THE SYSTEMATICS OF SOUTHERN AFRICAN MAMMALS

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(*Section Leader's Introductory Address*)

Getting on for a quarter of a century ago Julian Huxley edited and wrote the first chapter of *The New Systematics* (Huxley 1940), a work which has had far-reaching consequences for biology. We are today well into the era of the "New Systematics" and I want to review briefly the post-war trends and present position of the systematics of southern African mammals. Happily the main trends have been in the right direction, although the untimely death of both Dr. Austin Roberts and Capt. G. C. Shortridge shortly after the war left gaps not easy to fill. Nevertheless, more systematic research on mammals in southern Africa is being conducted today than would have seemed possible towards the end of the 1940s, although a vast amount remains to be done. It is pleasing to note that, in addition to augmentation of older collections, new study collections have been founded, notably that in Bulawayo Museum, now housing 22,000 specimens, which is a very respectable total to have been built up in about 15 years.

As far as the science itself is concerned, the tendency has been (as elsewhere) to bring taxonomy and ecology together as the basic foundation of systematics in the broad sense envisaged by Simpson (1961). No longer is a museum a place where the purely "closet naturalist" sits and looks at skins and skulls only. Today the mammalogist must combine such study with field observations, and he often collects a good deal of his own material. The advantage in this direction of having good study collections in Africa is obvious.

The new approach has done much to restore respectability to taxonomy, and to bring about better realisation of its fundamental importance, though there are, unfortunately, still many people who regard it only as a sort of parlour game of coining new names. To those who may hold such a view I recommend a paper on applied systematics in the Smithsonian Report for 1953 (Schmidt 1954).

The concept of geographical replacement has become firmly established and has led to much synthesis of allopatric forms, previously regarded as species, but now considered geographical representatives of polytypic species in a broad sense. No doubt more remains to be done in this direction, but recent research has pointed out the need for caution lest lumping should proceed unjustifiably beyond due limits, obscuring true inter-specific relationships.

The progress of mammal taxonomy through three more or less definite stages was summarised by Lundholm (1949), who showed graphically how demonstration of a cline is related to the numbers and localities of specimens available for study. Lundholm also proposed the term "cline complex" and analysed such a case in the mongoose *Cynictis penicillata*. The best method of nomenclature for a cline or cline complex is, however, somewhat unsettled and may remain so for some time.

The species of larger mammals are for the most part known, but much remains to be learned of their past and present distribution; and, in general, lack of adequate material prevents detailed study of infra-specific variation (Ansell 1958). It is, however, very satisfactory that in some places steps have been taken to remedy this, and long series of several ungulate species have now been assembled, notably in the Bulawayo Museum, which include both sexes and all ages, rather than the large number of male trophy heads which form an undue proportion of some older collections.

Among many of the smaller mammals we cannot as yet be altogether certain about the number of species occurring, though considerable progress has been made in some groups, notably the very difficult shrew genus *Crocidura*, in which, mainly due to Meester's (1963) studies, we now know what species there are in southern Africa, apart from one or two dubious cases, though some difficulties of nomenclature remain. In the Muridae Lundholm and D. H. S. Davis have done significant work, particularly on the *Rattus*-like forms, which at last seem to have been sorted out into a reasonable system of generic grouping. On the other hand some genera badly need revision, such as *Graphiurus*, which is in a chaotic state.

A word on nomenclature. The trinomial system has produced a good deal of discussion and sometimes outright condemnation in the past few years, one of the main objections being that it gives an impression of reality to something not finite in nature. This argument seems to be weakened by the fact that (while the species is indeed the most objectively definable taxon) there are in many cases difficulties about where to draw the line between valid species and well-marked subspecies, whether allopatric, as with some geographical isolates, or behaving as good species in one place but elsewhere intergrading as subspecies. One may cite as an example the pocket gophers, *Thomomys talpoides bridgeri*, *T. p. ocius* and *T. p. uinta* of U.S.A. (Durrant 1959), as well as the better known circumpolar birds *Larus argentatus*/*Larus fuscus*.

The basic purpose of nomenclature (which seems to get lost sight of in the trinomial controversy), is to give a name to a subject in order to discuss it unambiguously, and it seems quite obvious that brevity, as achieved in the trinomial, may be an advantage. It seems to me preferable for example to be able to substitute for "the very dark form of *Cercopithecus mitis* occurring in the high rainfall areas along the western shore of Lake Nyasa" the three words "*Cercopithecus mitis francescae*". This does not of course alter the fact that many trinomial names are invalid, nor that, where a cline can be demonstrated, one or more of the names for stages in the cline can perhaps be dropped with advantage. Again, while the trinomial may be very useful, it not indispensable. In discussing infra-specific variation, there will doubtless be other instances where only the species in its broadest sense is concerned, and here the binomial is sufficient. I would recommend, then, that the trinomial or binomial should be used according to the needs of the situation. Nomenclature should be the taxonomist's servant, not his master.

This leads me on to the question of splitting and lumping, and here again it seems that it is often forgotten just what the purpose of classification is. It is not to show only differences between groups of organisms, as the splitter would stress; nor is it to show only resemblances, as emphasised by the lumper. It is to show both. This seems so obvious as not to require

mention, but in fact, as I have said, it does seem to get overlooked. The ultimate extremes of splitting and lumping in zoological nomenclature would after all be the individual animal on one hand and the whole zoological kingdom on the other, a *reductio ad absurdum* which underlines the need for a balanced approach.

Retention of trinomials (where justifiable according to accepted practice) may serve to emphasise the variable nature of polytypic species, and may also, in our present state of knowledge, serve as a brake upon too much lumping. For example the dropping of the subspecies names in the classification adopted by Ellerman *et al.* (1953) for *Steatomys* would result in inclusion of three valid polytypic species all under the binomial *Steatomys pratensis*!

The subgenus, in Africa as elsewhere, has never been a popular taxonomic unit. It is perhaps unfortunate that a conscientious attempt to make it fill a real need was applied to *Rattus* (*sensu lato*) (Ellerman *et al.* 1953) which most African mammalogists do not now accept as occurring here (apart from the two introduced species), preferring the revised generic classification which D. H. S. Davis will be outlining later on. The subgenus has, however, been accepted for some groups, notably *Felis*, where the subgenera *Leptailurus* and *Lynx* (from which *Caracal* does not seem worth separating) recognise differences more than merely specific, while not obscuring the essential unity of the group.

So far the concept of superspecies has not been widely adopted in African mammal taxonomy, though I believe it could be very useful, especially in zoogeographical studies. It is not the same as the subgenus, though may be in some cases co-extensive with it. Dandelot (1959) has applied the idea to the *Cercopithecus aethiops* group of monkeys, while it has been suggested as a possibility for several of the forms of *Papio* by Freedman (1963) and myself (Ansell 1960). It also seems clearly applicable to *Kobus* (*sensu lato*).

As to the future, there is still the need for filling in many gaps in collected material of both large and small mammals. The present-day emphasis on the study of populations and their variation rather than a few individual specimens requires more, not less, collecting. How fruitful this may be is shown by the extensions of the known ranges of so many species revealed when collections are made in previously neglected areas, while even today completely new species may turn up and, very rarely, even a new genus.

Apart from the primary task of filling in such gaps, one of the greatest requirements is revision of many of the more widespread genera and species throughout their whole range. Though unavoidable, it is unfortunate that so much work in the past has been only regional in scope, and even then often limited by artificial national boundaries rather than zoogeographical ones.

The following list gives a few of the more urgent needs in taxonomic revision.

Soricidae: In the *Crocidura* the need now is to integrate Meester's work on Southern African species with Heim de Balsac's in West Africa. A number of East African forms probably represent species of wide distribution through the classical East and South African sub-region. African zoologists have been somewhat reluctant to accept the link-up at specific level of certain African and Palearctic forms proposed by Ellerman *et. al.* (1953) and further detailed investigation is needed.

Chiroptera: Many distributional gaps remain, and several species are known only from very few museum specimens. The difficult genera *Rhinolophus* and *Tadarida* still present problems requiring both additional collecting and synthesis of previous regional studies.

Primates: The precise relationships between *Papio ursinus* (*sensu lato* to include *P. doguera* and its allies) and *P. papio* of West Africa on one hand, and *P. cynocephalus* of central Africa on the other are still uncertain and additional collecting in areas of intergrading or possible overlap required.

Carnivora: It still remains to be settled finally whether there are two species of *Genetta* in southern Africa or three, and if the latter, what is the correct synonymy of the many described forms from the rest of the Ethiopian region. In *Herpestes* the *sanguineus* and *ratlamuchi* sections of Ellerman *et. al.* (1953) show some geographical overlap, and unpublished work by Lundholm suggests that there may be more than the two species admitted by those authors for southern Africa. Though it is generally accepted today that the small and large spotted servals are conspecific (*Felis serval*), the apparent geographical restriction of the small-spotted *brachyura* type to the West African sub-region and adjacent areas remains unexplained. It is apparently quite unknown south of Zambia (? absent also from the east coast).

Ungulates: The species are known, but intra-specific variation has been little studied. It is most important that adequate series from wild living populations should be collected while there is yet time, and these should include both sexes and all ages. Even in some major museums the females of many antelope species are virtually unrepresented. Far too much valuable scientific material from game departments and tsetse control game elimination schemes still goes to waste.

Rodents: The taxonomy of several rodent groups is in need of revision, particularly in Muscardinidae and Muridae. Genera in particular need of revision are *Graphiurus; Thamnomys* (*s.l.*) *Praomys* (*sensu* D. H. S. Davis), especially the *P. morio* and "*Hylomyscus*" groups; *Acomys; Steatomys;* and certain groups of *Otomys*.

Statistics will undoubtedly play an increased part in future taxonomic work, and a useful approach to the cline complex may be found in the more advanced techniques, such as multivariate analysis by means of discriminant functions, as has been carried out on the wolf of Canada (Jolicoeur 1959).

Although the need for more centralisation of collections and co-ordination of systematic work on African mammals has been stressed by several authors (Lundholm 1949, Skead 1955, Meester 1954), progress here has been limited. The question is beset with difficulty, partly (though not wholly) financial, and it may well be, as I have pointed out before (Ansell 1958), that individual governments are unable or unwilling to do much in this direction. Perhaps the best hope lies in one of the international bodies such as the International Union for the Conservation of Nature, the World Health Organisation, the Food and Agricultural Organisation, or the United Nations Educational, Scientific and Cultural Organisation, which could take a broader view than territorial governments, as well as offer material aid.

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