. Liveweights of some mammals from Hluhluwe Game Reserve, Zululand. *The Lammergeyer, 9:* 42.
302. HOLČIK, J., 1972. Abundance, ichthyomass and production of fish populations in three types of waterbodies in Czechoslovakia (man-made lake, trout lake, arm of the Danube River). In Z. Kajak & A. Hillbricht-Ilkowska (Eds), *Productivity Problems of Freshwaters:* 843–855. Warsaw: Polish Scientific Publishers.
303. HOLLOWAY, C., 1973. Swamp deer in Uttar Pradesh. *Oryx, 12:* 41–48.
304. HOLSWORTH, W. N., 1972. Reedbuck concentrations in Dinder National Park, Sudan. *East African Wildlife Journal, 10:* 307–308.
305. HOOGERWERF, A., 1970. *Udjung Kulon: The Land of the Last Javan Rhinoceros.* Leiden: E. J. Brill.
306. HORNOCKER, M. G., 1970. An analysis of mountain lion predation upon mule deer and elk in the Idaho Primitive Area. *Wildlife Monographs, 21:* 1–39.
307. HORST, T. J. & MARZOLF, G. R., 1975. Production ecology of burrowing mayflies in a Kansas reservoir. *Internationale Vereingung für Theoretische und Angewandte Limnologie, Verhandelungen, 19:* 3029–3038.
308. HOWARD, W. E. & CHILDS, H. E., JR., 1959. Ecology of pocket gophers with emphasis on *Thomomys bottae mewa. Hilgardia, 29:* 277–358.
309. HUBERT, B., 1977. Écologie des populations de rongeurs de Bandia (Sénégal) en zone Sahelo-soudanienne. *La Terre et La Vie, 31:* 33–100.
310. HUBERT, B. & ADAM, F., 1975. Reproduction et croissance en élevage de quatre espèces de rongeurs Sénégalais. *Mammalia, 39:* 57–73.
311. HUBERT, B. A., 1977. Estimated productivity of muskox on Truelove Lowland. In L. C. Bliss (Ed.), *Truelove Lowland, Devon Island, Canada: A High Arctic Ecosystem:* 467–491. Edmonton: University of Alberta Press.
312. HUGHES, R. N., 1970a. Population dynamics of the bivalve *Scrobicularia plana* (Da Costa) on an intertidal mud-flat in North Wales. *Journal of Animal Ecology, 39:* 338–356.
313. HUGHES, R. N. 1970b. An energy-budget for a tidal-flat population of the bivalve *Scrobicularia plana* (Da Costa). *Journal of Animal Ecology, 39:* 357–381.
314. HUNSAKER, D., II., 1977. Ecology of New World marsupials. In D. Hunsaker (Ed.), *The Biology of Marsupials:* 95–156. New York: Academic Press.
315. HUNTER, R. D., 1975. Growth, fecundity, and bioenergetics of three populations of *Lymnaea palustris* in upstate New York. *Ecology, 56:* 50–63.
316. INGLES, L. G., 1947. Ecology and life history of the California gray squirrel. *California Fish and Game, 33:* 139–158.
317. IRBY, L. R., 1973. A preliminary report on the mountain reedbuck (*Redunca fulvorufula*) in the Loskop Dam Nature Reserve. *Journal of the South African Wildlife Management Association, 3:* 53–58.
318. IRBY, L. R., 1977. Studies on mountain reedbuck populations with special reference to the Loskop Dam Nature Reserve. *South African Journal of Wildlife Research, 7:* 73–86.
319. IRWIN, L. L., 1975. Deer-moose relationships on a burn in northeastern Minnesota. *Journal of Wildlife Management, 39:* 653–662.
320. IURGENSON, P. B., 1955. Ecology of the lynx in forests of the Central Zone of the U.S.S.R. *Zoologicheskii Zhurnal, 34:* 609–620. (In Russian).
321. JACKSON, R., 1979. Snow leopards in Nepal. *Oryx, 15:* 191–195.
322. JACOBS, J., 1977. Coexistence of similar zooplankton species by differential adaptation to reproduction and escape in an environment with fluctuating food and enemy densities. II. Field data analysis of *Daphnia. Oecologia (Berlin), 30:* 313–329.
323. JACOBSEN, N. H. G., 1974. Distribution, home range and behaviour patterns of bushbuck in the Lutope and Sengwa Valleys, Rhodesia. *Journal of the South African Wildlife Management Association, 4:* 75–93.
324. JAKIMCHUK, R. D. & McCOURT, K. H., 1975. Distribution and movements of the Porcupine caribou herd in the northeastern Yukon. In J. R. Luick, P. C. Lent, D. R. Klein & R. G. White (Eds), *Proceedings of the First International Reindeer and Caribou Symposium. Biological Papers of the University of Alaska, Special Report, 1:* 140–154. Fairbanks, Alaska.
325. JANION, M., RYSZKOWSKI, L. & WIERZBOWSKA, T., 1968. Estimate of number of rodents with variable probability of capture. *Acta Theriologica, 13:* 285–294.
326. JARMAN, P. J., 1971. Diets of large mammals in the woodlands around Lake Kariba, Rhodesia. *Oecologia (Berlin), 8:* 157–178.
327. JARMAN, P. J., 1974. The social organisation of antelope in relation to their ecology. *Behaviour, 58:* 215–267.
328. JENNINGS, T. J. & BARKHAM, J. P., 1975. Slug populations in mixed deciduous woodland. *Oecologia (Berlin), 20:* 279–286.

329. JIMENEZ, J. J., 1971. Comparative post-natal growth in five species of the genus *Sigmodon*. I. External morphological character relationships. *Revista de Biologia Tropica, 19:* 133–148.
330. JOHNSINGH, A. J. T., 1982. Reproductive and social behaviour of the dhole, *Cuon alpinus* (Canidae). *Journal of Zoology (London), 198:* 443–463.
331. JÓNASSON, P. M., 1972. Ecology and production of the profundal benthos in relation to phytoplankton in Lake Esrom. *Oikos (Supplement), 14:* 1–148.
332. JÓNASSON, P. M., 1975. Population ecology and production of benthic detritivores. *Internationale Vereingung für Theoretische und Angewandte Limnologie, Verhandelungen, 19:* 1066–1072.
333. JONES, J. K., JR., & BARBER, A. A., 1957. Home ranges and populations of small mammals in central Korea. *Journal of Mammalogy, 38:* 377–392.
334. JONKEL, C. J. & COWAN, I. M., 1971. The black bear in the spruce-fir forest. *Wildlife Monographs, 27:* 1–95.
335. JORDAN, P. A., BOTKIN, D. B. & WOLFE, M. L., 1970. Biomass dynamics in a moose population. *Ecology, 52:* 147–152.
336. JOUBERT, E., 1972. The social organization and associated behaviour in the Hartmann zebra *Equus zebra hartmanni. Madoqua, series I, 6:* 17–56.
337. JOULE, J. & CAMERON, G. N., 1975. Species removal studies. I. Dispersal strategies of sympatric *Sigmodon hispidus* and *Reithrodontomys fulvescens* populations. *Journal of Mammalogy, 56:* 378–396.
338. JOULE, J. & JAMESON, D. L., 1972. Experimental manipulation of population density in three sympatric rodents. *Ecology, 53:* 653–660.
339. KAJAK, Z. & RYBAK, J. I., 1966. Production and some trophic dependences in benthos against primary production and zooplankton production of several Masurian lakes. *Internationale Vereingung für Theoretische und Angewandte Limnologie, Verhandelungen, 16:* 441–451.
340. KALLIO, P., 1975. Kevo, Finland. In T. Rosswall & O. W. Heal (Eds), *Structure and Function of Tundra Ecosystems:* 193–223. *Ecological Bulletin (Stockholm), 20.*
341. KAWAMICHI, T., 1976. Hay territory and dominance rank of pikas (*Ochotona princeps*). *Journal of Mammalogy, 57:*133–148.
342. KAY, D. G. & BRAFIELD, A. E., 1973. The energy relations of the polychaete *Neanthes (= Nereis) virens* (Sars). *Journal of Animal Ecology, 42:* 673–692.
343. KEARNEY, S. R. & GILBERT, F. F., 1976. Habitat use by white-tailed deer and moose on sympatric range. *Journal of Wildlife Management, 40:* 645–657.
344. KEMP, G. A., 1972. Black bear population dynamics at Cold Lake, Alberta, 1968–1970. In S. Herrero (Ed.), *Bears—their Biology and Management:* 26–31. Morges, Switzerland: International Union for the Conservation of Nature.
345. KEMP, G. A. & KIETH, L. B., 1970. Dynamics and regulation of red squirrel (*Tamiasciurus hudsonicus*) populations. *Ecology, 51:* 763–779.
346. KENAGY, G. J., 1973a. Daily and seasonal patterns of activity and energetics in a heteromyid rodent community. *Ecology, 54:* 1201–1219.
347. KENAGY, G. J., 1973b. Adaptations for leaf eating in the Great Basin kangaroo rat, *Dipodomys microps. Oecologia (Berlin), 12:* 383–412.
348. KENYI, J. M., 1978. Aerial count of buffalo herds in Rwenzori National Park, Uganda. *East African Wildlife Journal, 16:* 221–222.
349. KEVAN, P. G., 1974. Peary caribou and muskoxen on Banks Island. *Arctic, 27:* 256–264.
350. KEYMER, I. F., 1969. Investigations on the duiker (*Sylvicapra grimmia*) and its blood protozoa in central Africa. *Philosophical Transactions of the Royal Society of London, series B, Biological Sciences, 255:* 33–108.
351. KHAN, MOHAMMED KHAN BIN MOMIN, 1967. Movements of a herd of elephants in the Upper Perak area. *Malayan Nature Journal, 20:* 18–23.
352. KHAN, MOHAMMED KHAN BIN MOMIN, 1969. Population and distribution studies of Perak elephants. *Malayan Nature Journal, 23:* 7–14.
353. KHAN, MOHAMMED KHAN BIN MOMIN, 1971. The distribution of large animals in Taman Nagara. *Malayan Nature Journal, 24:* 125–131.
354. KHRUSTSELEVSKII, V. P., TRISTAN, D. P. & KARPOV, A. A., 1977. Aspects of predicting the population of the yellow suslik in deserts of the U.S.S.R. *Soviet Journal of Ecology, 8:* 538–540.
355. KIETH, L. B. & WINDBERG, L. A., 1978. A demographic analysis of the snowshoe hare cycle. *Wildlife Monographs, 58:* 1–70.
356. KING, C. M., 1975. The home range of the weasel (*Mustela nivalis*) in an English woodland. *Journal of Animal Ecology, 44:* 639–668.
357. KING, D. G., 1975. The afro-alpine grey duiker of Kilimanjaro. *Journal of the East African Natural History Society, 152:* 1–9.
358. KINGDON, J., 1971. *East African Mammals: An Atlas of Evolution in Africa. Vol. 1.* London: Academic Press.
359. KINGDON, J., 1974. *East African Mammals: An Atlas of Evolution in Africa. Vol 2(B). Hares and Rodents.* London: Academic Press.
360. KINGSTON, T. J., 1971. Notes on the black and white colobus monkey in Kenya. *East African Wildlife Journal, 9:* 172–175.
361. KINZEY, W. G., ROSENBERGER, A. L., HEISLER, P. S., PROWSE, D. L. & TRILLING, J. S.,

1977. A preliminary field investigation of the yellow handed titi monkey *Callicebus torquatus torquatus*, in northern Peru. *Primates, 18:* 159–181.
362. KISTCHINSKI, A. A., 1972. Life history of the brown bear (*Ursus arctos* L.) in north-east Siberia. In S. Herrero (Ed.), *Bears—their Biology and Management:* 67–73. Morges, Switzerland: International Union for the Conservation of Nature.
363. KITCHNER, D. J., 1973. Notes on home range and movement in two small macropods, the potoroo (*Potorous apicalis*) and the quokka (*Setonix brachyurus*). *Mammalia, 37:* 231–240.
364. KLEIN, G., RACHOR, E. & GERLACH, S. A., 1975. Dynamics and productivity of two populations of the benthic tube-dwelling amphipod *Ampelisca brevicornis* (Costa) in Heligoland Bight. *Ophelia, 14:* 139–159.
365. KLEYMANN, M., 1976. Beiträge zur Kenntnis der Infrastructuren beim Rotwild. I. Zur Entwicklung und gegenwärtigen Situation der Rotwildbestände in der Bundesrepublik Deutschland. *Zeitschrift für Jagdwissenschaft, 22:* 20–28.
366. KNIGHT, R. R., 1970. The Sun River elk herd. *Wildlife Monographs, 23:* 1–66.
367. KNOWLTON, F. F., 1960. Food habits, movements, and populations of moose in the Gravelly Mountains, Montana. *Journal of Wildlife Managements, 24:* 162–170.
368. KOEMAN, J. H., 1969. Verslag van een bezoek aan het Lambwe Valley Game Reserve in zuid-Nyanza in Kenya. *Lutra, 11:* 1–4.
369. KOFORD, C. B., 1958. Prairie dogs, whitefaces, and blue grama. *Wildlife Monographs, 3:* 1–78.
370. KOFORD, C. B., 1961. The ecology and management of the vicuna in the Puna zone of Peru. *La Terre et La Vie, 15:* 342–353.
371. KOFORD, C. B., 1978. The welfare of the puma in California, 1976. *Carnivore, 1:* 92–96.
372. KOFORD, K. B., 1973. Spotted cats in Latin America: an interim report. *Oryx, 12:* 37–38.
373. KRASIŃSKI, Z., 1967. Free living European bisons. *Acta Theriologica, 12:* 391–405.
374. KRASIŃSKI, Z., 1978. Dynamics and structure of the European bison population in the Białowieza Primeval Forest. *Acta Theriologica, 23:* 3–48.
375. KREBS, C. J., 1964. The lemming cycle at Baker Lake, Northwest Territories, during 1959–1962. *Arctic Institute of North America, Technical Paper, 15:* 1–104.
376. KREBS, C. J., 1966. Demographic changes in fluctuating populations of *Microtus californicus*. *Ecological Monographs, 36:* 239–273.
377. KREBS, C. J., KELLER, B. L. & TAMARIN, R. H., 1969. *Microtus* population biology: demographic changes in fluctuating populations of *M. ochrogaster* and *M. pennsylvanicus* in southern Indiana. *Ecology, 50:* 587–607.
378. KREFTING, L. W. & FLETCHER, J. B., 1941. Notes on the cruising method of censusing white-tailed deer in Oklahoma. *Journal of Wildlife Management, 5:* 412–415.
379. KRITZMAN, E. B., 1974. Ecological relationships of *Peromyscus maniculatus* and *Perognathus parvus* in eastern Washington. *Journal of Mammalogy, 55:* 172–188.
380. KRUUK, H. & PARISH, T., 1982. Factors affecting population density, group size and territory size of the European badger, *Meles meles*. *Journal of Zoology (London), 196:* 31–39.
381. KUENZLER, E. J., 1961. Structure and energy flow of a mussel population in a Georgia salt marsh. *Limnology and Oceanography, 6:* 191–204.
382. KUMMER, H., 1968. Social organization of hamadryas baboons: a field study. *Bibliotheca Primatologica, 6:* 1–189.
383. KUNDAELI, J. N., 1976. Distribution of tree hyrax (*Dendrohyrax validus validus* True) on Mt. Kilimanjaro, Tanzania. *East African Wildlife Journal, 14:* 253–264.
384. KURODA, S., 1979. Grouping of Pygmy chimpanzees. *Primates, 20:* 161–183.
385. KUTILEK, M. J., 1974. Density and biomass of large mammals in Lake Nakuru National Park. *East African Wildlife Journal, 12:* 201–212.
386. LAMPREY, H. F., 1964. Estimation of the large mammal densities, biomass, and energy exchange in the Tarangire Game Reserve and the Masai Steppe in Tanganyika. *East African Wildlife Journal, 2:* 1–46.
387. LANNING, D. V., 1976. Density and movements of the coati in Arizona. *Journal of Mammalogy, 57:* 609–611.
388. LARSEN, T., 1972. Air and ship census of polar bears in Svalbard (Spitzbergen). *Journal of Wildlife Management, 36:* 562–570.
389. LARSON, T. J., RONGSTAD, O. J. & TERBILCOX, F. W., 1978. Movement and habitat use of white-tailed deer in southcentral Wisconsin. *Journal of Wildlife Management, 42:* 113–117.
390. LAURIE, A. & SEIDENSTICKER, J., 1977. Behavioural ecology of the sloth bear (*Melursus ursinus*). *Journal of Zoology (London), 182:* 187–204.
391. LAVELLE, P., 1971. Recherches écologiques dans la savane de Lamto (Côte-d'Ivoire): Production annuelle d'une ver de terre *Millsonia anomala* Omodeo. *La Terre et La Vie, 25:* 240–254.
392. LAYNE, J. N., 1954. The biology of the red squirrel, *Tamiasciurus hudsonicus loquax* (Bougs), in central New York. *Ecological Monographs, 24:* 227–267.
393. LEARNER, M. A. & POTTER, D. W. B., 1974. Life-history and production of the leech *Helobdella stagnalis* (L.) (Hirudinea) in a shallow eutrophic reservoir in South Wales. *Journal of Animal Ecology, 43:* 199–208.

394. LE BOULENGE, F. & FUENTES, E. R., 1978. Preliminary population dynamics of *Octodon degus* (abstract). *International Congress of Theriology, 2:* 180.
395. LE COUNT, A. L., 1982. Characteristics of a central Arizona black bear population. *Journal of Wildlife Management, 46:* 861–868.
396. LEDGER, H. P., 1963. Weights of some East African mammals. *East African Wildlife Journal, 1:* 123–124.
397. LEDGER, H. P., 1964. Weights of some East African mammals: 2. *East African Wildlife Journal, 2:* 159.
398. LEGAIT, E., PETTER, F. & LEGAIT, H., 1966. Recherches sur le lobe intermédiaire de l'hypophyse de quelques rongeurs africains. *Mammalia, 30:* 337–342.
399. LE LOUARN, H. & SAINT-GIRONS, M.-C., 1977. *Les Rongeurs de France.* Paris: Institut National de la Recherche Agronomique.
400. LERESCHE, R. E., 1975. The international herds: present knowledge of the Fortymile and Porcupine caribou herds. In J. R. Luick, P. C. Lent, D. R. Klein & R. G. White (Eds), *Proceedings of the First International Reindeer and Caribou Symposium. Biological Papers of the University of Alaska, Special Report, 1:* 127–139.
401. LESLIE, D. M., JR., & DOUGLAS, C. L., 1979. Desert bighorn sheep of the River Mountains, Nevada. *Wildlife Monographs, 66:* 1–56.
402. LEUTHOLD, B. M. & LEUTHOLD, W., 1978. Ecology of the giraffe in Tsavo East National Park, Kenya. *East African Wildlife Journal, 16:* 1–20.
403. LEUTHOLD, W., 1972. Home range, movements, and food of a buffalo herd in Tsavo National Park. *East African Wildlife Journal, 10:* 237–243.
404. LEUTHOLD, W. & LEUTHOLD, B. M., 1976. Density and biomass of ungulates in Tsavo East National Park, Kenya. *East African Wildlife Journal, 14:* 49–58.
405. LÉVIEUX, J., 1983. The soil fauna of tropical savannas. IV. The ants. In F. Bourlière (Ed.), *Ecosystems of the World. Vol. 13. Tropical Savannas:* 525–540. Amsterdam: Elsevier.
406. LIDICKER, W. Z., JR., 1973. Regulation of numbers in an island population of the California vole, a problem in community dynamics. *Ecological Monographs, 43:* 271–302.
407. LIM BOO-LIAT, 1970. Distribution, relative abundance, food habits, and parasite patterns of giant rats (*Rattus*) in West Malaysia. *Journal of Mammalogy, 51:* 730–740.
408. LIM BOO-LIAT & HEYNEMAN, D., 1968. A collection of small mammals from Tuaran and the southwest face of Mt. Kinabalu, Sabah. *Sarawak Museum Journal, 16:* 257–276.
409. LINDZEY, F. G. & MESLOW, E. C., 1977. Population characteristics of black bears on an island in Washington. *Journal of Wildlife Management, 41:* 408–412.
410. LINZEY, D. W., 1968. An ecological study of the golden mouse, *Ochrotomys nutalli*, in the Great Smoky Mountains National Park. *American Midland Naturalist, 79:* 320–345.
411. LLOYD, H. G., 1980. *The Red Fox.* London: Batsford.
412. LÖBMANN, P., 1968. Quantitative Untersuchungen an der Rotelmaus, *Clethrionomys glareolus* (Schreber, 1780). *Zeitschrift für Säugetierkunde, 33:* 129–149.
413. LOCKIE, J. D., 1966. Territory in small carnivores. *Symposium of the Zoological Society of London, 18:* 143–165.
414. LOUGHREY, A. G. & KELSALL, J. P., 1970. The ecology and population dynamics of the barren-ground caribou in Canada. In *Ecology and Conservation Series, Vol 1. Ecology of the Subarctic Regions. Proceedings of the Helsinki Symposium:* 275–280. Paris: UNESCO.
415. LOWE, V. P. W., 1961. A discussion on the history, present status and future conservation of red deer (*Cervus elaphus* L.) in Scotland. *La Terre et La Vie, 15:* 9–40.
416. LOWE, V. P. W., 1969. Population dynamics of the red deer (*Cervus elaphus* L.) on Rhum. *Journal of Animal Ecology, 38:* 425–457.
417. MCCAFFERY, K. R., 1976. Deer trail counts as an index of population and habitat use. *Journal of Wildlife Management, 40:* 308–316.
418. M'CLOSKEY, R. T., 1972. Temporal changes in populations and species diversity in a California rodent community. *Journal of Mammalogy, 53:* 657–676.
419. M'CLOSKEY, R. T. & LAJOIE, D. J., 1975. Determinants of local distribution and abundance in white-footed mice. *Ecology, 56:* 467–472.
420. MCILROY, C. W., 1972. Effects of hunting on black bears in Prince William Sound. *Journal of Wildlife Management, 36:* 828–837.
421. MCILROY, J. C., 1977. Aspects of the ecology of the common wombat, *Vombatus ursinus*. II. Methods for estimating population numbers. *Australian Wildlife Research, 4:* 223–228.
422. MCKAY, D. O & VERTS, B. J., 1978. Estimates of some attributes of a population of Nuttall's cottontails. *Journal of Wildlife Management, 42:* 159–168.
423. MACKIE, R. J., 1970. Range ecology and relations of mule deer, elk, and cattle in the Missouri River Breaks, Montana. *Wildlife Monographs, 20:* 1–79.
424. MACKINNON, J., 1971. The orang-utan in Sabah today. *Oryx, 12:* 141–191.
425. MACKINNON, J., 1973. Orang-utans in Sumatra. *Oryx, 12:* 234–242.
426. MACKINNON, J. C., 1973. Analysis of energy flow and production in an unexploited marine flatfish population. *Journal of the Fisheries Research Board of Canada, 30:* 1717–1728.
427. MCNAB, B. K., 1982. The physiological ecology of South American mammals. In M. A. Mares & H. H.

Genoways (Eds), *Mammalian Biology in South America. Pymatuning Laboratory of Ecology, University of Pittsburgh, Special Publication, 6:* 187–208.
428. McNEILL, S., 1971. The energetics of a population of *Leptopterna dolabrata* (Heteroptera: Miridae). *Journal of Animal Ecology, 40:* 127–140.
429. MADDEN, J. R., 1974. Female territory in a Suffolk County, Long Island, population of *Glaucomys volans. Journal of Mammalogy, 55:* 647–652.
430. MAITLAND, P. S. & HUDSPITH, P. M. G., 1974. The zoobenthos of Loch Levan, Kinross, and estimates of its production in the sandy littoral area during 1970 and 1971. *Proceedings of the Royal Society of Edinburgh B, 74:* 219–239.
431. MAKACHA, S., MOLLEL, C. L. & RWEZAURA, J., 1978. The conservation status of the black rhinoceros (*Diceros bicornis* L.) in the Ngorogoro Crater, Tanzania. *African Journal of Ecology, 17:* 97–103.
432. MANN, R. H. K., 1971. The populations, growth and production of fish in four small streams in southern England. *Journal of Animal Ecology, 40:* 155–190.
433. MARBURGER, R. G. & THOMAS, J. W., 1965. A die-off of white-tailed deer of the central mineral region of Texas. *Journal of Wildlife Management, 29:* 706–716.
434. MARKHAM, O. D. & WHICKER, F. W., 1973. Seasonal data on reproduction and body weights of pikas (*Ochotona princeps*). *Journal of Mammalogy, 54:* 496–498.
435. MARKOV, G., CHRISTOV, L. & GLIWICZ, J., 1972. A population of *Clethrionomys glareolus pirinus* on the Vitosha Mountain, Bulgaria. I. Variations in numbers and age structure. *Acta Theriologica, 17:* 327–335.
436. MARTIN, E. P., 1956. A population study of the prairie vole (*Microtus ochrogaster*) in northeastern Kansas. *University of Kansas Publications of the Museum of Natural History, 8:* 361–416.
437. MARTIN, E. P., 1960. Distribution of native mammals among the communities of the mixed prairie. *Fort Hays Studies Science Series, 1:* 1–26.
438. MARTINKA, C. J., 1974. Population characteristics of grizzly bears in Glacier National Park, Montana. *Journal of Mammalogy, 55:* 21–29.
439. MASON, C. F., 1970. Snail populations, beech litter production, and the role of snails in litter decomposition. *Oecologia (Berlin), 5:* 215–239.
440. MASON, D. R., 1976. Some observations on social organization and behaviour of springbok in the Jack Scott nature reserve. *Journal of the South African Wildlife Management Association, 6:* 33–39.
441. MATHEWS, C. P., 1971. Contributions of young fish to total production of fish in the river Thames near Reading. *Journal of Fish Biology, 3:* 157–180.
442. MATHIAS, J. A., 1971. Energy flow and secondary production of the amphipods *Hyalella azteca* and *Crangonyx richmondensis occidentalis* in Marion Lake, British Columbia. *Journal of the Fisheries Research Board of Canada, 28:* 711–726.
443. MATTICE, J. S., 1972. Production of a natural population of *Bithynia tentaculata* L. (Gastropoda, Molluscs). *Ekologia Polska, 20:* 525–539.
444. MAZURKIEWICZ, M., 1972. Density and weight structure of populations of the bank vole in open and enclosed areas. *Acta Theriologica, 17:* 455–465.
445. MEDWAY, LORD & WELLS, D. R., 1971. Diversity and density of birds and mammals at Kuala Lompat, Pahang. *Malayan Nature Journal, 24:* 238–247.
446. MENTIS, M. T., 1978. Population limitation in grey rhebuck and oribi in the Natal Drakensberg. *The Lammergeyer, 26:* 19–28.
447. MERRITT, J. F., 1974. Factors influencing the local distribution of *Peromyscus californicus* in northern California. *Journal of Mammalogy, 55:* 102–114.
448. MESERVE, P. L., 1971. Population ecology of the prairie vole, *Microtus ochrogaster*, in the western mixed prairie of Nebraska. *American Midland Naturalist, 86:* 417–433.
449. MESERVE, P. L., 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. *Journal of Mammalogy, 57:* 300–319.
450. MESSICK, J. P. & HORNOCKER, M. G., 1981. Ecology of the badger in southwestern Idaho. *Wildlife Monographs, 76:* 1–53.
451. MICHAEL, E. D., 1965. Movements of white-tailed deer on the Welder Wildlife Refuge. *Journal of Wildlife Management, 29:* 44–52.
452. MILLAR, J. S., 1974. Success of reproduction in pikas, *Ochotona princeps* (Richardson). *Journal of Mammalogy, 55:* 527–542.
453. MILLER, F. L. & RUSSELL, R. H., 1974a. Aerial surveys of Peary caribou and muskoxen on western Queen Elizabeth Islands, Northwest Territories, 1973. *Canadian Wildlife Service Progress Notes, 40:* 1–5.
454. MILLER, F. L. & RUSSELL, R. H., 1974b. Distribution and numbers of muskoxen (*Ovibos moschatus*) on western Queen Elizabeth Islands of Arctic Canada. *Journal of Mammalogy, 55:* 824–828.
455. MILLER, F. L. & RUSSELL, R. H., 1975. Aerial surveys of Peary caribou and muskoxen on Bathurst Island, Northwest Territories, 1973 and 1974. *Canadian Wildlife Service Progress Notes, 44:* 1–7.
456. MILLER, R. J. & MANN, K. H., 1973. Ecological energetics of the seaweed zone in a marine bay on the Atlantic coast of Canada. III. Energy transformations by sea urchins. *Marine Biology, 18:* 99–114.
457. MILLER, R. S., 1958. A study of a wood mouse population in Wytham Woods, Berkshire. *Journal of Mammalogy, 39:* 477–493.

458. MILLER, S., ROTTMAN, J. & TABER, R. D., 1973. Dwindling and endangered ungulates of Chile: *Vicugna, Lama, Hippocamelus,* and *Pudu. Transactions of the North American Wildlife and Natural Resources Conference, 38:* 55–68.
459. MILTON, O., 1964. The orang-utan and rhinoceros in Sumatra; from two preliminary reports. *Malayan Nature Journal, 18:* 60–63.
460. MISPAGEL, M. E., 1978. The ecology and bioenergetics of the acridid grasshopper, *Bootettix punctatus* on creosote bush, *Larrea tridentata,* in the northern Mojave Desert. *Ecology, 59:* 779–788.
461. MISONNE, X., 1963. Les rongeurs de Rwenzori et des régions voisines. *Explorations du Parc National Albert, deuxième Série, 14:* 1–164.
462. MOMOT, W. T. & GOWING, H., 1977. Production and population dynamics of the crayfish *Orconectes virilis* in three Michigan lakes. *Journal of the Fisheries Research Board of Canada, 34:* 2041–2055.
463. MONFORT, A., 1972. Densités, biomasses et structure des populations d'ongulés sauvages au Parc de l'Akagera (Rwanda). *La Terre et La Vie, 26:* 216–256.
464. MONFORT, A. & MONFORT, N., 1974. Notes sur l'écologie et le comportement des oribis (*Ourebia ourebi,* Zimmerman, 1783). *La Terre et La Vie, 28:* 169–208.
465. MONTFORT, G., 1973. Saving the tiger. *Oryx, 12:* 109–112.
466. MONTGOMERY, S. D., WHELAN, J. B. & MOSBY, H. S., 1975. Bioenergetics of a woodlot gray squirrel population. *Journal of Wildlife Management, 39:* 709–717.
467. MOREL, J. & MEYLAN, A., 1970. Une pulluation de campagnols terrestres (*Arvicola terrestris* (L.)) (Mammalia Rodentia). *Revue Suisse de Zoologie, 77:* 705–712.
468. MOROW, K., 1975. Moose population characteristics and range use in the Augustow Forest. *Ekologia Polska, 23:* 493–506.
469. MORRIS, P. A. & MALCOLM, J. R., 1977. The Simien fox in the Balé Mountains. *Oryx, 14:* 151–160.
470. MORRIS, R. F., 1955. Population studies on some small forest mammals in eastern Canada. *Journal of Mammalogy, 36:* 21–35.
471. MOSBY, H. S., 1969. The influence of hunting on the population dynamics of a woodlot gray squirrel population. *Journal of Wildlife Management, 33:* 59–73.
472. MUELLER-DOMBOIS, D., 1972. Crown distortion and elephant distribution in the woody vegetations of Ruhuna National Park, Ceylon. *Ecology, 53:* 208–226.
473. MUKINYA, J. G., 1973. Density, distribution, population structure and social organization of the black rhinoceros in Masai Mara Game Reserve. *East African Wildlife Journal, 11:* 385–400.
474. MÜLLER, J. P., 1972. Die Verteilung der Kleinsäuger auf die Lebensräume an einem Norhang im Churer Rheintal. *Zeitschrift für Säugetierkunde, 37:* 257–286.
475. MÜLLER, J. P., 1972. Populationsökologie von *Arvicanthus abbysinicus* in der Grassteppe des Simien Mountains National Park (Äthiopien). *Zeitschrift für Säugetierkunde, 42:* 145–172.
476. MURIE, J. O., 1973. Population characteristics and phenology of a Franklin ground squirrel (*Spermophilus franklinii*) colony in Alberta, Canada. *American Midland Naturalist, 90:* 334–340.
477. MYLLYIMÄKI, A., 1970. Productivity of a free-living population of the field vole, *Microtus agrestis* (L.). In K. Petrusewicz & L. Ryszkowski (Eds), *Energy Flow Through Small Mammal Populations:* 255–265. Warsaw: Polish Scientific Publishers,
478. MYTON, B., 1974. Utilization of space by *Peromyscus leucopus* and other small mammals. *Ecology, 55:* 277–290.
479. NEAL, B. R., 1977. Reproduction of the multimammate rat, *Praomys (Mastomys) natalensis* (Smith), in Uganda. *Zeitschrift für Säugetierkunde, 42:* 221–231.
480. NEAL, E. G., 1977. *Badgers.* Poole: Blandford.
481. NEGUS, C. L., 1966. A quantitative study of growth and production of unionid mussels in the River Thames at Reading. *Journal of Animal Ecology, 35:* 513–532.
482. NELLIS, C. H. & KEITH, L. B., 1976. Population dynamics of coyotes in central Alberta, 1964–68. *Journal of Wildlife Management, 40:* 389–399.
485. NEVILLE, M. K., 1968. Ecology and activity of Himalayan foothill rhesus monkeys (*Macaca mulatta*). *Ecology, 49:* 110–123.
486. NEVILLE, M. K., 1972. The population structure of red howler monkeys (*Alouatta seniculus*) in Trinidad and Venezuela. *Folia Primatologica, 17:* 56–86.
487. NEWSOME, A. E., 1971. The ecology of red kangaroos. *Australian Zoologist, 16:* 32–50.
488. NEWSOME, A. E., STEVENS, D. R. & SHIPWAY, A. K., 1967. Effects of a long drought on the abundance of red kangaroos in central Australia. *CSIRO Wildlife Research, 12:* 1–8.
489. NICHOLSON, I. A., 1974. Red deer range and problems of carrying capacity in the Scottish Highlands. *Mammal Review, 4:* 103–118.
490. NIETHAMMER, J. & KRAPP, F., 1982. *Handbuch der Säugetiere Europas. Vol. 1. Rodentia II.* Wiesbaden: Academische Verlagsgesellschaft.
491. NIETHAMMER, J. & MARTENS, J., 1975. Die Gattungen *Rattus* und *Maxomys* in Afghanistan und Nepal. *Zeitschrift für Säugetierkunde, 40:* 325–355.
492. NORTON-GRIFFITHS, M., 1973. Counting the Serengeti migratory wildebeest using two-stage sampling. *East African Wildlife Journal, 11:* 135–149.

493. NORTON-GRIFFITHS, M., 1975. The numbers and distribution of large mammals in Ruaha National Park, Tanzania. *East African Wildlife Journal, 13:* 121–140.
494. OBOUSSIER, H., 1970. Beiträge zur Kenntnis der Pelea (*Pelea capreolus*, Bovidae, Mammalia), ein Vergleich mit etwa gleichgrossen anderen Bovinae (*Redunca fulvorufula, Gazella thomsoni, Antidorcas marsupialis*). *Zeitschrift für Säugetierkunde, 35:* 342–353.
495. OBOUSSIER, H. & SCHLIEMANN, H., 1966. Hirn-Körpergewichtsbeziehungen bei Boviden. *Zeitschrift für Säugetierkunde, 31:* 464–471.
496. OBRTEL, R., ZEJDA, J. & HOLISOVA, V., 1978. Impact of small rodent predation on an overcrowded population of *Diprion pini* during winter. *Folia Zoologica, 27:* 97–110.
497. O'CONNELL, M. A., 1982. Population biology of North and South American grassland rodents: a comparative review. In M. A. Mares & H. H. Genoways (Eds), *Mammalian Biology in South America. Pymatuning Laboratory of Ecology, University of Pittsburgh, Special Publication, 6:* 167–185.
498. ODUM, E. P., 1955. An eleven year study of a *Sigmodon* population. *Journal of Mammalogy, 36:* 368–378.
499. ODUM, E. P., CONNELL, C. E. & DAVENPORT, L. B., 1962. Population energy flow of three primary consumer components of old-field ecosystems. *Ecology, 43:* 88–96.
500. OKIA, N. O., 1976. The biology of the bush rat, *Aethomys hindei* Thomas in southern Uganda. *Journal of Zoology (London), 180:* 41–56.
501. OLIVER, M. D. N., SHORT, N. R. M. & HANKS, J., 1978. Population ecology of oribi, grey rhebuck and mountain reedbuck in Highmoor State Forest Land, Natal. *South African Journal of Wildlife Research, 8:* 95–105.
502. O'ROKE, E. C. & HAMERSTROM, F. N., JR., 1948. Productivity and yield of the George Reserve deer herd. *Journal of Wildlife Management, 12:* 78–86.
503. ØSTBYE, E., BERG, A., BLEHR, O., ESPELAND, M., GAARE, E., HAGEN, A., HESJEDAL, O., HAGVAR, S., KJELVIK, S., LIEN, L., MYSTERUD, I., SANDHAUG, A., SKAR, H.-J., SKATVEIT, A., SKRE, O., SKOGLAND, T., SOLHØY, T., STENSETH, N. C. & WIEGOLASKI, F. E., 1975. Hardangervidda, Norway. In T. Rosswall & O. W. Heal (Eds), *Structure and Function of Tundra Ecosystems. Ecological Bulletin, (Stockholm), 20:* 225–264.
504. OTTO, C., 1975. Energetic relationships of the larval population of *Potamophylax cingulatus* (Trichoptera) in a South Swedish stream. *Oikos, 26:* 159–169.
505. OWEN, R. E. A., 1970. Some observations on the sitatunga in Kenya. *East African Wildlife Journal, 8:* 181–195.
506. PACKARD, R. L., 1968. An ecological study of the fulvous harvest mouse in eastern Texas. *American Midland Naturalist, 79:* 68–88.
507. PAINE, R. T., 1976. Size-limited predation: an observational and experimental approach with the *Mytilus-Pisaster* interaction. *Ecology, 57:* 858–873.
408. PARAGAMIAN, V. L. & COBLE, D. W., 1975. Vital statistics of smallmouth bass in two Wisconsin rivers, and other waters. *Journal of Wildlife Management, 39:* 201–210.
509. PARKER, G. R., 1973. Distribution and densities of wolves within barren-ground caribou range in northern mainland Canada. *Journal of Mammalogy, 54:* 341–348.
510. PARKER, G. R., MAXWELL, J. W., MORTON, L. D. & SMITH, G. E. J., 1983. The ecology of the lynx (*Lynx canadensis*) on Cape Breton Island. *Canadian Journal of Zoology, 61:* 770–786.
511. PATE, L., 1969. Diamond Ring antelope studies. *Proceedings of the Annual Conference of the Western Association of State Game and Fish Commissioners, 49:* 323–328.
512. PATTON, J. L. & YANG, S. Y., 1977. Genetic variation in *Thomomys bottae* pocket gophers: macrogeographic patterns. *Evolution, 31:* 697–720.
513. PAVLOV, B. M., SAVEL'EV, V. D., YAKUSHIN, G. D. & ZYRANOV, V. A., 1971. The ecological structure of the Taimyr wild reindeer population. *Soviet Journal of Ecology, 2:* 35–41.
514. PEARSON, A. M., 1972. Population characteristics of the Northern Interior grizzly in the Yukon Territory, Canada. In S. Herrero (Ed.), *Bears—Their Biology and Management:* 32–35. Morges, Switzerland: International Union for the Conservation of Nature.
515. PEARSON, O. P. & PEARSON, A. K., 1982. Ecology and biology of the southern rainforests of Argentina. In M. A. Mares and H. H. Genoways (Eds), *Mammalian Biology in South America. Pymatuning Laboratory of Ecology, University of Pittsburgh, Special Publication, 6:* 129–142.
516. PEARSON, O. P. & RALPH, C. P., 1978. The diversity and abundance of vertebrates along an altitudinal gradient in Peru. *Memorias del Museo de Historia Natural "Javier Prado", 18:* 1–77.
517. PEARSON, W. D. & KRAMER, R. H., 1972. Drift and production of two aquatic insects in a mountain stream. *Ecological Monographs, 42:* 365–385.
518. PEEK, J. M., LERESCHE, R. E. & STEVENS, D. R., 1974. Dynamics of moose aggregations in Alaska, Minnesota, and Montana. *Journal of Mammalogy, 55:* 126–137.
519. PELIKAN, J., MADKOUR, G. & GAISLER, J., 1971. On some mammals from Egypt (Insectivora, Lagomorpha, Rodentia). *Zoologicé Listy, 20:* 307–318.
520. PELIKAN, J. & ZEJDA, J., 1962. Comparison of two methods of estimating small mammal populations. *Zoologicé Listy, 11: 227–242.*
521. PENNYCUICK, L., 1975. Movements of the migratory wildebeest population in the Serengeti area between 1960 and 1973. *East African Wildlife Journal, 13:* 65–87.

522. PETERSEN, M. K., 1975. An analysis of multiple captures in several rodents from Durango, Mexico. *Journal of Mammalogy, 56:* 703–705.
523. PETRIDES, G. A. & SWANK, W. G., 1965. Estimating the productivity and energy relations of an African elephant population. *Proceedings of the Ninth International Grasslands Congress, São Paulo, Brazil,* 831–841.
524. PETTER, J.-J. & HLADIK, C. M., 1970. Observations sur le domaine vital et la densité de population du loris tardigrade dans les forêts de Ceylan. *Mammalia, 34:* 394–409.
525. PETTER, J.-J., SCHILLING, A. & PARIENTE, G., 1971. Observations éco-éthologiques sur deux lémuriens Malagaches nocturnes: *Phaner furcifer* et *Microcebus coquereli. La Terre et La Vie, 25:* 287–327.
526. PETTER, J.-J., ALBIGNAC, R. & RUMPLER, Y., 1977. Mammifères lemuriens (Primates prosimiens). *Faune de Madagascar, 44:* 1–513.
527. PETTICREW, B. G. & SADLEIR, R. M. F. S., 1974. The ecology of the deermouse, *Peromyscus maniculatus*, in a coastal coniferous forest. I. Population dynamics. *Canadian Journal of Zoology, 52:* 107–118.
528. PFEFFER, P., 1965. Esquisse écologique de la Reserve de Baluran (Java-est). *La Terre et La Vie, 20:* 199–215.
529. PFEFFER, P., 1969. Considerations sur l'écologie des forêts claires du Cambodge oriental. *La Terre et La Vie, 23:* 3–24.
530. PHILLIPSON, J., 1983. Life cycle, numbers, biomass, and respiratory metabolism of *Trichosurus pusillus* (Crustacea, Isopoda) in a beech woodland—Wytham Woods, Oxford. *Oecologia (Berlin), 57:* 339–343.
531. PHILLIPSON, J., ABEL, R., STEEL, J. & WOODELL, S. R. J., 1978. Earthworm numbers, biomass and respiratory metabolism in a beech woodland—Wytham Woods, Oxford. *Oecologia (Berlin), 33:* 291–309.
532. PIELOWSKI, Z., 1969. Die Wiedereinbergerung des Elches—*Alces alces* (L.) im Kampinos Nationalpark in Polen. *Zeitschrift für Jagdwissenschaft, 15:* 6–17.
533. PIENAAR, U. DE V., VAN WYK, P. & FAIRALL, N., 1966. An aerial census of elephant and buffalo in the Kruger National Park and the implications thereof on intended management schemes. *Koedoe, 9:* 40–107.
534. PILBEAM, D., 1972. *The Ascent of Man: An Introduction to Human Evolution.* New York: Macmillan.
535. PIMLOTT, D. H., 1961. The ecology and management of moose in North America. *La Terre et La Vie, 15:* 246–265.
536. PINE, D. S. & GERDES, G. L., 1973. Wild pigs in Monterey County, California. *California Fish and Game, 59:* 126–137.
537. POCHÉ, R. M., 1974a. Notes on the roan antelope (*Hippotragus equinus* (Desmarest)) in West Africa. *Journal of Applied Ecology, 11:* 963–968.
358. POCHÉ, R. M., 1974b. Ecology of the African elephant (*Loxodonta a. africana*) in Niger, West Africa. *Mammalia, 38:* 567–580.
539. POGLAYEN-NEUWALL, I., 1975. Copulatory behavior, gestation, and parturition of the tayra (*Eira barbara* L., 1758). *Zeitschrift für Säugetierkunde, 40:* 176–189.
540. POLLOCK, J. I., 1975. Field observations on *Indri indri*: a preliminary report. In I. Tattersall & R. W. Sussman (Eds), *Lemur Biology:* 287–311. New York: Plenum.
541. POLLOCK, J. I., 1977. The ecology and sociology of feeding in *Indri indri*. In T. H. Clutton-Brock (Ed.), *Primate Ecology: Studies of Feeding and Ranging Behaviour in Lemurs, Monkeys, and Apes:* 37–69. London: Academic Press.
542. POTTER, D. W. B. & LEARNER, M. A., 1974. A study of the benthic macro-invertebrates of a shallow eutrophic reservoir in South Wales with emphasis on Chironomidae (Diptera); their life-histories and production. *Archiv für Hydrobiologie, 74:* 186–226.
543. POUGH, F. H., 1980. The advantages of ectothermy for tetrapods. *American Naturalist, 115:* 92–112.
544. POULET, A.-R., 1972. Recherches écologiques sur une savane sahélienne du Ferlo septentrional, Sénégal: les mammifères. *La Terre et La Vie, 26:* 440–472.
545. POULET, A.-R., 1972. Recherches écologiques sur une savane sahélienne du Ferlo septentrional, Sénégal: quelques effets de la sécheresse sur le peuplement mammalien. *La Terre et La Vie, 28:* 124–130.
546. POULET, A.-R. & POUPON, H., 1978. L'invasion d'*Arvicanthus niloticus* dans le Sahel Sénégalais en 1975–76 et ses conséquences pour la strate ligneuse. *La Terre et La Vie, 32:* 161–193.
547. POWELL, R. A., 1979. Fishers, population models, and trapping. *Wildlife Society Bulletin, 7:* 149–154.
548. POWELL, R. A., 1982. *The Fisher: Life History, Ecology, and Behavior.* Minneapolis: University of Minnesota Press.
549. PUCEK, Z., BOBEK, B., ŁABUDZKI, L., MIŁKOWSKI, L., MOROW, K. & TOMEK, A., 1975. Estimates of density and number of ungulates. In W. Grodzinski and Z. Pucek (Eds), *The Role of Large Herbivore Mammals in Woodland Ecosystems. Polish Ecological Studies, 1:* 121–135. Warsaw: Polish Scientific Publishers.
550. QURIS, R., 1975. Écologie et organisation sociale de *Cercocebus galeritus agilis* dans le nord-est du Gabon. *La Terre et La Vie, 29:* 337–398.
551. RADDA, A., 1968. Populationstudien an Rötelmäusen (*Clethrionomys glareolus* Schreiber, 1780) durch Markierungsfang in Niederösterreich. *Oecologia (Berlin), 1:* 219–235.

552. RADDA, A., PRETZMANN, G. & STEINER, H. M., 1969. Bionomische und ökologische Studien an österreichischen Populationen der Gelbhalsmaus (*Apodemus flavicollis* Melchior 1834) durch Markierungsfang. *Oecologia (Berlin), 3:* 351–373.
553. RAHM, U., 1967. Les muridés des environs du Lac Kivu et des régions voisines (Afrique Central) et leur écologie. *Revue Suisse de Zoologie, 74:* 439–519.
554. RAHM, U., 1971. Ökologie und Biologie von *Tachyoryctes ruandae* (Rodentia, Rhizomyidae). *Revue Suisse de Zoologie, 78:* 623–638.
555. RAJSKA, E., 1968. Estimation of European hare density depending on the width of the assessment belt. *Acta Theriologica, 13:* 35–53.
556. RAUN, G. G., 1966. A population of woodrats (*Neotoma micropus*) in southern Texas. *Bulletin of the Texas Memorial Museum, 11:* 1–62.
557. RAUTENBACH, I. L. & NEL, J. A. J., 1975. Further records of smaller mammals from the Kalahari Gemsbok National Park. *Koedoe, 18:* 195–198.
558. REDFIELD, J. A., KREBS, C. J. & TAITT, M. J., 1977. Competition between *Peromyscus maniculatus* and *Microtus townsendii* in grasslands of coastal British Columbia. *Journal of Animal Ecology, 46:* 607–616.
559. REID, V. H., HANSEN, R. M. & WARD, A. L., 1966. Counting mounds and earth plugs to census mountain pocket gophers. *Journal of Wildlife Management, 30:* 327–334.
560. REIMERS, E., 1977. Population dynamics in two subpopulations of reindeer in Svalbard. *Arctic and Alpine Research, 9:* 369–381.
561. RESH, V. H., 1975. The use of transect sampling in estimating single species production of aquatic insects. *Internationale Vereingung für Theoretische und Angewandte Limnologie, Verhandelungen, 19:* 3089–3094.
562. RICHARD, A. F. & SUSSMAN, R. W., 1975. Future of the Malagasy lemurs: conservation or extinction? In I. Tattersall & R. W. Sussman (Eds), *Lemur Biology:* 335–350. New York: Plenum.
563. RICKART, E. A., 1981. Demography and activity patterns of some small mammals from the Cape Province, South Africa. *Journal of Mammalogy, 62:* 646–649.
564. RICKLEFS, R. E., 1979. *Ecology.* 2nd ed. New York: Chiron Press.
565. RIGLER, F. H., MacCALLUM, M. E. & ROFF, J. C., 1974. Production of zooplankton in Char Lake. *Journal of the Fisheries Research Board of Canada, 31:* 637–646.
566. RIGLER, F. H. & COOLEY, J. M., 1974. The use of field data to derive population statistics of multivoltine copepeds. *Limnology and Oceanography, 19:* 636–655.
567. ROBERTS, J. D. & PACKARD, R. L., 1973. Comments on movements, home range, and ecology of the Texas kangaroo rat, *Dipodomys elator* Merriam. *Journal of Mammalogy, 54:* 957–962.
568. ROBINETTE, W. L., 1963. Weights of some of the larger mammals of Northern Rhodesia. *The Puku, 1:* 207–215.
569. ROBINETTE, W. L. & CHILD, G. F. T., 1964. Notes on the biology of the lechwe. *The Puku, 2:* 84–117.
570. ROOD, J. P., 1972. Ecological and behavioural comparisons of three genera of Argentine cavies. *Animal Behaviour Monographs, 5:* 1–83.
571. ROOD, J. P., 1975. Population dynamics and food habits of the banded mongoose. *East African Wildlife Journal, 13:* 89–111.
572. ROOD, J. P. & TEST, F. H., 1968. Ecology of the spiny rat, *Heteromys anomalus*, at Rancho Grande, Venezuela. *American Midland Naturalist, 79:* 89–102.
573. ROOD, J. P. & WASER, P. M., 1978. The slender mongoose, *Herpestes sanguineus*, in the Serengeti. *Carnivore, 1:* 54–58.
574. ROSE, A. B., 1976. Small mammals trapped in Dorrigo National Park, New South Wales. *Australian Zoologist, 19:* 103–105.
575. ROSE, G. B., 1977. Mortality rates of tagged adult cottontail rabbits. *Journal of Wildlife Management, 41:* 511–514.
576. ROSS, I. C., FIELD, C. R. & HARRINGTON, G. N., 1976. The savanna ecology of Kidepo National Park, Uganda. III. Animal populations and park management recommendations. *East African Wildlife Journal, 14:* 35–48.
577. ROTH, H. H. & CHILD, G., 1968. Distribution and population structure of black rhinoceros (*Diceros bicornis* L.) in the Lake Kariba basin. *Zeitschrift für Säugetierkunde, 33:* 214–226.
578. ROWELL, T. E., 1966. Forest living baboons in Uganda. *Journal of Zoology (London), 149:* 344–364.
579. ROWE-ROWE, D. T., 1978. The small carnivores of Natal. *The Lammergeyer, 25:* 1–48.
580. RUDD, C. L., 1965. Weight and growth in Malaysian rainforest mammals. *Journal of Mammalogy, 46:* 588–594.
581. SADLEIR, R. M. F. S., 1965. The relationship between agonistic behaviour and population changes in the deermouse, *Peromyscus maniculatus* (Wagner). *Journal of Animal Ecology, 34:* 331–352.
582. SAINT-GIRONS, M.-C. & MAZAK, V., 1971. Données morphologiques sur quelques micromammifères en Laponie. *Zeitschrift für Säugetierkunde, 36:* 179–190.
583. SAITO, S., 1969. Energetics of isopod populations in a forest of central Japan. *Researches on Population Ecology, 11:* 229–258.
584. SANDERSON, G. C., 1950. Small-mammal population of a prairie grove. *Journal of Mammalogy, 31:* 17–25.

585. SAUNDERS, L. H. & POWER, G., 1970. Population ecology of the brook trout, *Salvelinus fontinalis*, in Matamek Lake, Quebec. *Journal of the Fisheries Research Board of Canada, 27:* 413–424.
586. SAYER, J. A. & VAN LAVIEREN, L. P., 1975. The ecology of the Kafue lechwe population of Zambia before the operation of hydro-electric dams on the Kafue River. *East African Wildlife Journal, 13:* 9–37.
587. SCHAAF, D. & SINGH, A., 1977. Barasingha in the Dudhwa Sanctuary. *Oryx, 13:* 495–498.
588. SCHALLER, G. B., 1972. *The Serengeti Lion.* Chicago: University of Chicago Press.
589. SCHALLER, G. B., 1976. Mountain mammals in Pakistan. *Oryx, 13:* 351–356.
590. SCHALLER, G. B. & LAURIE, A., 1974. Courtship behaviour of the wild goat. *Zeitschrift für Säugetierkunde, 39:* 115–127.
591. SCHALLER, G. B. & VASCOMELAS, J. M. C., 1978. A marsh deer census in Brazil. *Oryx, 14:* 345–351.
592. SCHAUENBERG, P., 1981. Elements d'écologie du chat forestier d'Europe *Felis sylvestris* Schreber, 1777. *Revue d'Écologie, 35:* 3–36.
593. SCHLADWEILER, P. & STEVENS, D. R., 1973. Weights of moose in Montana. *Journal of Mammalogy, 54:* 772–775.
594. SCHNEEGAS, E. R. & FRANKLIN, G. W., 1972. The Mineral King deer herd. *California Fish and Game, 58:* 133–140.
595. SCHNELL, J. H., 1968. The limiting effects of natural predation on experimental cotton rat populations. *Journal of Wildlife Management, 32:* 698–711.
596. SCHOENER, T. W. & SCHOENER, A., 1980. Densities, sex ratios and population structure in four species of Bahamian *Anolis* lizards. *Journal of Animal Ecology, 49:* 19–53.
597. SCHOMBER, H.-W., 1964. Beiträge zur Kenntnis der Lamagazelle, *Ammodorcas clarkei* (Thomas, 1891). *Zeitschrift für Säugetierkunde, 12:* 65–90.
598. SCHRODER, G. D. & GELUSO, K. N., 1975. Spatial distribution of *Dipodomys spectabilis* mounds. *Journal of Mammalogy, 56:* 363–368.
599. SCHRODER, D. G. & ROSENZWEIG, M. L., 1975. Perturbation analysis of competition and overlap in habitat utilization between *Dipodomys ordii* and *Dipodomys merriami. Oecologia (Berlin), 19:* 9–28.
600. SCHWARTZ, O. A. & BLEICH, V. C., 1975. Comparative growth in two species of woodrats, *Neotoma lepida intermedia* and *Neotoma albigula venusta. Journal of Mammalogy, 56:* 653–666.
601. SCHWEINSBERG, R. E., 1971. Home range, movements, and herd integrity of the collared peccary. *Journal of Wildlife Management, 35:* 455–460.
602. SEMENOV-TIAN-SHANSKII, I. O., 1975. The status of wild reindeer in the U.S.S.R., especially the Kola Peninsula. In J. R. Luick, P. C. Lent, D. R. Klein & R. G. White (Eds), *Proceedings of the First International Caribou Symposium. Biological Papers of the University of Alaska, Special Report, 1:* 155–161.
603. SERAFIŃSKI, W., 1969. Reproduction and dynamics of moose (*Alces alces* L.) population in the Kampinos National Park. *Ekologia Polska, 17:* 709–718.
604. SHANNON, N. H., HUDSON, R. J., BRINK, V. C. & KITTS, W. D., 1975. Determinants of spatial distribution of Rocky Mountain bighorn sheep. *Journal of Wildlife Management, 39:* 387–401.
605. SHELDON, W. G., 1975. *The Wilderness Home of the Giant Panda.* Amherst, Massachusetts: University of Massachusetts Press.
606. SHEPPE, W., 1972. The annual cycle of small mammal populations on a Zambian floodplain. *Journal of Mammalogy, 53:* 445–460.
607. SHEPPE, W., 1973. Notes on Zambian rodents and shrews. *The Puku, 7:* 167–190.
608. SIMMS, D. A., 1979. Studies of an ermine population in southern Ontario. *Canadian Journal of Zoology, 57:* 824–832.
609. SINCLAIR, A. R. E., 1972. Long term monitoring of mammal populations in the Serengeti: census of non-migratory ungulates. *East African Wildlife Journal, 10:* 287–297.
610. SINIFF, D. B. & SKOOG, R. O., 1964. Aerial censusing of caribou using stratified random sampling. *Journal of Wildlife Management, 28:* 391–401.
611. SKAR, H.-J., HAGEN, A. & ØSTBYE, E., 1971. The bank vole (*Clethrionomys glareolus* (Schreber, 1780)) in south Norwegian mountain areas. *Norwegian Journal of Zoology, 19:* 261–266.
612. SLADE, N. A. & BALPH, D. F., 1974. Population ecology of Uinta ground squirrels. *Ecology, 55:* 989–1003.
613. SMALLEY, A. E., 1960. Energy flow of a salt marsh grasshopper population. *Ecology, 41:* 672–677.
614. SMITH, A. T. & VRIEZE, J. M., 1979. Population structure of Everglades rodents: responses to a patchy environment. *Journal of Mammalogy, 60:* 778–794.
615. SMITH, D. A. & SPELLER, S. W., 1970. The distribution and behavior of *Peromyscus maniculatus gracilis* and *Peromyscus leucopus noveboracensis* (Rodentia: Cricetidae) in a southeastern Ontario woodlot. *Canadian Journal of Zoology, 48:* 1187–1199.
616. SMITH, M. H., GENTRY, J. B. & PINDER, J., 1974. Annual fluctuations in small mammal population in an eastern hardwood forest. *Journal of Mammalogy, 55:* 231–234.
617. SMITHERS, R. H. N., 1971. The mammals of Botswana. *National Museums of Rhodesia (Salisbury), Museum Memoirs, 4:* 1–340.
618. SMUTS, G. L., 1975. Reproduction and population characteristics of elephants in the Kruger National Park. *Journal of the South African Wildlife Management Association, 5:* 1–10.

619. SMYTHE, N., 1978. The natural history of the Central American agouti (*Dasyprocta punctata*). *Smithsonian Contributions to Zoology, 257:* 1–85.
620. SOHOLT, L. F., 1973. Consumption of primary productivity by a population of kangaroo rats (*Dipodomys merriami*) in the Mohave Desert. *Ecological Monographs, 43:* 357–376.
621. SOUTHERN, H. N., 1979. Population processes in small mammals. In D. M. Stoddart (Ed.), *Ecology of Small Mammals:* 63–101. London: Chapman and Hall.
622. SOUTHWICK, C. H. & CADIGAN, F. C., JR., 1972. Population studies of Malaysian primates. *Primates, 13:* 1–18.
623. SOUTIERE, E. C., 1978. The effects of timber harvesting on the marten. *Dissertation Abstracts International, 39B:* 2591–2592.
624. SPENCER, D. L. & LENSINK, C. J., 1970. The muskox of Nunivak Island, Alaska. *Journal of Wildlife Management, 34:* 1–15.
625. SPINAGE, C. A., 1970. Population dynamics of the Uganda defassa waterbuck (*Kobus defassa ugandae* Neumann) in the Queen Elizabeth Park, Uganda. *Journal of Animal Ecology, 39:* 51–78.
626. SPINAGE, C. A., GUINESS, F., ELTRINGHAM, S. K. & WOODFORD, M. H., 1972. Estimation of large mammal numbers in the Akagera National Park and Mutara Hunting Reserve, Rwanda. *La Terre et La Vie, 26:* 561–570.
627. STACHURSKI, A., 1972. Population density, biomass and maximum natality rate and food conditions in *Ligidium hypnorum* L. (Isopoda). *Ekologia Polska, 20:* 186–198.
628. STAINES, B. W., 1970. A population study of red deer in Glen Dye, North-east Scotland. *Mammal Review, 1:* 53.
629. STEVENSON, R. D., 1985. Body size and limits to the daily range of body temperature in terrestrial ectotherms. *American Naturalist, 125:* 102–117.
630. STEWART, D. R. M., 1963. Wildlife census—Lake Rudolf. *East African Wildlife Journal, 1:* 121.
631. STEWART, D. R. M. & ZAPHIRO, D. R. P., 1963. Biomass and density of wild herbivores in different East African habitats. *Mammalia, 27:* 483–496.
632. STICKEL, L. F. & STICKEL, W. H., 1949. A *Sigmodon* and *Baiomys* population in ungrazed and unburned Texas prairie. *Journal of Mammalogy, 30:* 141–150.
633. STICKEL, L. F. & WARBACH, O., 1960. Small-mammal populations in a Maryland woodlot, 1949–1954. *Ecology, 41:* 269–286.
634. STOCKNER, J. G., 1971. Ecological energetics and natural history of *Hedriodiscus truquii* (Diptera) in two thermal spring communities. *Journal of the Fisheries Research Board of Canada, 28:* 73–94.
635. STRICKLAND, D. L., 1967. Ecology of the rhinoceros in Malaya. *Malayan Nature Journal, 20:* 1–17.
636. STRUHSAKER, T. T., 1967. Ecology of vervet monkeys (*Cercopithecus aethiops*) in the Masai-Amboseli Game Reserve, Kenya. *Ecology, 48:* 891–904.
637. STRUHSAKER, T. T., 1973. A recensus of vervet monkeys in the Masai–Amboseli Game Reserve, Kenya. *Ecology, 54:* 930–932.
638. STRUHSAKER, T. T., 1976. A further decline in numbers of Amboseli vervet monkeys. *Biotropica, 8:* 211–214.
639. STRUHSAKER, T. T., 1980. Comparison of the behaviour and ecology of red colobus and redtail monkeys in the Kibale Forest, Uganda. *African Journal of Ecology, 18:* 33–51.
640. SULLIVAN, T. P., 1979. Demography of populations of deer mice in coastal forests and clear-cut (logged) habitats. *Canadian Journal of Zoology, 57:* 1636–1648.
641. SUNDERLAND, K. D., HASSALL, M. & SUTTON, S. L., 1976. The population dynamics of *Philoscia muscorum* (Crustacea, Oniscoidea) in a dune grassland ecosystem. *Journal of Animal Ecology, 45:* 487–506.
642. SUNQUIST, M. E., 1982. Movements and habitat use of a sloth bear. *Mammalia, 46:* 545–547.
643. SUSSMAN, R. W., 1975. A preliminary study of the behaviour and ecology of *Lemur fulvus rufus* Audabert 1800. In I. Tattersall & R. W. Sussman (Eds), *Lemur Biology:* 237–279. New York: Plenum.
644. SUTTON, S. L., 1968. The population dynamics of *Trichoniscus pusillus* and *Philoscia muscorum* (Crustacea, Oniscoidea) in limestone grassland. *Journal of Animal Ecology, 37:* 425–444.
645. SVENDSEN, G. E., 1974. Behavioural and environmental factors in the spatial distribution and population dynamics of a yellow-bellied marmot population. *Ecology, 55:* 760–771.
646. SVENDSEN, G. E. & YAHNER, R. H., 1979. Habitat preferences and utilization by the eastern chipmunk (*Tamias striatus*). *Kirtlandia, 31:* 1–14.
647. SWANEPOEL, P., 1975. Small mammals of the Addo Elephant National Park. *Koedoe, 18:* 103–130.
648. SWANEPOEL, P., 1976. An ecological study of rodents in northern Natal, exposed to Dieldrin coverspraying. *Annals of the Cape Provincial Museums (Natural History), 11:* 57–81.
649. SWANK, W. G., 1958. The mule deer in Arizona chaparral. *Arizona Game and Fish Department Wildlife Bulletin, 3:* 1–109.
650. TABER, R. D., 1961. The black-tailed deer: a review of ecology and management. *La Terre et La Vie, 15:* 221–245.
651. TALBOT, R. M. & STEWART, D. R. M., 1964. First wildlife census of the entire Serengeti-Mara Region, East Africa. *Journal of Wildlife Management, 28:* 815–827.
652. TAMARIN, R. H. & MALECHA, S. R., 1971. The population biology of Hawaiian rodents: demographic parameters. *Ecology, 52:* 383–394.

653. TANAKA, R., 1951. Estimation of the vole and mouse populations on Mt. Ishizuchi and on the uplands of southern Shikoku. *Journal of Mammalogy, 32:* 450–458.
654. TANTON, M. T., 1969. The estimation and biology of populations of the bank vole. (*Clethrionomys glareolus* (Schr.)) and wood mouse (*Apodemus flavicollis* (L.)). *Journal of Animal Ecology, 38:* 511–529.
655. TATE, G. H. H., 1952. Weights of Queensland mammals. *Journal of Mammalogy, 33:* 117–118.
656. TATTERSALL, I., 1977. Ecology and behavior of *Lemur fulvus mayottensis* (Primates, Lemuriformes). *Anthropological Papers of the American Museum of Natural History, 54:* 421–482.
657. TAYLOR, K. D. & GREEN, M. G., 1976. The influence of rainfall on diet and reproduction in four African rodent species. *Journal of Zoology (London), 180:* 367–389.
658. TEER, J. G., THOMAS, J. W. & WALKER, E. A., 1965. Ecology and management of white-tailed deer in the Llano Basin of Texas. *Wildlife Monographs, 15:* 1–62.
659. TENER, J. S., 1963. Queen Elizabeth Islands game survey, 1961. *Canadian Wildlife Service Occasional Papers, 4:* 1–50.
660. TERWILLIGER, V. J., 1978. Natural history of Baird's tapir on Barro Colorado Island, Panama Canal Zone. *Biotropica, 10:* 211–220.
661. THOMSON, J. A. & OWEN, W. H., 1964. A field study of the Australian ringtail possum *Pseudocheirus peregrinus* (Marsupialia: Phalangeridae). *Ecological Monographs, 34:* 27–52.
662. TINKLE, D. W., 1967. Home range, density, dynamics, and the structure of a Texas population of the lizard *Uta stansburiana*. In W. W. Milstead (Ed.), *Lizard Ecology: A Symposium:* 5–29. Columbia, Missouri: University of Missouri Press.
663. TINLEY, K. L., 1969. Dikdik *Madoqua kirki* in South West Africa: notes on distribution, ecology and behaviour. *Madoqua, 1:* 7–33.
664. TODD, A. W., KEITH, L. B. & FISCHER, C. A., 1981. Population ecology of coyotes during a fluctuation of snowshoe hares. *Journal of Wildlife Management, 45:* 629–640.
665. TOWEILL, D. E. & MESLOW, E. C., 1977. Food habits of cougars in Oregon. *Journal of Wildlife Management, 41:* 576–578.
666. TRAPP, G. R., 1978. Comparative behavioural ecology of the ringtail and gray fox in southwestern Utah. *Carnivore, 1:* 3–32.
667. TRENT, T. T. & RONGSTAD, O. J., 1974. Home range and survival of cottontail rabbits in southwestern Wisconsin. *Journal of Wildlife Management, 38:* 459–472.
668. TUDORANCEA, C., 1972. Studies on Unionidae populations from the Crapina-Jijila complex of pools (Danube zone liable to inundation). *Hydrobiologia, 39:* 527–561.
669. TULLOCH, D. G., 1978. The water buffalo, *Bubalus bubalis*, in Australia: grouping and home range. *Australian Wildlife Research, 5:* 327–354.
670. TURNER, M. & WATSON, M., 1964. A census of game in Ngorogoro Crater. *East African Wildlife Journal, 2:* 165–166.
671. TYNDALE-BISCOE, C. H. & SMITH, R. F. C., 1969. Studies on the marsupial glider, *Schoinobates volans* (Kerr). II. Population structure and regulatory mechanisms. *Journal of Animal Ecology, 38:* 637–659.
672. TYSON, E. L., 1959. A deer drive vs. track census. *Transactions of the North American Wildlife Conference, 24:* 457–464.
673. UHLIG, H., 1957. Gray squirrel populations in extensive forested areas of West Virginia. *Journal of Wildlife Management, 21:* 335–341.
674. VAN DEN BRINK, F. H., 1968. *A Field Guide to the Mammals of Britain and Europe*. Boston: Houghton Mifflin.
675. VAN LAVIEREN, L. P. & BOSCH, M. L., 1977. Evaluation des densités de grands mammifères dans le Parc National de Bouba Ndjida, Cameroun. *La Terre et La Vie, 31:* 3–22.
676. VASSILJEVSKAYA, V. D., IVANOV, V. V., BOGATYREV, L. G., POSPELOVA, E. P., SHALAEVA, N. M. & GRISHINA, L. A., 1975. Agapa, U.S.S.R. In T. Rosswall & O. W. Heal (Eds), *Structure and Function of Tundra Ecosystems. Ecological Bulletin (Stockholm), 20:* 141–158.
677. VAUGHN, T. A., 1974. Resource allocation in some sympatric, subalpine rodents. *Journal of Mammalogy, 55:* 764–795.
678. VERTS, B. J., 1967. *The Biology of the Striped Skunk*. Urbana, Illinois: University of Illinois Press.
679. VIEGA-BORGEAUD, T., 1982. Données écologiques sur *Oryzomys nigripes* (Desmarest, 1819) (Rongeurs; cricétidés) dans le foyer naturel de peste de Barracao dos Mendes (État de Rio de Janeiro, Brésil). *Mammalia, 46:* 336–359.
680. VINCENT, J., 1969. The status of the square-lipped rhinoceros, *Ceratotherium simum simum* (Burchell), in Zululand. *The Lammergeyer, 10:* 12–21.
681. VON LA CHEVALLERIE, A., 1970. Meat production from wild ungulates. *Proceedings of the South African Society of Animal Products, 9:* 73–87.
682. VON RICHTER, W., 1972. Territorial behaviour of the black wildebeest *Connochaetes gnu*. *Zoologica Africana, 7:* 207–231.
683. WALKER, E. P., 1975. *Mammals of the World*. 3rd edition, 3 Vols. Baltimore: Johns Hopkins University Press.
684. WARD, F. J. & ROBINSON, G. G. C., 1974. A review of research on the limnology of West Blue Lake, Manitoba. *Journal of the Fisheries Research Board of Canada, 31:* 977–1005.

685. WASER, P. M., 1976. *Cercocebus albigena*: site attachment, avoidance and intergroup spacing. *American Naturalist, 110:* 911–955.
686. WASER, P. M., 1977. Feeding, ranging and group size in the mangebey *Cercocebus albigena.* In T. H. Clutton-Brock (Ed.), *Primate Ecology: Studies of Feeding and Ranging Behaviour in Lemurs, Monkeys and Apes:* 183–222. London: Academic Press.
687. WASER, P. M., 1980. Small nocturnal carnivores: ecological studies in the Serengeti. *African Journal of Ecology, 18:* 167–185.
688. WATERS, T. F., 1966. Production rate, population density, and drift of a stream invertebrate. *Ecology, 47:* 595–604.
689. WATERS, T. F., 1977. Secondary production in inland waters. In A. MacFayden (Ed.), *Advances in Ecological Research, 10:* 91–164. London: Academic Press.
690. WATERS, T. F. & CRAWFORD, G. W., 1973. Annual production of a stream mayfly population: a comparison of methods. *Limnology and Oceanography, 18:* 286–296.
691. WATSON, A. & HEWSON, R., 1973. Population densities of mountain hares (*Lepus timidus*) on western Scottish hills. *Journal of Zoology (London), 170:* 151–159.
692. WATSON, R. M. & BELL, R. H. V., 1969. The distribution, abundance, and status of elephant in the Serengeti region of northern Tanzania. *Journal of Applied Ecology, 6:* 115–132.
693. WATSON, R. M., PARKER, I. S. C. & ALLAN, T., 1969. A census of elephant and other large mammals in the Mkomasi region of Northern Tanzania and Southern Kenya. *East African Wildlife Journal, 7:* 11–26.
694. WELCH, H. E., 1976. Ecology of Chironomidae (Diptera) in a polar lake. *Journal of the Fisheries Research Board of Canada, 33:* 227–247.
695. WELLS, R. T., 1978. Field observations of the hairy-nosed wombat, *Lasiorhinus latifrons* (Owen). *Australian Wildlife Research, 5:* 299–303.
696. WESTERN, D., 1974. The distribution, density and biomass density of lizards in a semi-arid environment of northern Kenya. *East African Wildlife Journal, 12:* 49–62.
697. WESTERN, D. & SINDIYO, D. M., 1972. The status of the Amboseli rhino population. *East African Wildlife Journal, 10:* 43–57.
698. WHATELEY, A. & BROOKS, P. M., 1978. Numbers and movements of spotted hyaenas in Hluhluwe Game Reserve. *The Lammergeyer, 26:* 44–52.
699. WHITE, R. G., THOMSON, B. R., SKOGLAND, T., PERSON, S. J., RUSSELL, D. E., HOLLEMAN, D. F. & LUICK, J. R., 1975. Ecology of caribou at Prudhoe Bay, Alaska. In J. Brown (Ed.), *Ecological Investigations of the Tundra Biome in the Prudhoe Bay Region, Alaska. Biological Papers of the University of Alaska, Special Report, 2:* 151–201.
700. WHITFIELD, D. W. A., 1977. Energy budgets and ecological efficiencies on Truelove Lowland. In L. C. Bliss (Ed.), *Truelove Lowland, Devon Island, Canada: A High Arctic Ecosystem:* 607–620. Edmonton: University of Alberta Press.
701. WHITFORD, W. G., 1976. Temporal fluctuations in density and diversity of desert rodent populations. *Journal of Mammalogy, 57:* 351–367.
702. WHITNEY, P., 1976. Population ecology of two species of subarctic microtine rodents. *Ecological Monographs, 46:* 85–104.
703. WILLIAMS, J. M., 1973. The ecology of *Rattus exulans* (Peale) reviewed. *Pacific Science, 27:* 120–127.
704. WILLIAMSON, P., CAMERON, R. A. D. & CARTER, M. A., 1977. Population dynamics of the land snail *Cepaea nemoralis* L.: a six-year study. *Journal of Animal Ecology, 46:* 181–194.
705. WILSON, C. C. & WILSON, W. L., 1975. The influence of selective logging on primates and some other animals in East Kalimantan. *Folia Primatologica, 23:* 245–274.
706. WILSON, V. J., 1965. Observations on the greater kudu *Tragelaphus strepsiceros* Pallas from a tsetse control hunting scheme in Northern Rhodesia. *East African Wildlife Journal, 3:* 27–37.
707. WILSON, V. J. & CHILD, G. F. T., 1964. Notes on the bushbuck (*Tragelaphus scriptus*) from a tsetse fly control area in Northern Rhodesia. *The Puku, 2:* 118–128.
708. WING, L. D. & BUSS, I. O., 1970. Elephants and forests. *Wildlife Monographs, 19:* 1–92.
709. WIRTZ, W. O., II., 1972. Population ecology of the Polynesian rat, *Rattus exulans*, on Kure Atoll, Hawaii. *Pacific Science, 26:* 433–464.
710. WOLFE, M. L. & ALLEN, D. L., 1973. Continued studies of the status, socialization, and relationships of Isle Royale wolves, 1967–1970. *Journal of Mammalogy, 54:* 611–633.
711. WOOD, D. H., 1971. The ecology of *Rattus fuscipes* and *Melomys cervinipes* (Rodentia: Muridae) in a south-east Queensland rainforest. *Australian Journal of Zoology, 19:* 371–392.
712. WOOD, D. H., 1980. The demography of a rabbit population in an arid region of New South Wales, Australia. *Journal of Animal Ecology, 49:* 55–78.
713. WOOD, T. J. & MUNROE, S. A., 1977. Dynamics of snowshoe hare populations in the Maritime Provinces. *Canadian Wildlife Service Occasional Papers, 30:* 1–20.
714. WRIGHT, P. C., 1978. Home range, activity pattern, and agonistic encounters of a group of night monkeys (*Aotus trivirgatus*) in Peru. *Folia Primatologica, 29:* 43–55.
715. YALDEN, D. W., 1971. A population of the yellow-necked mouse, *Apodemus flavicollis. Journal of Zoology (London), 164:* 244–250.

716. YERGER, R. W., 1953. Home range, territoriality, and populations of the chipmunk in central New York. *Journal of Mammalogy, 34:* 448–458.
717. YONG HOI SEN., 1969. Rats from Kedah Peak (Gunong Jerai), Kedah. *Malayan Nature Journal, 22:* 53–56.
718. YOUNG, B. F. & RUFF, R. L., 1982. Population dynamics and movements of black bears in east central Alberta. *Journal of Wildlife Management, 46:* 845–860.
719. YOUNGMAN, P. M., 1956. A population of the striped field mouse, *Apodemus agrarius coreae*, in central Korea. *Journal of Mammalogy, 37:* 1–10.
720. ZEGERS, D. A. & WILLIAMS, O., 1979. Energy flow through a population of Richardson's ground squirrels. *Acta Theriologica, 24:* 221–235.
721. ZELENKA, G., 1965. Observations sur l'écologie de la marmotte des alpes. *La Terre et La Vie, 20:* 238–256.
722. ZELINKA, M., 1973. Die Eintagsfliegen (Ephemeroptera) in Forellenbächen der Beskiden. II.—Produktion. *Hydrobiologia, 42:* 13–19.
723. ZERVANOS, S. M. & HADLEY, N. F., 1973. Adaptional biology and energy relationships of the collared peccary (*Tayassu tajacu*). *Ecology, 54:* 759–774.
724. ZIRUL, D. L. & FULLER, W. A., 1970. Winter fluctuations in size of home range of the red squirrel (*Tamiasciurus hudsonicus*). *Transactions of the North American Wildlife Conference, 35:* 115–127.
725. MYERS, N., 1973. Leopard and cheetah in Ethiopia. *Oryx, 12:* 197–205.
726. THORINGTON, R. W., JR., 1968. Observations of the tamarin *Saguinus midas*. *Folia Primatologica, 9:* 95–98.
727. MENTIS, M. T. & DUKE, R. R., 1976. Carrying capacities of natural veld in Natal for large wild herbivores. *South African Journal of Wildlife Research, 6:* 65–74.
728. FRENCH, N. R., STEINHORST, R. K. & SWIFT, D. M., 1979. Grassland biomass trophic pyramids. In N. R. French (Ed.), *Perspectives in Grassland Ecology: Results and Applications of the US/IBP Grassland Biome Study. Ecological Studies, 32:* 59–87. New York: Springer-Verlag.
729. LEUTHOLD, W., 1978. On the ecology of the gerenuk *Litocranius walleri*. *Journal of Animal Ecology, 47:* 561–580.
730. FRENCH, N. R., communication *in lit.*
731. Data from specimens in Field Museum of Natural History, Chicago, USA.
732. Mass based upon that of congeneric species of similar body length.
733. CORDERO, R. & OJASTI, J., 1981. Comparison of capybara populations of open and forested habitats. *Journal of Wildlife Management, 45:* 267–271.
734. HUSSON, A. M., 1978. *The Mammals of Suriname.* Leiden: E. J. Brill.
735. SHKOLNIK, A., 1980. Energy metabolism in hedgehogs: "primitive" strategies? In K. Schmidt-Nielsen, L. Bolis & C. R. Taylor (Eds), *Comparative Physiology: Primitive Mammals:* 148–154. Cambridge: Cambridge University Press.
736. BUCKNER, C. H., 1969. Some aspects of the population ecology of the common shrew, *Sorex araneus*, near Oxford, England. *Journal of Mammalogy, 50:* 326–332.
737. YALDEN, D. W., 1974. Population density in the common shrew, *Sorex araneus*. *Journal of Zoology (London), 173:* 262–264.
738. MICHIELSON, N. C., 1966. Intraspecific and interspecific competition in the shrews *Sorex araneus* L. and *S. minutus* L. *Archives néerlandaises de Zoologie, 17:* 73–174.
739. PERNETTA, J. C., 1977. Population ecology of British shrews in grassland. *Acta Theriologica, 22:* 279–296.
740. FUNMILAYO, O., 1977. Distribution and abundance of moles (*Talpa europea* L.) in relation to physical habitat and food supply. *Oecologia (Berlin), 30:* 277–283.
741. SARRAZIN, J.-P. R. & BIDER, J. R., 1973. Activity, a neglected parameter in population estimates—the development of a new technique. *Journal of Mammalogy, 54:* 369–382.
742. MORTON, S. R., 1978. An ecological study of *Sminthopsis crassicaudata* (Marsupialia: Dasyuridae). II. Behaviour and social organization. *Australian Wildlife Research, 5:* 163–182.
743. BENSON, C. W., 1964. Leopard weights. *The Puku, 2:* 131.
744. STOUT, I. J. & SONENSHINE, D. E., 1974. Ecology of an opossum population in Virginia, 1963–69. *Acta Theriologica, 19:* 235–245.
745. Mass calculated from equations in references 49, 543, or 689.
746. HORTON, P. A., 1961. The bionomics of brown trout in a Dartmoor stream. *Journal of Animal Ecology, 30:* 311–338.