The use of nomenclature in researches on bird ecology and the avifauna.

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At the beginning of this century the consistent use of the geographical principle in bird systematics placed the use of trinomial nomenclature on a permanent footing, first in ornithology and gradually also in other well-known animal groups, both in the eastern and the western hemisphere. This development is clearly to be seen in the Finnish ornithological literature too, particularly in the nineteen-twenties. At that time the use of the trinomial nomenclature begins, step by step, following the pioneer work of HARTERT (1910—38). HORTLING in particular tried to conform to the results of research on geographical races, and it is very largely due to him that these racial problems, actively discussed by himself too (e. g. HORTLING 1925, 1926 a, b), come within the scope of Finnish ornithology, in the form of nomenclatorial changes at least. In the articles and shorter notices in Ornis Fennica, the only ornithological periodical in the country, trinomials are encountered as early as the first volume (1924), but only more or less occasionally. A couple of years later the use of trinomials seems to be general in some articles, and the index of 1928 is throughout trinomial so far as polytypic species are concerned. The work „Suomen linnut" by KIVIRIKKO (1926/27) was the first ornithological work in this country where the trinomial nomenclature was finally accepted and, in conclusion, the handbook by HORTLING (1929/31) consistently recognized the results up to that time of researches concerning geographical races.

From the first volumes of Ornis Fennica and from the discussion on the naming of birds conducted in those days in the columns of the zoological and botanical journal „Luonnon Ystävä" (HORTLING—KIVIRIKKO 1926), it appears that, at least to begin with, the sound point of view then prevailed that trinomials should not be used except in those cases where one can be sure of the geographical race in question. This opinion was held also by KIVIRIKKO (dis-

cussion mentioned above), who, however, in his later work (KIVIRIKKO 1926/27) was converted to the view taken by HORTLING that trinomials could be used for all Finnish polytypic bird species. The rational basis for this procedure was, as these two ornithologists declared, that central European investigators named the species in question with trinomials. Then the northern representatives of these species, first described by LINNAEUS, were type forms. They thus assumed that the species in question were racially uniform throughout the Fennoscandian region, i. e. the representatives inhabiting Finland, excluding certain exceptional cases, were regarded as belonging to the type form. Such was, in brief, the origin of the trinomial nomenclature concerning the avifauna of Finland which has been used up to the present in the ornithological literature here.

Owing to the immediate proximity of Finland to the regions from which the forms appearing now as type forms have been described, it is certain that this nomenclature has been correct in most cases and will thus persist. And it cannot be denied that this procedure, reflecting the stage of our knowledge at that time, would have been justified as such, even though the northwest European species of birds have been taken very collectively there, and though the establishing of racial distinctions has often been based only upon comparison between central European material and northern migrants without their provenience being known exactly. This being the case, we have to prepare ourselves for the fact that investigation of the racial relationships of the Finnish bird fauna will cause some changes in the nomenclature so far used. From experience gained in geographical race research it is now perfectly clear that in most cases, where sufficiently accurate analyses can be made, individual local populations of a species differ in minute but constant characteristics. Without doubt also in this country investigations made on different species will lead to results which justify one in making nomenclatorial distinctions on the basis of the customary taxonomic criteria between separate local representatives of the species population.

But it cannot be denied that there are two sides to the question. This country, in its entirety, is a wide and continuous territory immediately connected with the other parts of the northern Palaearctic. Geographical race researches have shown that in such regions, in contrast to the isolated conditions of the geographically dis-

continuous areas, the formation of races is gradual and the variation amplitude of the races largely overlapping. As, furthermore, the detailed analyses of the populations have revealed that the individual populations differ from one another also within the same trinomially named subspecies (geographical race), the geographical races are not, in such conditions, morphologically clear cut units. This fact involves a practical problem quite new in subspecific taxonomy. The appearance of a nomenclatorially expressed subspecies in the system often means the drawing of a quite artificial limit between gradually changing populations. Therefore the usefulness of the trinomial nomenclature, as a reflector of the actual relations in variability, has been called in question (e. g. LACK 1946, WYNNE—EDWARDS 1948, see also MOREAU 1948).

These objections as such are indisputably justified, and the naming of those subspecies forming a continuous series of variation is only a transitional phase in demonstrating and analyzing preliminarily the geographical variation. In spite of all this, however, in accordance with the author's previously expressed opinion (VOIPIO 1947) the practice still enforces us, at the present stage of race research in birds, to follow the principle that every specimen belonging to a local sample must be given a certain niche in the collection corresponding to a definite category expressed by trinomial nomenclature. [1]) This is the case without doubt elsewhere too, for only very few bird species have been investigated taxonomically in all parts of their range.

Our task is not, from this point of view, to enter deeply into the nomenclatorial problems of subspecific taxonomy and their practical solution, which is of great theoretical importance. By referring to what has been said above, we can verify that, on the basis of the present stage of the study of geographical races, we can hold to this trinomial nomenclature and that, with regard to most of our bird species, we are justified, on the basis of the studies carried

[1]) There is particular reason, in this connection to note the very instructive recent article by TUCKER (1949), where he points out repeatedly that „the practice of defining and naming subspecies — — — is an essential weapon in the study of geographical variation" (loc. c. p. 134) and that „the trinomial nomenclature has justified itself as the most practical method of expressing the facts of geographical variation, even though not perfect — —" (p. 200).

out, in regarding their representatives inhabiting this country as belonging to the type form.

The result of this development, however, was that in most local species-lists and reports trinomials were used for all bird species without reservation, according to the orthodox nomenclature which was crystallized in the handbooks and which — strange to say — was considered in a way as definite. This is clearly seen, for instance, from the first volumes of Ornis Fennica. For in this periodical only binomials were used at first and trinomials only on the rare occasions when it was certain that the representatives of the species in question did *not* belong to the type form described by LINNAEUS, but the use of trinomials became, little by little, fully accepted, wholly independent of the regions and the season where and when the observation was made. The possibility was altogether ignored as to whether the representatives of the species in question in the northern and eastern parts of Finland belong to some other race described from the immediately adjacent regions outside the country or that the specimens observed during the migration period originate from these or still more remote races.

Such was the case also in more extensive researches on bird ecology and the avifauna. These are generally based upon data in which the racial relationships of the species concerned are not taken into account. Even in monotypic species in which no geographical races have been described in any stage of taxonomic research, trinomials have been used rather commonly, e. g. *Sylvia b. borin!*

A geographic subspecies expressed with the aid of trinomial nomenclature had become, in practice, a collective conception meaning the species in question as a whole.

The author has pointed out these drawbacks in the use of trinomial nomenclature in a Finnish article before (VOIPIO 1944). The errors arose on the one hand from the presumption that the species inhabiting Fennoscandia were throughout homogeneous racially, on the other from the fact that ornithologists wished to follow modern principles in every respect. But then the meaning and the significance of trinomial nomenclature was forgotten.

It is to the credit of the previous editors of Ornis Fennica, that this weakness has been gradually eliminated. To begin with (i. e. in the years 1942—44), reports where the geographical race concerned was particularly notified were distinguished from those where

the question of race was uncertain or where the species was treated collectively. The last named appeared as binomial in the index, e. g. *Motacilla flava* coll. From the year 1945, the index of Ornis Fennica is practically entirely binomial and the trinomials refer only to articles dealing with the racial relationships of the species in question or to reports where the race is exactly determined. An adequate attempt is made in the text to avoid the use of needless and unnecessary trinomial nomenclature. Since the index of Ornis Fennica also has for its aim to act as a guide to the user of the nomenclature, this is an important step towards an improvement in the use of nomenclature. In this manner the impression is avoided that the racial relationships of Finnish bird species are entirely solved, a danger pointed out by KIVIRIKKO (discussion HORTLING—KIVIRIKKO 1926) in his time.

But we are compelled, on entering closer into the matter, to admit that although the transition to the use of entirely binomial nomenclature as such means an improvement on previous usage in researches on bird ecology and the avifauna, this change at the same time leaves a gap both in the general taxonomic orientation and in the interpretation of results concerning the ecology of the species in question as regards infra-specific differentiation. We are now well aware of the fact that geographical races do not differ merely in their morphological properties, but that many physiological differences are characteristic of them too. Their habits may vary considerably, as is seen in the choice of biotope (habitat), feeding and nesting habits (choice of nest site and nest building), in migratory tendency, courtship behaviour, song and so on. The geographical variation of the clutch-size is considerable and, in addition, there appear differences in the sex-ratio. The frequencies of different phases in polymorphic species again may be different and the varying proportions of migrant and non-migrant individuals in different populations may belong to the same category.

All these variations may be encountered in wider ecological researches and many of them also in the more exhaustive local faunas. It is naturally a great advantage to state reliably the taxonomic group, to whose characteristics the ecologic relations established belong. We can then ascertain the extent to which there is variation in these properties in the range of individual subspecies or whether there are differences in this respect between

geographical races or to what extent their distribution areas and the geographically varying ecologic behaviour of the species coincide or deviate from each other. On these grounds the author is inclined to consider the use of trinomial nomenclature also in researches on bird ecology and the fauna as better than being content with mere collective nomenclature.

This is all the more convincing upon reading the very recent article by TUCKER (1949). [1]) As appears from the foregoing, I agree with TUCKER completely in that the use of trinomials in reports based on field observations is uncritical in those cases where the racial status of the specimens in question is uncertain, and needless when the report contains a mere notice upon the occurrence of the species within a certain district. On the other hand, however, I ultimately consider TUCKER's opinion that „the use of trinomials — — adds nothing to the value and precision of the record" (op. c. p. 201) and that „trinomial names are primarily the province of museum workers and are better not used in field ornithology" (op. c. p. 202) as being too strong in the case of research concerning a local avifauna as a whole or dealing in more detail with the ecology of certain species. The same applies, to my mind, to field observations where records of the habits, behaviour, song and, in general, what may be called ecologic behaviour are included, all of which observations are able to indicate certain local characteristics.

That local differences in habits, song and other „physiological" characters sometimes coincide with the subspecific differences, sometimes — as is often the case — not, is not, viewed taxonomically, any exceptional phenomenon and does not in any way lessen their significance in this respect. Morphological characters behave in this way too. As pointed out by LACK (1946), the relations, appearing in the mutual non-coincidence of the clines, between the continental and British race of the robin (*Erithacus rubecula*) form a case in point producing „nomenclatorial difficulties". Another circumstance to be noted in regard to such (physiological) characters is that, although in many cases they are doubtless non-hereditary changes acquired by the members of the population in their attitude towards different environmental factors (PEITZMEIER 1949), they are often

[1]) Received during the final stage of the preparation of this manuscript.

also properties based on hereditary reaction norms. And further even if this should not be the case, since they may lead to isolation of an ecologic or other kind, they may, none-the-less, signify the incipient genetic differentiation in the isolates so formed (STRESEMANN 1943). They thus deserve special and continual attention in regard to their taxonomic relations too.

As mentioned before, most Finnish bird species undoubtedly will prove to belong to the type form. But we must also investigate whether the individuals of such a species recorded outside the breeding season also with certainty belong to the same geographical (type) form. If this is not the case only the material from the breeding season itself can be named trinomially, and even then only in those cases where the intergradation zone between the type form and the geographical race migrating across the country lies sufficiently far beyond the political boundaries of the country. On the other hand, in the case of a species in which there exist two or more geographical races within the Finnish political area, the use of trinomial nomenclature is to be avoided at least until the taxonomic relationships of the species concerned are so well explained that we can with certainty define those parts of the country where these races occur, during the breeding period, as the sole forms without intermediate types. The same applies also to those species in which there is, in the neighborhood of the Finnish political area, some geographical form differing from the representatives of this locality and unknown in regard to its boundary with the race found in Finland. For in consequence, its occurrence here even during the breeding season would remain still within the bounds of possibility.

The comment made by TUCKER (1949) that, in most cases, the trinomial name used in connection with field observations „is either at worst a mere guess or at best a pure assumption based on geographical considerations" (loc. c. p. 201) is at present well founded both here and elsewhere. And in such cases it is agreed that trinomial nomenclature adds nothing to the value of the record. It is for this very reason that the use of trinomial nomenclature has recently been restricted here as much as possible. The fact, however, that the geographic race or subspecies is a unit, one of its essential criteria being geographic replacement, forms the rational basis for the fact that in well explored regions, with the racial relationships of their species populations clarified, the use of trinomials or signs expressing the intergradation is to be defended and, on the grounds mentioned before, even to be recommended.

The Finnish bird species of the *breeding season* would thus seem to belong to four categories:

1) the species which doubtless are to be numbered with the type form or which surely belong to a certain other (but only single) geographical race; trinomials are to be used for them (e. g. *Carduelis c. carduelis* (L.) or *Falco columbarius aesalon* Tunst.),

2) the species from which there are more than one race within the boundaries of this country; the author proposes that they should be named binomially in ecologic and faunal papers but, to indicate the situation, should be furnished with the addendum ssp. (e. g. *Accipiter gentilis* (L.) ssp.),

3) the species, the taxonomic status of which is uncertain in so far as that in the neighborhood of this country some other geographical race has been described or in certain parts of the country (or in the whole country) a local form has been established which differs from the type form but whose taxonomic relationships are still insufficiently known; these species should also to be named binomially but, to give a distinction from the previous category, furnished with the addendum coll. (e. g. *Corvus monedula* L. coll. or *Tetrao urogallus* L. coll.),

4) so-called monotypic species within which geographical subspecies are not known; they are to be named in the customary way only binomially (e. g. *Carduelis spinus* (L.)).

The material of the *migration period* forms a group of its own within the categories mentioned. When it also belongs with certainty to the only race occurring in the country, the naming is trinomial (e. g. *Circus c. cyaneus* (L.)), but binomial when this is not the case. Then there are two possibilities: either the material of the migration period contains specimens from more than one race appearing in this country or from a foreign race which is known to migrate across the country or at intervals strays here; or during the migration periods there arrive here populations *possibly* belonging to another form known in the neighborhood of the Finnish territory or to a subspecies as yet imperfectly described from some part of the country (or the country as a whole). In the former case the addendum „ssp." should be used (e. g. *Calidris alpina* (L). ssp. or *Nucifraga caryocatactes* (L.) ssp.) and in the latter the addendum coll. (e. g. *Larus fuscus* L. coll. or *Parus atricapillus* L. coll.).

The following table demonstrates schematically how the scientific

nomenclature, according to this proposal, should be used in each case in the present state of taxonomic research.

Recent taxonomic status	The use of the nomenclature	
	breeders	migrants
one race only	trinomial	trinomial
a certain other race migrating across the country	trinomial	binomial with „ssp."
several races in the country	binomial with „ssp."	binomial with „ssp."
another race in the neighborhood of the country	binomial with „coll."	binomial with „coll."
another uncertain form in the country	binomial with „coll."	binomial with „coll."
monotypic species	binomial	binomial

It is also to be borne in mind that at certain times during a year it is naturally rather difficult to determine within which category, breeders or migrants, a single observation is to be placed. In such cases, of course, the decision must be left unmade and one has to be satisfied by a collective note with its pertinent addenda unless there are some clear indications that the specimen in question remains in the locality or unless some other plausible circumstances suffice to convince one sufficiently in the case concerned. Another circumstance to be taken into account is also the indisputable possibility that in some species the young unmated individuals stray, even during the breeding season, from one district to the other. Since, however, this fact apparently has no decisive influence on the composition of a local breeding population, the possibility of error may be so minute that the factor in question can be ignored.

The proposed manner of recording is by no means intended to be followed obligatorily in all possible small notices where one can, with full reason indeed, be content with mere binomial nomenclature without any additional notes (see, however, p. 44 above). Our problem concerns particularly special researches on the ecology of some species or the more consistent faunistic publications which are not less extensive than a general survey of a local bird fauna. For it is expected from these especially that they should be up-to-date

also from the nomenclatorial point of view, and this is best realized when a critical attitude to the subspecies problems is apparent in them. At the same time a more correct picture of the taxonomic relations of the forms concerned is obtained outside the boundaries of this country and the problems centering round these matters become apparent also in regard to eastern Fennoscandia.

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Om rapphönans, *Perdix perdix*, uppträdande i Finland under höstflyttningen.

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Rapphönan finnes praktiskt taget i hela Europa och uppträder med ett flertal raser. Enl. PETERS „Checklist of birds of the World" indelas rapphönsen i följande raser:

Perdix perdix perdix L. England, Skandinavien till södra Frankrike, Alperna, Österrike, Ungern och Makedonien. — *Perdix perdix armoricana* Hart. Normandie och Bretagne. — *Perdix perdix sphagnetorum* Altum. Nordöstra Holland, östra Friesland och Hannover. — *Perdix perdix hispaniensis* Reich. Pyreneerna och norra Spanien. — *Perdix perdix italica* Hart. Italien. — *Perdix perdix lucida* Altum. Baltiska provinserna, Ostpreussen, Polen