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SUBSPECIATION IN THE PIPIT *ANTHUS CINNAMOMEUS* RÜPPELL OF THE AFROTROPICS

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Anthus cinnamomeus Rüppell is the Afrotropical representative of a complex of medium-sized pipits inhabiting open grassland, cultivation and steppe-like areas in parts of the Palaearctic, the Afrotropics and the Oriental Region, south to Australasia, the other species of the plexus being *A.richardi* Vieillot (Palaearctic), *A.rufulus* Vieillot (Oriental) and *A.novaeseelandiae* (Gmelin) (Australasia). Taxonomic treatment of the group is still very largely fluid, recent qualified opinion moving away from the former merging of closely related forms into a single species *(A.novaeseelandiae).* The recognition of regional polytypic species as part of a wide-ranging superspecies is now seen as an eminently more satisfactory and practical arrangement.

In Africa, *A.cinnamomeus* is concentrated over the east and south of the continent, with outlying populations isolated in eastern Nigeria and Cameroun, extending disruptedly to Chad and to Darfur in the far west of the Sudan. Beyond African continental limits, it extends to the south-west of the Arabian Peninsula, ranging from Asir-Tihama in Saudi Arabia to North Yemen and locally in South Yemen (formerly the Aden Protectorate) (Fig. 1).

Until very recently certain localised and deceptively similar pipit species were uncritically merged with *A.cinnamomeus* subspp. in a species *A.novaeseelandiae,* either as recognised subspecies or as synonymous names of yet others that were. Now that the longstanding problems presented by the true identity of both *A.latistriatus* Jackson, 1899, described from Kavirondo in south-western Kenya, and *A.hoeschi* Stresemann, 1938, named from the Erongo Mtns of Damaraland, South West Africa/Namibia, have been adequately resolved, both being separate species and not part of *A.cinnamomeus,* a restructuring of the subspecies of the last named is urgently called for.

Resulting from recent work, the arrangement of the races as laid out in the continuation of Peters' Check-List by White (1960) is now seen as being particularly badly flawed, as many recognisable racial taxa were uncritically synomised, while

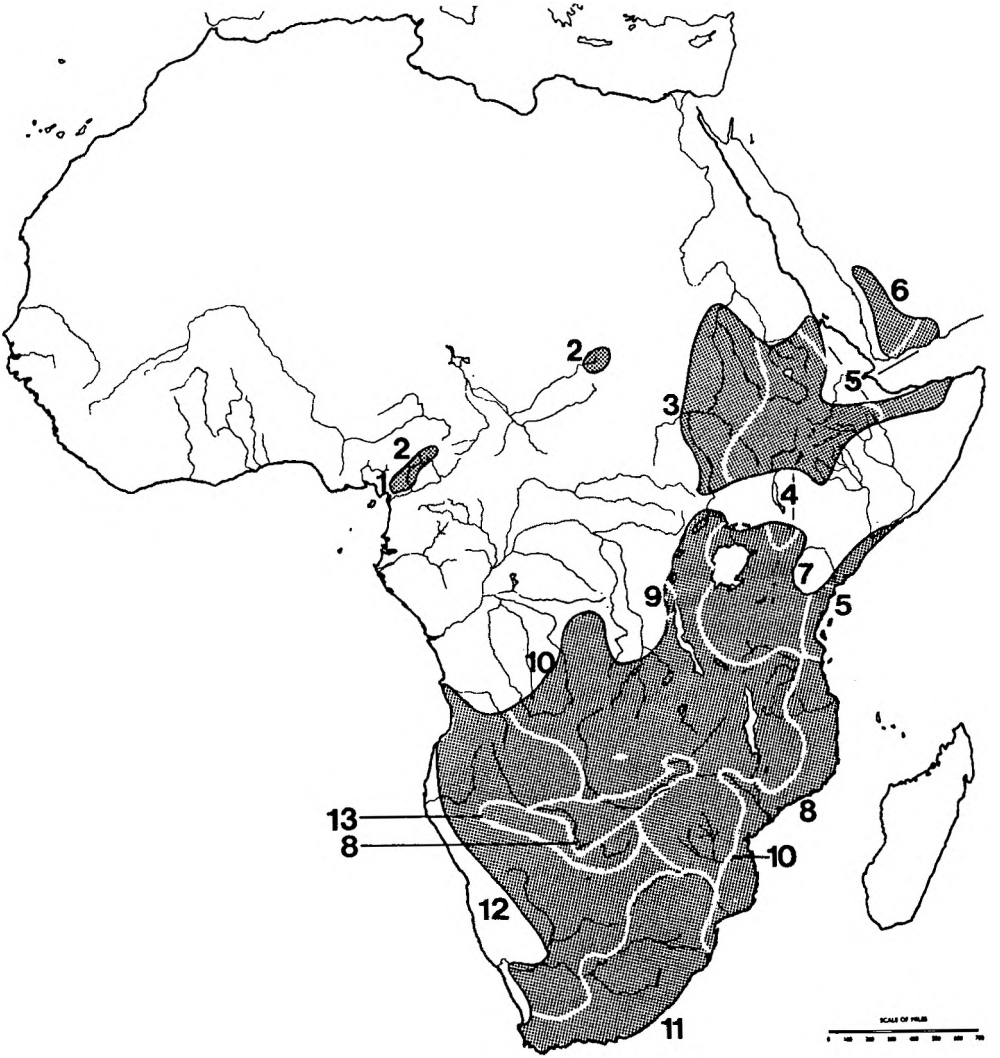

Fig. 1. Simplified sketch-map showing the disposition of the subspecies of *Anthus cinnamomeus* Rüppell

1. *Anthus cinnamomeus camaroonensis* Shelley
2. » » *lynesi* Bannerman and Bates
3. » » *stabilis* Clancey
4. » » *cinnamomeus* Rüppell
5. » » *annae* Meinertzhagen
6. » » *eximius* Clancey
7. » » *lacuum* Meinertzhagen
8. » » *spurium* Clancey
9. » » *itombwensis* Prigogine
10. » » *lichenya* Vincent (including *A.c.katangae* Chapin)
11. » » *rufuloides* Roberts
12. » » *bocagii* Nicholson
13. » » *grotei* Niethammer

others, synonyms and incorrectly assigned yet valid forms, were incorrectly included in *A.cinnamomeus* in this standard taxonomic work.

A re-assessment of the geographical variation in the present pipit was finalised during a brief month's work at the British Museum (Nat.Hist.), Tring, when particular attention was paid to the variation exhibited by the species in East and north-eastern Africa, the south-western Arabian Peninsula and in West Africa. The subspecifically relevant variation in the south of the range had been dealt with more or less definitively earlier as part of a study of the entire avifauna of the South African Sub-Region commenced in the latter part of 1950.

MATERIAL

This new assessment of the subspecific mosaic presented by *A.cinnamomeus* is based solidly on our understanding of the complex variation and post-breeding dispersal patterns established for the populations of the South African Sub-Region in recent times. With the variational trends established for all of fifty per cent. of the species' range, it was a relatively routine exercise to survey the variation throughout the remainder of the range and arrange the populations into subspecies.

In South Africa, the series in the South African Museum (Cape Town), East London Museum, Albany Museum (Grahamstown), Durban Museum and the Transvaal Museum (Pretoria) were used on two or more occasions in the course of earlier research. In addition, the series in the State Museum (Windhoek), the National Museum (formerly the Museu Dr Alvaro de Castro) (Maputo), and the National Museum of Zimbabwe (Bulawayo), were consulted wholly or in part. In October, 1983, I examined much of the extensive holding of this species in the collection of the British Museum (Nat.Hist.), all of which had been arranged by Mrs B.P.Hall as part of her revisionary work on the entire genus *Anthus* Bechstein. From each tray the skins in freshly moulted dress best qualified in my opinion to show the relevant geographical variation were selected. In Brussels and at Tervuren, in Belgium, material of eastern Zaïrese populations was made available for study through the kind offices of Dr A. Prigogine, attached to the Institut Royal des Sciences Naturelles de Belgique.

As a considerable proportion of the skin material in all collections is in worn and colour leached condition and of little use in subspecific analysis, no count of the actual number of specimens was kept, but it is estimated that well over 1200 skins were handled. To the Directors of the southern African museums mentioned, the authorities of the Sub-Department of Ornithology, British Museum (Nat.Hist.), Tring, and Dr A. Prigogine I extend my thanks for facilities granted and assistance given.

MOULT, SEASONAL VARIATION AND POST-BREEDING MOVEMENT

A.cinnamomeus undergoes a complete moult shortly after the annual breeding cycle has been completed. In the case of the forms present in the South African Sub-Region, moult is commenced in February, being completed by May/June. In birds of the year, the remiges and rectrices of the juvenile dress are not shed but are carried until the second moult when the individual is approximately 12-15 months of age. A partial moult of sections of the contour plumage, especially over the dorsum, affects some adults during the course of the breeding season *ca.* October/November onwards.

Resulting from extended daily exposure to ultraviolet light and the abrasiveness of the grass cover in which it exists, the present pipit changes relatively quickly from being a rich buffy coloured species to one in which the entire facies is both colder and more greyish olivaceous. This environmentally induced colour change is in line with comparable seasonal change without moult recorded for a whole range of pipit species.

Having a strong bearing on the success or otherwise of efforts to elucidate the pattern of geographical variation in *A.cinnamomeus,* is the well-established post-breeding movement of some populations from regions where the species is common enough in the breeding season but is scarcely present at other times. In the South African Sub-Region long distance migration has been confirmed as present in several of the populations, especially those breeding in the more desertic parts. Elements of the South West Arid District race *A.c.bocagii* winter east to the humid lowlands of Moçambique (from May/June), while the more localised and still more xeric *A.c. grotei* of the saline pans of northern South West Africa/Namibia and Botswana ranges after breeding to western Zimbabwe and western Zambia. Over the south-eastern highland system of South Africa, the widespread breeding race *A.c.rufuloides* is virtually absent from its breeding grounds May - late August/September. Large numbers of *rufuloides* winter in Moçambique and some in Zimbabwe, and, perhaps, even further afield. Birds on migration travel in parties, often in association with other passerine species, when they are much attracted to recently burnt grassland and fallow cultivated lands.

While well-marked post-breeding movement has been established for many of the populations breeding in the southern aspects of Africa, there is little evidence that comparable seasonal vagility affects the eastern tropical littoral population *(A.c.spurium),* with its rather different breeding season, or the highland birds of eastern Zimbabwe and adjacent Moçambique *(A.c.lichenya).* Nor is there any discernable pattern of post-breeding movement in the East and north-eastern African, south-western Arabian or West African elements. In the tropics it is evident that what little movement takes place scarcely amounts to migration in the generally acceptable meaning of the term. As pointed out by Britton (1980), the species is essentially opportunistic, tending to move into areas cleared of bush, especially in regions supporting large stands of wooded savanna.

GEOGRAPHICAL VARIATION

HISTORICAL

Variation in *A.cinnamomeus* was first dealt with in modern terms and on a continental basis by Meinertzhagen (1921), and later by Sclater in his Systema (1930), and again by White (1957 and 1960) and Hall (1961). The involved situation obtaining in the South African Sub-Region was discussed or dealt with in part in regional works and journals by, among others, Roberts (1940), Vincent (1952), Clancey (1952, 1954, 1968 and 1980), and Pinto and Lamm (1953).

White's arrangement of all the populations into subspecies in the continuation of Peters' Check-List is the only contemporary authoritative pronouncement on the nomenclaturally tenable races of *cinnamomeus*. White dealt with *cinnamomeus* and its component races as part of the megaspecies *A.novaeseelandiae*. Unfortunately, the arrangement is seriously marred as a result of highly tendentious reasoning and totally inadequate research, and in consequence will require to be replaced. It would be uncharitable of the present worker to pick out all the questionable points for re-assessment here. In extending the range of nominate *A.cinnamomeus* from the Ethiopian highlands south to the Zambesi R. and the entire territory of Moçambique, not only has the true nature of the variation been completely obscured, but the synonymy of *A.c.cinnamomeus* has been loaded with the names of many valid taxa as well as that of a full, and at that stage unrecognised, species *(A.latistriatus)*. This last was dismissed as being a melanistic variant, which it is not. Further on in the arrangement of the populations two taxa are recognised, both of which are absolute synonyms of a third, which in turn rests in the synonymy of a fourth form which it does not resemble in colour, tail pattern or even size. *A.hoeschi*, a valid species, lies in the synonymy of *A.c.bocagii*, while *A.n.lwenarum* (based on non-breeding migrants) and *A.n.editus* (founded on breeders), both of which are junior synonyms of *hoeschi*, are accorded full and separate recognition!

VARIATION IN THE SOUTH AFRICAN SUB-REGION

In this major segment of the species' range, variation is complex but on the whole relatively slight, affecting both dorsal and ventral colouration, levels of saturation, the degree of breast streaking and size. Interestingly enough, mensural variation is not seen as always altitudinally correlated, as small-sized birds (wings in adult males 88 and below, females under 85 mm) are present both along the humid eastern littoral of the Sub-Region in association with flood-plains and in northern South West Africa/Namibia on the plateau in xeric or semi-arid environments and again on flood-plain. In the case of austral African breeders large size is seen as being closely associated with post-breeding vagility and true migration as deter-

mined for arid interior and moist eastern upland breeding populations, in the adults of which males have wings 89-96, females 85-89 mm.

The colouration parameters vary along somewhat comparable lines, with eastern low country breeders with blackish shaft-streaking over the upper-parts from the head-top to the lower back, the feathers fringed cold greyish buff, and on the ventral surface with the lower forethroat and breast streaking bold and blackish. To the immediate west of these littoral populations and associated with altitude the upper-parts are decidedly more olivaceous rufous and the shaft-streaking browner. Below, such birds are more strongly buffish and the forethroat and breast streaking is on the whole browner. This more richly coloured assemblage varies within itself, the reddest birds present over the plateau of Zimbabwe with overspill into Manica, Moçambique, the populations occurring to the south of the Limpopo R. somewhat intermediate in colour towards the palest of the three populations of this assemblage. The pale extreme ranges from south-western Angola and northern South West Africa/Namibia south to the northern Cape, and east through Botswana to the dry west of the Transvaal and western Matabeleland, Zimbabwe. Xeric birds breeding on the glaring substrate of saline pans occur disruptedly from the Etosha National Park in northern South West Africa/Namibia, south-east to the Makgadikgadi Salt Pan complex in the north-east of Botswana. These saline pan breeders are characterized by small size (wing in males to 89, females to 85 mm, *i.e.*, as in the eastern littoral population), greyer or duller pale vinaceous edging to the dorsal featharing, whiter forethroat and medio-ventral plane and much reduced pectoral spotting. These very pallid birds *(A.c.grotei)* lie in close association with very different ones breeding on the flood-plain of the Okavango R. and like habitat on the Chobe R. and in the Okavango Delta region of northern Botswana. The flood-plain breeders from this interior region seem taxonomically inseparable from the birds with a like ecological background present from south-eastern Tanzania, south throughout Moçambique, and in southern Malawi on the lower Shiré R. drainage.

The phenetic variation present in the species in the South African Sub-Region is an involved mosaic of light and dark populations not lending itself to ready grouping into a graded clinal sequence. Examination of the mosaic reveals dark, small-sized birds in the northern interior and along the eastern littoral, these breeding in association with flood-plains. In turn, these are replaced by redder populations breeding at higher elevations or under more temperate conditions over the eastern parts and south of the Sub-Region, and by paler representatives over the South West Arid District in association with increasing aridity. These findings indicate that soil colour and the texture of the substrate, are, acting in association with precipitation levels, the main determinants of colour variation in populations of the present species. They also suggest that while size and colour parameter trends are often to be seen as being closely concordant, their backgrounds are different, an increase in size deriving from residence at high altitudes, or the need to undertake extended post-breeding movements (migrations) in temperate climate breeders owing to the seasonal unsuitability of the nesting grounds. The present population complex comprises five acceptable geographical races.

In the recent S.A.O.S. Checklist (Clancey (Ed.), 1980) *A.c. katangae* was recognised, but a re-examination of this taxon indicates that it is inseparable from *A.c.lichenya* (see discussion below), the Okavango/Chobe flood-plain breeding population, placed as *katangae* in the Checklist, hereunder treated as part of *A.c.spurium*.

VARIATION IN SOUTH-CENTRAL AFRICA

Specimen coverage in museum collections for much of the interior of Angola, southern Zaïre, northern Zambia, western and southern Tanzania and Malawi is on the whole inadequate, with many specimens clearly migrants from further south in the continent.

Size varies simply and is here clearly correlated with altitude, the population with the shortest wing-length present on the coastal lowlands of northern Moçambique, the lower Shiré R. in Malawi, and south-eastern Tanzania as far north as the Rufiji R. delta. Small size, cold greyish olivaceous fringing to the dorsal feathers, the shaft-streaking black, and the heavily blackish streaked lower forethroat and upper breast distinguish this population *(A.c.spurium)*. Breeders at high elevations in the mountains of the interior of northern Moçambique (Namuli Mtn) and Malawi to south-western Tanzania, Zambia, north-eastern Angola and Shaba, Zaïre, are longer winged than the lowland birds just dealt with (wings in males 89-95,5, females 86-90 mm). In newly assumed dress they are relatively reddish, agreeing with those of the plateau of Zimbabwe and adjacent Manica, Moçambique, but in some of the mountain ranges to the north-west of L. Tanganyika (Itombwe Mtns) and to the east of the lake (Mt Mahari) darker and more vinous coloured birds are found, the ventral surface of these more heavily streaked with black. Indications are that they breed at still higher altitudes than the rufous birds mentioned earlier, but current evidence is somewhat inconclusive on this score.

The dark vinous and ventrally heavily streaked birds found in the mountains round the northern end of L.Tanganyika have been discussed on several occasions in the periodic literature and related on occasion to the enigmatic *A.latistriatus,* described in 1899 from Kavirondo, south-western Kenya. Prigogine (1981) has demonstrated that they represent a distinct local mountain race of *A.cinnamomeus,* while Clancey (1984) has shown that *latistriatus* is a separate species, still darker than the sympatric *A.c.itombwensis,* which it deceptively resembles, but with a much shorter hind-claw, indicating that it affects a more broken, less well-grassed substrate. *A.latistriatus* breeds in mountains of the Rift of south-eastern Zaïre, and is only a non-breeding visitor to its type-locality, where it has not been collected since the *Type* was shot late last century. Dark pipits showing in part the characters of the Wood Pipit *Anthus nyassae* Neumann present in steppe-like areas on mountains round the northern end of Lake Malawi are now

seen as elements of *A.latistriatus,* which will require to be treated as polytypic on the publication of the research results.

The situation in all Angola is not particularly clear at this stage, but apart from reddish birds found in north-eastern Angola which are part of *A.c.lichenya* (synonym *katangae*), the far western and south-eastern birds are of the South West Arid District race *A.c.bocagii,* with *A.c.spurium* replacing it along the drainage of the Okavango R. on the border between Cuando-Cubango and north-eastern South West Africa/Namibia (Kavango).

Apart from the good racial characters manifested by the vinous coloured *A.c.itombwensis,* the more rufous and less boldly streaked and widespread populations of the plateau show little variation within themselves, subspecifically comparable birds extending from regions of Uganda to the west of the Lake Victoria basin and particularly in Kigezi, and Rwanda and Burundi, south to Zambia, south-eastern Zaïre, north-eastern Angola, Malawi and the plateau of Zimbabwe all appear inseparable subspecifically and comprise but a single race. Two names have been proposed by competent workers on two demes of this subspecies: Chapin, in 1937, proposed *A.r.katangae* on material from L. Musoli in Shaba, Zaïre, while Vincent, in 1933, named *A.r.lichenya* on carbon soiled and worn skins from the uplands of Mt Mlanje, in southern Malawi. A satisfactory colour difference between these two named forms could not be found — they are alike in size — and I believe that *katangae* should be sunk into the synonymy of the earlier *lichenya.* All of these high level reddish populations *(A.c.lichenya* (including *A.c.katangae*) and *A.c.itombwensis)* show a marked reduction or loss of the white wedging to the penultimate rectrix (in about 77 % of cases).

It seems sufficient to recognise only three races of *A.cinnamomeus* in south-central Africa: the eastern lowland floodplain race *stygium,* a widespread reddish race over the plateau regions: *lichenya,* and a localised montane form in the Itombwe and probably other mountains round the northern end of L.Tanganyika: *itombwensis.*

VARIATION IN EAST AND NORTH-EASTERN AFRICA AND SOUTH-WESTERN ARABIA

Variation exhibited by the present region's populations is in accord with that recorded further south, but with the size variation less closely linked to altitude, as the smallest birds are to be found in the highland system of the south-western corner of the Arabian Peninsula (wings in males 85-88,5, female 87 mm) and over the Horn of Africa, south to coastal Kenya. Only the last, detached, population is actually coastal.

Birds of intermediate proportions occupy the interior plains to the east of the Rift, the largest the highlands of Ethiopia, south to about Mt Kenya in the cen-

tral Highlands of Kenya, and the mid-drainage of the White Nile in the Sudan (wings in males 90-99, females 87,5-91 mm). It is significant that size in these larger sized birds does not meet its upper register in association with occurrence at very high altitudes, as White Nile specimens have, in the female, a still longer tail than is present in Ethiopian examples (tail $\bar{x}$ 66,8, *versus* 59,8 mm). The finding in the region being dealt with that an increase in size is not capable of correlation with altitude was also found to be the case in the southern African populations.

In contrast to the findings on mensural criteria, colour variation in the present pipit is unquestionably precipitation and substrate orientated, with the palest (and smallest) birds occurring in association with semi-arid conditions from Eritrea, and South Yemen in the Arabian Peninsula to Somalia and coastal Kenya, these markedly whitish over the forethroat and mid-ventral surfaces. The elements of the mid-elevation plains of the interior of East Africa are in turn intermediate both in colour and size towards the darker and more reddish birds, breeding in the Highlands of Ethiopia and in the northern parts of the Central Highlands of Kenya. To their immediate west, however, a population of lighter yet more heavily streaked and spotted birds breeds in the mid-White Nile drainage, this population morphologically similar to the race of the Ethiopian highlands in size (except in the case of the tail of the female).

White assembled this highly disparate plexus of small-sized and pallid, intermediate and saturated reddish/pale, heavily striated and large-sized populations in one subspecies, thereby suppressing a particularly important facet of the species evolutionary background as reflected in its extensive subspeciation over much of the east of the continent. In the new arrangement of the species presented hereunder five subspecies are recognised, two of which are here resuscitated from synonymy and two are proposed as new races. The range of nominate *A.cinnamomeus* is restricted to the Ethiopian highlands and Kenya in the Mt Kenya area of the Central Highlands.

WEST AND CENTRAL SUB-SAHARAN AFRICA

The species is largely absent from West Africa as such, only appearing in eastern Nigeria and Cameroun. In the central sub-Saharan region it is recorded from Chad (Fort Lamy) and further to the east in the uplands of Darfur in the western Sudan. These populations are large sized, as in the case of the White Nile drainage and Ethiopian highland representatives (wings in males 92-100,5, females 89-95 mm), from which they differ in having the tail ranging a little longer. In colour they are both darker and colder, less ochraceous, than the Ethiopian and north-central Kenyan nominate race. Within the component populations variation affects in the main the ventral colouration, the more xeric of the two populations with the underside with the ground a deep clay colour, this form *(A.c.lynesi)* ranging from eastern Nigeria to parts of Cameroun, Chad, and Darfur in western Sudan. At

the time this distinctive population was described as a new subspecies by Bannerman and Bates (1926), it was believe that its occurrence in Darfur was occasioned by long distance migration from its breeding grounds in the Bamenda Highlands in Cameroun Occidentale, the type-locality, a view which has recently been refuted by Clancey (1984). The second more localised population *(A.c.camaroonensis)* is darker over the dorsal surface but not so rusty below, and is confined to the grasslands and cultivation on Mt Cameroun, extending to some nearby mountain ranges, such as the Manenguba and Bamenda Mtns. The presence of the two races, *lynesi* and *camaroonensis,* in the Bamenda Range is perhaps indicative that the reddish ventralled *lynesi* is only a non-breeding visitor from elsewhere to its type-locality.

The two races of *A.cinnamomeus* present in West Africa and in central sub-Saharan Africa seem at no stage to have been adversely criticised by workers.

SUMMARY OF THE GEOGRAPHICAL VARIATION

Small-sized and relatively pale or pallid birds occur in both arid and low-lying or coastal regions in both the eastern and south-western aspects of the range. Pallor is directly associated with low rainfall and the colour and texture of the substrate in the breeding area, and the desertic birds of the north-eastern Afrotropics and the south-west of the Arabian Peninsula are very similar in facies to the more restricted desertic birds affecting the saline pans of northern South West Africa/Namibia and Botswana. In addition to their small size, pale buffish or greyish upper-parts, extensively white undersides and reduced pectoral spotting distinguish such xeric elements. With size as in the two desertic groups, elements breeding in association with flood-plains on the tropical littoral south of the Rufiji R. in Tanzania and on the Okavango R. and in the Okavango Delta system are further characterised by a marked increase in melanin in their blackish streaking and cold colouration.

These small-sized coteries are separated by a range of larger-sized birds with the colouration redder or more ochraceous and the undersides buffier. These larger, richly pigmented phenotypes are closely correlated with breeding grounds in highlands and more temperate (or mesic) conditions and effectively sunder the two coteries of paler and smaller elements. Such populations range tenuously from the Ethiopian highlands through the interior of the eastern tropics to Malawi, Zimbabwe and the Republic of South Africa.

The isolated and fragmented populations present to the north-west of the main blocks of populations, ranging from eastern Nigeria and Cameroun, to Chad and Darfur, Sudan, reveal a measure of divergence from the main trends determined in the extended population continuum distributed from the southern Cape, north in the east to Ethiopia and Eritrea.

Thirteen populations are considered sufficiently well-marked as to qualify for recognition as subspecies.

THE SUBSPECIES OF *ANTHUS CINNAMOMEUS*

In the following accounts of individual subspecies the data on the number of skins examined is presented in two forms: "Material examined" in instances where total specimen coverage was limited, when the locality of each specimen is given, and, secondly, "Material measured" in cases where the material handled was extensive to very extensive. In "Material measured" only the localities of specimens actually handled for the statistical treatment are given.

As most of the subspecifically significant characters in the present pipit are greatly modified of lost in time through the interaction of environmental agencies and solar bleaching, the listing of the localities of a great many of the specimens examined during the course of the present research and referred to subspecies on geographical grounds would serve little purpose other than that of simple species distribution.

Anthus cinnamomeus camaroonensis Shelley

A. rufulus camaroonensis Shelley, Birds of Africa, vol. 2, 1900, p. 321: Mt Cameroun, Cameroun, at 3033 m a.s.l.

Compared with north-eastern races of *A. cinnamomeus,* dorsal surface darker and colder, somewhat greyer, much less tawny, the feather centres blackish olive-brown, rather than dark umber, the pale fringing Drab (Ridgway (1912), pl.xlvi). Dark areas of face blacker, and dark streaking to the sides of the throat and breast blacker and heavier; buff suffusion to the ground of the venter duller, less bright and pinkish. Wings and tail darker, less rufous. Tail pattern similar, but white areas on outer two pairs of rectrices tinged pinkish or buffy, less starkly white.

Measurements: Wings (flattened) of 5 males 92,5-96 (94,3), SD 1,30, tails 66-70 (67,4), SD 1,78, wings of 9 females 89-94 (91,4), SD 1,81, tails 62,5-66,5 (65,4), SD 1,93 mm (in 6).

Material examined: 14 (*Cameroun:* Mt Cameroun (including Mann's Spring); Sabga in Bamenda at 06°00'N, 10°17'E; Manenguba Mtns 05°05'N, 09°50'E).

Range: Grasslands on Mt Cameroun and on the Manenguba Mtns, Cameroun. Also taken at Sabga, Bamenda Division.

Remarks: The finding of a specimen of *camaroonensis* from the Bamenda Division - *lynesi* was named from east of Bamenda - suggests a measure of localised

seasonal movement on the part of some elements of the present taxon. White, in the continuation of Peters' Check-List (1960), gives the range simply as «Mt Cameroun».

Anthus cinnamomeus lynesi Bannerman and Bates

Anthus rufulus lynesi Bannerman and Bates, Ibis, Ser. 12,2, 1926, p. 802: east of Bamenda at 1525 m a.s.l., Cameroun.

Compared with the contiguous *A.c. camaroonensis* similarly dark but with the dorsum more brownish, less grey, the mantle and scapular feathers edged with Tawny-Olive (pl. xxix). Below, much brighter and more reddish ochraceous (about Clay Color (pl. xxix)), and with the spotting to the sides of the forethroat and breast both heavier (coarser) and deeper black. Size in male greater, the C.D. 1,29.

Measurements: Wings (flattened) of 6 males 95-100,5 (98,5), SD 1,95, tails in 5 65,5-72 (69,2), SD 2,64, wings of 3 females 90-95 (92,5), SD 2,50, tails 64-66,5 (65,2), SD 1,26 mm.

Material examined: 9 (*Nigeria:* Obudu Grass Plateau, Ogoja, at 06°25' N, 09°22'E; Guroji, Mambila Plateau; *Sudan:* Jebel Marra; Zalingei; Kulme; all in Darfur).

Range: Described from east of Bamenda and recorded from the Banso Highlands, Cameroun; also in eastern Nigeria (localities as previously given), and recorded from Fort Lamy, Chad (White), and from various localities in Darfur, western Sudan.

Remarks: Bannerman and Bates, in describing *lynesi,* believed that it was only a non-breeding migrant from far to the south-west to Darfur in the Sudan. examination of the original material, which was collected by Lynes, does not indicate that it is other than a local resident in the uplands of Darfur (see Clancey, 1984).

Anthus cinnamomeus stabilis, subsp. nov.

Holotype: Male, adult. Renk, White Nile, Sudan, at 11°47'N, 32°49'E. 26 June, 1920. Collected by W.H. Pollen. In the collection of the British Museum (Nat. Hist.), Tring, B.M.Reg.No.1921.11.29.58.

Description: Differs from the adjacent highlands *A.c.cinnamomeus* in having the pileum more heavily streaked with blackish brown, and the mantle and scapulars with broader and blacker shaft-streaking, the light fringing to the feathers more vinaceous, less strongly ochraceous (Isabella Color, pl.xxx). Below, rather darker, more vinaceous, less light, warm buffy, and with the lateral forethroat and breast streaking much heavier and blacker, almost dappled, this

extended down to the lower breast in neatly prepared examples. Size large and as in nominate *A.cinnamomeus,* but female with a longer tail (C.D. 1,58).

Measurements: Wings (flattened) of 4 males 91-94,5 (92,5), SD 1,77, tails 63-68 (66,0), SD 2,94, wings of 8 females 88,5-91 (90,0), SD 1,05, tails 63,5-70 (66,8), SD 2,61 mm.

Material examined: 12 (*Sudan:* «Nubia» (*ex* Verreaux coll.); Renk, upper White Nile; Goz-Abu-Gumar, White Nile; Baro R., upper Sobat R.; Kaig, Baro R.).

Range: The mid- and upper-drainage of the Bahr-el-Abiad (White Nile) in the Sudd and White Nile districts of the Sudan. Mainly known at this stage from Renk and the Baro R. on the Sudan/Ethiopia border.

Measurements of the holotype: Wing 90, culmen from base 19, tarsus 27,5, tail 65,5 mm.

Remarks: I cannot find that this well-marked population has ever been discussed in the literature. It is distinctive in that the female is as long tailed as the male.

The specimens in the collection at Tring made up by P.P.C. Zaphiro (1877-1933) are particularly «bunched», thereby tending to obscure the discreteness of the form.

The name given to this new taxon is from the Latin *stabilis,* steady.

Anthus cinnamomeus cinnamomeus Rüppell

Anthus cinnamomeus Rüppell, Neue Wirbelth. Vög., 1840, p. 103: Simen, Ethiopia.

In freshly assumed dress with the dorsum dark olive-brown, the feathers broadly edged with Buckthorn Brown (pl.xv). Below, with breast Warm Buff (pl.xv), moderately marked with elongate brownish black spots. Size large.

Measurements: Wings (flattened) of 10 males 90-99 (93,2), SD 2,98, tails 61-67 (64,1), SD 2,28, wings of 10 females 87,5-91 (89,3), SD 1,08, tails 57,5-63 (59,8), SD 1,81 mm.

Material measured: 20 (*Ethiopia:* Burye, S. of L. Tana; Dangila, S. of L. Tana; L. Tana; L. Zwai; Antoto, Shoa; Addis Ababa; Balti; Kambata, S. Ethiopia; Burgi, S. Ethiopia; Kullo, S. Ethiopia; Alghe, Siddamo; Jefadensa; Maji, S.W. Ethiopia).

Range: The high plateaux and mountains of Ethiopia, extending disruptedly south of this to Mt Kenya in the north-central highlands of Kenya.

Remarks: This north-eastern subspecies bears a striking likeness in fresh dress to the southern *A.c.rufuloides,* differing only in being slightly more saturated over the upper-parts, wings and tail, and in averaging rather longer in the wing.

Anthus cinnamomeus annae Meinertzhagen

Anthus r.(ichardi) annae Meinertzhagen, Ibis, Ser. 11, 1, 1921, p. 656: Megago (Magago), northern Somalia.

Compared with nominate *A.cinnamomeus* of the highlands of Ethiopia appreciably lighter, the dorsal feathers with centres browner, and the edges of the feathers Wood Brown or greyer (pl.xi). Ventrally, whiter over the entire throat, mid-breast and belly, and ground to breast lighter, more pinkish, the dark spotting browner and more diffuse. Smaller in all its critical dimensions.

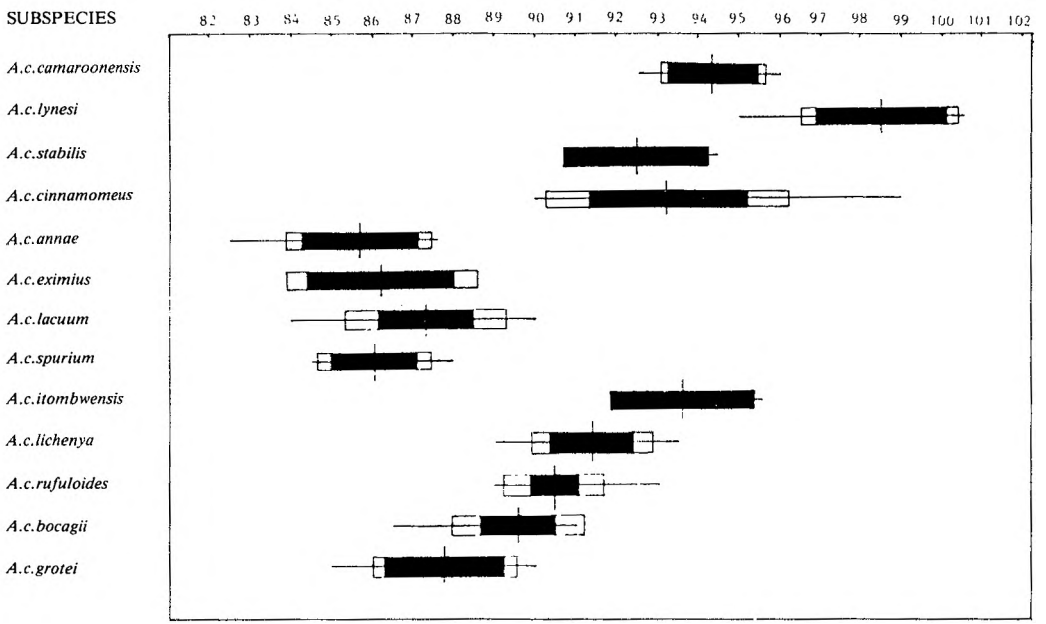

Fig. 2. Wing-length parameter in adult males in *Anthus cinnamomeus* subspecies.

Statistical analysis of the wing-length parameter in adult males of the thirteen races of *Anthus cinnamomeus* Rüppell of the Afrotropics. Horizontal bars represent the established size range, open rectangles on either side of the mean the standard deviation and blocked in rectangles twice the standard error.

Measurements: Wings (flattened) of 6 males 82,5-87,5 (85,7), SD 1,78, tails 57-58 (57,4), SD 0,37, wings of 8 females 81-88 (83,7), SD 2,53, tails 54-59 (55,4), SD 1,95 mm.

Material examined: 20 (*Eritrea:* Asmara; *South Yemen:* Dhala, hinterland inland of Aden; Habil; *Somalia:* Waghar Mtn; Woob; Jifa; Megago (Magago); 10 km N. of Mogadishu; *coastal Kenya:* Malindi; Lamu; Manda Island; Kilifi; Takaungu).

Range: Red Sea coastlands of Ethiopia (Eritrea) from Asmara, probably to the Danakil region, arid coastal lowlands of South Yemen (former Aden Protectorate), Somalia in the north and south-west, and south-eastern Kenya, west to about 39°50'E. Also north-eastern Tanzania. Generally rather sparse, especially in the more arid parts.

Remarks: A well-marked xeric race with an extensive but highly disjunct range.

It is difficult to appreciate the reason for the action by some other workers in sinking this arid country form into the synonymy of nominate *A.cinnamomeus*. The C.D. of 1,57 indicates a joint non-overlap of wing-length in males in the nature of 94 per cent.

Anthus cinnamomeus eximius, subsp. nov.

Holotype: Male, adult. San'a, North Yemen. 6 September, 1913. Collected by G.W. Bury. In the collection of the British Museum (Nat. Hist.), Tring, B.M.Reg.No.1914.1.28.58.

Description: Compared with the vicinal *A.c.annae* of the arid lowlands of South Yemen differs in having the buffy ground of the breast both darker and more extended caudad, the dark speckling likewise extended down to the lower breast; individual breast spots both larger and more inclined to form streaks than is the case in the lightly spotted *annae*. Similar in size.

Measurements: Wings (flattened) of 7 males 82-88,5 (86,2), SD 2,37, tails 56-63 (59,8), SD 2,26, wing of 1 female 87, tail 60,5 mm.

Material examined: 8 (*North Yemen:* San'a, Sôk-al-Khamis; *Saudi Arabia:* Suda, near Abha, in Asir; Mahsan, near Abha; Najran).

Range: Montane plateaux of the south-western highlands of the Arabian Peninsula from Asir-Tihama, Saudi Arabia, south to North Yemen. Precise southern limits uncertain.

Measurements of the holotype: Wing 88,5, culmen from base 18, tarsus 28, tail 60 mm.

Remarks: R. Meinertzhagen, in his Birds of Arabia, 1954, p. 142, placed all the south-western Arabian Peninsula populations in *A.c.lacuum,* treating *A.c.annae* as a synonym. Only two such examples of *annae* are in the collection of the Sub-Department of Ornithology of the British Museum (Nat. Hist.), Tring, one an adult female from Dhala in the hinterland to the north of Aden and the other a juvenile from Habil.

The name selected for this new taxon is from the Latin *eximius,* chosen and distinguished.

Anthus cinnamomeus lacuum Meinertzhagen

Anthus richardi lacuum Meinertzhagen, Bull. Brit. Orn. Club, vol. 41, 1920, p. 22: Lake Naivasha, Kenya.

Compared with the xeric *A.c.annae,* rather more buffy olivaceous, less vinaceous or greyish, over the dorsal surfaces. Differs taxonomically below in having the ground to the breast buffier, and with the throat and medio-ventral plane less starkly and extensively white. Similar in size.

Differs from *A.c.cinnamomeus* in being less saturated reddish over the upperparts, wings and tail. Below, paler, less strongly buffish, with the breast spotting less black and sparser. Size smaller.

Measurements: Wings (flattened) of 11 males 84-90 (87,3), SD 1,96, tails 57-62 (58,5), SD 1,46, wings of 11 females 82,5-87 (84,5), SD 1,49, tails 53,5-58 (56,4), SD 1,44 mm.

Material measured: 22 (*Kenya:* Kakamega; N.E. Kenya; Guasso Nyiro; L. Naivasha; Kikuyu; Nairobi; Nanyuki; Kisumu; Kapiti Plains; Athi Plains; *Uganda:* Likipia).

Range: Mid-level plains of the interior of Kenya, west to the Lake Victoria basin of Uganda, and south to the interior of northern as well as central Tanzania.

Remarks: Britton (Ed.) (1980) treats this and all other populations of *A.cinnamomeus* of East Africa as belonging to the nominate race, presumably following the earlier recommendation of White (1957 and 1960). Even in fresh dress, *lacuum* is statistically much smaller than the Ethiopian highlands *A.c.cinnamomeus.*

Anthus cinnamomeus spurium Clancey

Anthus richardi spurium Clancey, Ann. Natal Mus., vol. 12, 1, 1951, p. 144 Mzimbiti = Dondo, Sofala, southern Moçambique.

Differs from the plains race of the interior of East Africa *(A.c.lacuum)* in being colder and greyer above, the feathers with the centres deep blackish brown, and lacking the buffiness present in *lacuum*. Ventrally, with the spotting to the lower forethroat and breast blacker, the individual spots larger. Size similar to *A.c.annae*. Wings and tail darker.

Measurements: Wings of 7 males 84,5-88 (86,0), SD 1,39, tails 57-59,5 (57,7), SD 1,07, wings of 10 females 81-85 (82,7), SD 1,31, tails 55-59 (55,9), SD 1,32 mm. Northern Moçambique specimens in British Museum (Nat. Hist.), Tring.

Material examined: 75 *(Southern Moçambique:* Dondo; Panda, lower Limpopo flood-plain; Incoluane; Palmeira, Manhiça; lower Komati flood-plain; *Northern Moçambique:* Mossuril; Namapa; Gurue; Lurio R. mouth; Ile, Quelimane; *southern Malawi:* lower Shiré R.; *South West Africa/Namibia:* mid-Okavango R.).

Range: Coastal lowlands of Moçambique, southern Malawi in the Shiré R. valley, and south-eastern lowland Tanzania north to the Rufiji R. delta. Also in the south-central interior in the lower drainage of the Okavango R. in north-eastern South West Africa/Namibia, the Caprivi Strip, the Okavango R. delta system of Botswana and adjacent Zambesi R. valley. The eastern limits in this latter sector are currently unclear.

Remarks: The somewhat remarkable distribution of this subspecies with its close association with flood-plains is in some ways unique, though a parallel can be detected in the joint distributions and characters of the two Redcapped Lark *Calandrella cinerea* (Gmelin) races *C.c.saturatior* and *C.c.alluvia*. Both the pipit subspecies *(spurium)* and the two lark races are alluvium-based breeders.

Wing-measurements of additional populations of *spurium* are as follows:
Southern Moçambique: 14 males 83,5-90 (87,1), SD 2,22, 10 females 80-83 (81,7), SD 1,13.
Southern Malawi: 5 males 85-90 (87,7), SD 1,92.
Okavango R.: 4 males 86,5-90 (88,3), SD 1,49, 4 females 79-84 (81,2), SD 2,21 mm.

Anthus cinnamomeus itombwensis Prigogine

Anthus cinnamomeus itombwensis Prigogine, Le Gerfaut, vol. 71, 4, « 1981 » (= 1982), p. 565: Kilumba, Itombwe Mtns, south-eastern Zaïre.

Differs from *A.c.cinnamomeus* in being darker over the upperparts, the feather-centres from the head-top to the lower back blacker brown, the light edges more vinaceous. Below, with ground duller, more vinaceous, less reddish buff, the lateral throat and breast streaking heavier and blacker, the streaking over the sides inclined to be more extended caudad. Size similar.

Measurements: Wings (flattened) in 3 males 92-95,5 (93,6), SD 1,75, tails 62,5-65 (64,1), SD 1,44, wings of 3 females 87-88,5 (88,0), SD 0,86, tails 57,5-59 (58,3), SD 0,76. Hind-claw in 6 males and females 11-14 (11,9), SD 1,11 mm.

Material measured: 6 (*S.E. Zaïre:* Itombwe Mtns). The entire series of this race in the collection of the Musée royal de l'Afrique centrale, Tervuren, was cursorily examined in November, 1983.

Range: Presently known from the Itombwe Mtns lying to the north-west of Lake Tanganiyka in south-eastern Zaïre. Probably extends to other ranges round the same lake, as very dark birds according with the recently proposed *itombwensis* are recorded from Mahari Mtn at 2000-2400 m a.s.l. on the eastern side of the lake in Tanzania. No skins of the Mt Mahari population appear to exist, so the possibility remains that it may be referable wholly or in part to the closely allied species of pipit *Anthus latistriatus* Jackson, in which the upper-parts are still darker and the hind-claw is only 7-9 mm long.

Remarks: In general facies *A.c.itombwensis* and *A.latistriatus* are remarkably and deceptively alike, the latter rather darker and more saturated over the dorsum than the *A.cinnamomeus* race, and, as just stated, the hind-claw is very short, suggesting that these two pipits inhabit differing terrain at high elevations in the mountain ranges round Lake Tanganyika, *latistriatus* probably occurring at higher levels and on coarser ground than in the case of *itombwensis*.

Britton (Ed.) (1980) refers to *latistriatus* as being a melanistic variety of Richard's Pipit. This is now known to be incorrect. The type in the collection of the British Museum (Nat. Hist.), Tring, is not a melanistic aberration, but represents a distinct species *Anthus latistriatus,* Jackson's Pipit.

Prigogine (1981) provides additional measurements of *itombwensis* as follows:

wings of 31 males 90-98 (93,4), SD 2,02
tails of 31 males 63-69,5 (65,9), SD 1,82
wings of 30 females 86-91 (88,1), SD 1,43
tails of 30 females 58-66 (61,7), SD 2,09 mm.

Anthus cinnamomeus lichenya Vincent

Anthus richardi lichenya Vincent, Bull. Brit. Orn. Club, vol. 59, 1933, p. 131: Mlanje Mtn, southern Malawi at 1980 m. a.s.l.

Anthus richardi katangae Chapin, Rev. Zool. Bot. Afr., vol. 39, 1937, p. 339: L. Musole, Shaba, south-eastern Zaïre.

Compared with nominate *A.cinnamomeus* darker and more saturated reddish above, the shaft-streaking broader and more blackish, resulting in a more heavi-

ly streaked effect; hind neck less pallid, and rump darker. Closely similar below, but on the whole more rufous buff over the entire ground of the breast. In over 75 per cent. of cases the white of the penultimate rectrix is vestigial or entirely absent. Size ranging smaller.

From *A.c.rufuloides,* which replaces it immediately to the southward, differs in being redder and more saturated over the upper-parts (fringes of the mantle feathers deep Buckthorn Brown (pl.xv), *versus* Tawny-Olive (pl.xxix)). Ventrally, with the ground of the breast redder buff (Ochraceous-Buff (pl.xv), against Warm Buff (same pl.) in *rufuloides*. Light and dark pattern on penultimate rectrix similarly simplified as determined in comparison with nominate subspecies.

Measurements; Wings (flattened) of 10 males 89-93,5 (91,4), SD 1,58, tails 58,5-62 (59,9), SD 1,01; wings of 10 females 83-90 (86,8), SD 2,44, tails 55,5-62 (58,5) SD 3,03 mm.

Material examined: 50 (*Uganda:* Entebbe; L. Mutanda; Kumba, Rukiga; Mfumbiro, Kigezi; *western Tanzania:* W. shore of L. Tanganyika; *Zambia:* Lundazi; *Malawi:* Mlanje Mtn; *northern Moçambique:* Namuli Mtn; *Zimbabwe:* Tjolotjo, Gwaai; Harare; Mt Selinda, Chipinga).

Range Western Uganda, the lowlands of Rwanda and Burundi, western Tanzania, Shaba, Zaïre, north-eastern Angola, northern and eastern Zambia, Malawi, western northern Moçambique (on certain highlands), and south of the Zambesi over the plateau of Zimbabwe from Matabeleland to Mashonaland and the Eastern Highlands; also extending to Manica, southern Moçambique, on the Zimbabwean frontier. Some specimens from highland areas of the northern Transvaal exhibit a trend towards *lichenya* in their darker and redder dorsal colouration.

The populations of this extended race show little marked evidence of the existence of post-breeding movement.

Remarks: The status of *A.r.katangae* is still largely unresolved, as the taxon was based in the first instance on non-breeders taken at L. Musole, in Shaba, and is almost certainly composite in nature. Such evidence as it has been possible to gather is that it is part of the wide-ranging *A.c.lichenya,* of which it is here treated as a junior synonym. As Chapin considered Jackson's Pipit *A. latistriatus* (but which = *A.c.itombwensis* Prigogine) to be a separate species, *katangae* is clearly not an earlier name for *itombwensis,* described from the uplands of the Itombwe Mtns lying to the north-west of L. Tanganyika immediately to the north of the type-locality of *A.r.katangae.*

Commenting on *katangae,* Prigogine (1981) informs us that the taxon is known from seven specimens dated February and June-August, and comments that the possibility exists that it is not a resident in localities where specimens attributed to it have been collected.

Prigogine (1981) provides additional wing- and tail-length data of *lichenya* taken from specimens collected in Zimbabwe:

wings of 29 males 86-93 (89,4), tails 57-66 (62,3)
wings of 17 females 80-86 (83,8), tails 53-62,5 (58,8) mm.

Anthus cinnamomeus rufuloides Roberts

Anthus raaltenii auct., nec Layard, 1867.

Anthus richardi rufuloides Roberts, Ostrich, vol. 7, 2, 1936, p. 111: Grahamstown, eastern Cape.

Anthus richardi transkeiensis Vincent, Bull. Brit. Orn. Club, vol. 64, 1948, p. 17: Qumbu, Transkei.

Differs from *A.c.lichenya* in being duller, less strongly rufous, over the upperparts, wings and tail, the edging to the dorsal feathers about Tawny-Olive. Below, with the ground to the entire breast paler, less rufous buff (Warm Buff (pl.xv)). Penultimate rectrix with extensive and sharply defined white «wedging» to inner vane. Similar in size.

Measurements: Wings (flattened) of 16 males 89-93 (90,5), SD 1,21, tails 61-67,5 (63,4), SD 1,88, wings of 15 females 83-87,5 (85,0), SD 1,56, tails 57,5-62 (59,0), SD 1,49 mm.

Material measured: 31 (*Cape:* Port Elizabeth; Swartkops estuary; Cathcart; Tarkastad; Aliwal North; Kimberley; Riverton; Kuruman; *Natal:* Kokstad; Matatiele; Pietermaritzburg; Ladysmith; *Orange Free State:* Glen; *Transvaal:* Rustenburg; Kendal; Wakkerstroom; *Swaziland:* Siteki.

Range: Cape south of the Orange R. in the south and east and north of the Orange in Griqualand West, Transkei, Natal and Zululand, Swaziland, Lesotho in the northern and north-western lowlands, the Orange Free State and the Transvaal. Migratory, wintering north of the range given to northern Botswana, western and southern Zimbabwe, Moçambique, southern Zambia, and, perhaps, Malawi (May-September).

Remarks: Vincent introduced the name *A.r.transkeiensis* on the mistaken belief that Roberts, in proposing *A.r. rufuloides,* simply renamed the untenable *A.raaltenii* of Layard. As pointed out by White in the *Ibis,* 1951, p. 464, the introduction of the name *transkeiensis* was unnecessary as Roberts, in designating a *Type* of *rufuloides* from Grahamstown, in the eastern Cape, in effect described the Cape population subspecifically.

Additional wing-length measurements of *rufuloides* from Clancey (1954) are as follows:

34 males 89-95 (91,9), SD 1,57
20 females 84,5-88 (86,2), SD 0,89 mm.

Anthus cinnamomeus bocagii Nicholson

Anthus pallescens Bocage, Jorn.Acad.Sci.Lisboa, 17, 1874, p. 52: Humbe, Huila, southern Angola, not *Anthus pallescens* Vigors and Horsfield.

Anthus bocagii Nicholson, Ibis, 1884, p. 469, *nom.nov.pro Anthus pallescens* Bocage, *nec Anthus pallescens* Vigors and Horsfield.

Compared with *A.c.rufuloides,* which it replaces in the dry interior and west of the South African Sub-Region, paler and duller in series over the upper-parts, wings and tail, the pale edging to the dorsal feathering about Buffy Olive (pl.xxix); rump lighter and greyer. Buff ground to entire breast still paler and spotting somewhat lighter and sparser. Size similar.

Measurements: Wings (flattened) of 14 males 86,5-91 (89,6), SD 1,58, tails 56-66 (62,3), SD 2,97, wings of 14 females 80-87 (83,1), SD 2,39, tails 53-62,5 (58,1), SD 2,30 mm.

Specimens measured: 28 (*Angola:* Baia Farta; Guma (Cuangar); Calai (Cuangar); *South West Africa/Namibia:* Etosha National Park; Okahandja; Windhoek; *Botswana:* Lethlakeng; Morabane; *Cape:* Kuruman; Kimberley; Riverton; Teebus; Tarkastad).

Range: Western and south-western Angola, South-West Africa/Namibia to the west and south of the Etosha National Park, the Kalahari of Botswana, the northern Cape and some distance to the south of the middle Orange R. to reach the eastern aspects of the Karoo. Birds breeding in the more xeric aspects of the western Orange Free State and the south-western Transvaal are also probably attributable to *bocagii.* There is a pronounced eastward movement of some populations of this race after the completion of the annual moult in May, when reaching the eastern Transvaal and the lowlands of southern Moçambique.

Remarks: This is not a particularly satisfactory subspecies, being only moderately well-differentiated from *A.c.rufuloides.* In worn breeding dress the subspecies are not readily distinguisable. The *A.c.bocagii* of much of the literature on the races of *A.cinnamomeus* is actually the subspecies *A.c.grotei,* which was only described in 1957.

Anthus cinnamomeus grotei Niethammer

Anthus richardi grotei Niethammer, Journ.f.Ornith., vol. 98, 1957, p. 449: Onguma, east of Etosha Pan, northern South West Africa/Namibia.

Still paler than *A.c.bocagii,* the upper-parts light greyish Drab (pl.xlvi) with the fringing to the hind neck and mantle feathering still whiter. Below, whiter over the forethroat and much more extensively white over the entire mid-venter, and ground to breast paler buff. Breast spotting paler and still more diffuse. In wings, edging to coverts and tertials whiter. Size rather smaller.

Compared with *A.c.spurium* lighter and browner, less deep black, over the upper-parts, the feather fringes much paler, more whitish, this especially marked over the hind neck. Below, with the ground to the breast paler and more pinkish buff, and the entire forethroat and mid-venter clearer and more extensively white; spotting paler and more diffuse. Wings paler, the edging to the remiges whiter. Tail also with whiter edging to the rectrices. Size similar to *A.c.spurium.*

Measurements: Wings of 6 males 85-90 (87,8), SD 1,76, tails 56-62 (58,4), SD 2,93, wings of 6 females 79-86,5 (81,9), SD 2,87, tails of 5 54,5-59 (56,2), SD 1,82 mm.

Material examined: 18 (*South West Africa/Namibia:* Okaukuejo; Namutoni; Onguma; Etosha National Park; *Zimbabwe:* Tjolotjo).

Range: Breeds in association with arid saline pans in northern South West Africa/Namibia in the Etosha National Park, and in north-eastern Botswana in the Makgadikgadi Salt Pan complex, south in the east to Lake Dow. In the non-breeding season ranges to far western Matabeleland, Zimbabwe, and south-western Zambia (Livingstone). A very worn bird from Lidfontein, Great Namaqualand, South West Africa/Namibia, appears to be an example of *grotei.*

Remarks: This arid country subspecies breeds on the glaring substrate of the two major desertic saline pan complexes in the South West Arid District. In its small dimensions it reveals close evolutionary affinity with the contiguous flood-plain breeding *A.c.spurium,* which replaces it immediately to the north of its broken breeding range.

The close relationship of the races *grotei* and *spurium* is underscored by the fact that the Etosha Pan is a long defunct drainage « fan » formerly fed by waters from the highlands of Angola. The Makgadikgadi Salt Pan is still periodically flooded following high rainfall in the Bié Higlands of Angola.

SUMMARY

Anthus cinnamomeus Rüppell is a highly polytypic regional species of pipit of the Afrotropics which is closely allied to *A.richardi* of the Palaearctic, *A.rufulus* of the Oriental Region, and *A.novaeseelandiae* of Australasia. It probably lies closest to *A.rufulus.* While several proposals for the adequate handling of the geographical variation have been publish-

ed since Meinertzhagen's pioneer study in 1921, none has found general acceptance. Resulting from recent work on allied Afrotropical pipit species, culminating in the elucidation of the status of the forms *A.hoeschi* and *A.latistriatus,* it has been possible to revise the taxonomic treatment of the geographical variation in *A.cinnamomeus* itself. Much of this work was carried out in South Africa between 1950 and 1983, in which latter year the study was finalized on the basis of a detailed examination of the freshly moulted skins of *cinnamomeus* in the collection of the Sub-Department of Ornithology, British Museum (Nat. Hist.), Tring, and in other centres, notably in Belgium.

Subspecifically relevant variation affects wing- and tail-lengths, levels of saturation, especially over the upper-parts and wings, the buffishness of the breast, and the extent of the dorsal and pectoral streaking. To cater for the extensive variation, which is noticeably correlated with environmental factors on the breeding grounds and rather less so with altitude, I recognise some thirteen subspecies. Twelve of these occur in Africa to the south of the Sahara, the thirteenth in the highlands of the south-western Arabian Peninsula. Two of the subspecies are introduced as new in the present paper.

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SAMENVATTING

Anthus cinnamomeus Rüppell is een sterk polytypische Afrotropische piepersoort. Zij is nauw verwant met de palearctische *A.richardi,* met de orientale *A.rufus* en met de Australaziatische *A.novaeseelandiae.* Waarschijnlijk staat *A.cinnamomeus* het dichtst bij *A.rufulus.* Sedert de grondige studie van Meinertzhagen in 1921 worden verschillende hypothesen voorop gezet om de geografische verschillen van de soort uit te leggen, maar geen enkele ervan werd algemeen aangenomen. Ten gevolge van recent werk over Afrotropische aanverwante piepers waarbij de status van *A.hoeschi* en *A.latistriatus* werd opgehelderd, werd het mogelijk de geografische variaties van *A.cinnamomeus* opnieuw te bekijken. Het grootste gedeelte van dit onderzoek werd in Zuid-Afrika verricht tussen 1950 en 1983. Tijdens het laatste jaar werd de studie besloten met een gedetailleerd onderzoek van specimens van *cinnamomeus* in vers verenkleed (na het beëindigen van de rui) in de verzamelingen van het British Museum te Tring en van andere instellingen, o.a. in België.

Subspecifieke verschillen zijn te vinden op het niveau van de vleugellengte, de staartlengte, de al of niet intense kleuring vooral van bovenzijde en vleugels, de intensiteit van de beige kleur van de borst en van de uitgebreidheid van de strepen op rug en flanken. Om rekening te houden met deze grote verschillen die duidelijk gecorreleerd zijn met omgevingsfactoren (in het bijzonder met de bodem van de broedgebieden en minder met de hoogte), worden 13 ondersoorten erkend: 12 in Afrika ten zuiden van de Sahara en een dertiende op de hoogplatteaus van het zuidwesten van het Arabisch schiereiland. Twee van deze ondersoorten worden in deze bijdrage als nieuw beschreven.

RESUME

Anthus cinnamomeus Rüppell est une espèce hautement polytypique d'un pipit afrotropical. Elle est étroitement apparentée à *A.richardi* paléarctique, à *A.rufulus* de la région orientale et à *A.novaeseelandiae* de l'Australasie. *A.cinnamomeus* est situé probablement le plus proche de *A.rufulus.* Depuis l'étude fondamentale de Meinertzhagen, en 1921, plusieurs propositions ont été faites pour le traitement adéquat de ses variations géographiques, mais aucune n'a été acceptée en général. Suite à une travail récent concernant des

pipits de la région afrotropicale, appartenant à des espèces alliées, qui s'est terminé par l'élucidation du statut des formes *A.hoeschi* et *A.latistriatus*, il a été possible de revoir le traitement des variations géographiques de *A.cinnamomeus*. La plus grande partie de ce travail a été effectuée en Afrique du Sud, entre 1950 et 1983. Au cours de cette dernière année, l'étude a été terminée par un examen détaillé des spécimens en plumage frais, après mue, de *cinnamomeus* dans les collections du British Museum (Nat. Hist.) et dans celles d'autres institutions, notamment en Belgique.

Des variations sous-spécifiques affectent la longueur de l'aile et de la queue, l'état de saturation, spécialement du dessus et des ailes, de l'intensité de la couleur beige de la poitrine, et l'étendue des stries du dos et des pectoraux. Pour tenir compte de ces variations extensives, qui sont nettement en corrélation avec les facteurs de l'environnement, en particulier avec le sol des terrains de reproduction, et moins avec l'altitude, je reconnais treize sous-espèces; douze habitent l'Afrique au sud du Sahara; la treizième se rencontre sur les hauts-plateaux du sud-ouest de la péninsule d'Arabie. Deux des sous-espèces sont introduites comme nouvelles dans cet article.

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