

Variation in and the Relationships of the Brownheaded Parrot of the Eastern African Lowlands

By

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Dedicated to Professor Dr. Martin Eisentraut on the event of his 75th birthday.

The Brownheaded Parrot *Poicephalus cryptoxanthus* (Peters) of the humid eastern lowlands of Africa, from the coast of Kenya, south to eastern Zululand, was first demonstrated as showing subspecifically significant variation by Wedgwood Bowen (1930). From a study of twenty-seven specimens, this American worker admitted three subspecies: *P. c. zanzibaricus* Bowen, 1932 (*nom. nov.*, for *P. fuscicapillus* [Verreaux and Des Murs, 1849], pre-occupied by *Pionus fuscicapillus* Wagler, 1832), was recognised as an insular form of large size confined to Zanzibar, with two smaller-sized races replacing it on the mainland: *P. c. tanganyikae* Bowen, 1930: Kilosa district, Tanzania, in coastal East Africa, south to northern Mozambique and Malawi, and *P. c. cryptoxanthus* (Peters, 1854): Inhambane, southern Mozambique, occurring to the southward. Peters (1937) adopted Bowen's findings, but took the matter further by placing the Niam-Niam Parrot *P. crassus* (Sharpe), 1884: Ndoruma, Upper Uelle district, Zaïre, as a subspecies of *cryptoxanthus*, an action which has much to commend it but has seldom been followed by later workers, such as Chapin (1939), Wolters (1975), *inter al.* Grant and Mackworth-Praed (1938) briefly considered Bowen's proposals, sinking *P. c. tanganyikae* into the synonymy of *P. c. cryptoxanthus*, but at the same time failed to consider the nomenclatural adjustments called for by the change in the species' name and the validity or otherwise of the then recently proposed *P. c. zanzibaricus*. While the need to change the name of the species from *fuscicapillus* to *cryptoxanthus* was pointed out as far back as 1924 by Hartert, adoption of the latter name did not become universal until the late 1930's. Forshaw (1973), on the other hand, again followed Bowen's arrangement, but was doubtful of the discreteness of *zanzibaricus* and treated *crassus* as a separate monotypic species.

General comments on the smaller *Poicephalus* spp. complex

In southern Africa, the three small wooded savanna parrots *P. rueppellii* (Gray, 1849), *P. meyeri* (Cretzschmar, 1827), and *P. cryptoxanthus* form a

west-east parapatric sequence of closely allied species. Further north, in equatorial Africa, much the same pattern is presented by the sequence *P. crassus*, *P. meyeri*, *P. rufiventris* and *P. cryptoxanthus*. Grote (1926) considered *P. rufiventris* (Rüppell, 1845) of the North East Arid District of Ethiopian Africa, and *P. meyeri* to be closely allied, and in conjunction with *P. senegalus*, components of his *senegalus* "Formenkreis". While it is true enough that the smaller *Poicephalus* parrots are parapatrically distributed over the wooded savannas of Africa, and even where they appear to overlap they are to a large measure ecologically isolated, it is still far from clear how far they can be grouped into one or more superspecies or treated as conspecific.

Resulting from recent work on these parrots, *P. cryptoxanthus*, *P. meyeri*, *P. crassus*, and, perhaps, *P. rueppellii*, can be considered allospecies of a single superspecies. Lying to the north-west of this *meyeri* superspecies is the polytypic *P. senegalus* (Linnaeus), and to the north-east lies *P. rufiventris*. As one or two of the juvenile examples of *P. cryptoxanthus* before me clearly adumbrate over their under-parts the ventral colour zonation characteristic of both *P. senegalus* and *P. rufiventris*, particularly the former, and the geographical distribution pattern lends further support to such a conclusion, the entire assemblage of smaller *Poicephalus* (*senegalus*, *meyeri*, *crassus*, *rufiventris*, *cryptoxanthus* and *rueppellii*) probably form one gigantic superspecies complex. Where *P. flavifrons* (Rüppell, 1945: Ethiopia) lies in relation to this possible superspecies complex, if not a direct member of it, is still far from clear and need not concern us at this stage. The scope of the present paper is to ascertain the nature of the variation in the Brownheaded Parrot, determine its relationship with the vicinal *P. meyeri*, and consider the status of the rare *P. crassus* in the light of Peters' action in making it a race of *P. cryptoxanthus*.

Variation in *P. cryptoxanthus*

Recent study in the Durban Museum of a series of well over a hundred specimens of this small parrot suggests that the findings of Bowen are fundamentally correct, but that the characters and ranges of his three subspecies are in need of radical adjustment. It has also revealed that *P. cryptoxanthus* and *P. meyeri* hybridize freely if locally, and are, despite their marked dissimilarity, more closely allied than formerly believed. This large panel of material also reveals that in some facets of the individual and racial variation of *P. cryptoxanthus*, the characters diagnostic of *P. crassus*, such as putatively larger size, extension of brown on to the upper breast, and green rather than yellow under wing-coverts and thighs, are adumbrated.

The Brownheaded Parrot is subject to marked individual variation over the head, neck and upper back, which vary from dull greyish brown to warm buffy brown and even isabelline in some, much of which appears to be related to the age of the individual. There is also a noticeable spectrum of variation in the depth and yellowness of the greens, though a measure of this is clearly the outcome of insolation and abrasion. Partial xanthochroism is also present in *P. cryptoxanthus* in the wild state. A male taken on the Olifants R., near the Kruger National Park, Transvaal, on 30 July, 1934 (T.M. 19,771) is heavily spangled with yellow feathers over the hind neck, dorsum, venter and wings. A second male collected at Davata Spring, Rhodesia, at 21° 15' S., 31° 13' E. on 21 October, 1966 (N.M. 60,540), has the entire head about equally divided between dull yellow and brown. There is also individual variation in the extent of yellow on the under-wing, some birds invaded with olive-green and not wholly chrome yellow over the coverts.

In his pioneer study, Bowen demonstrated a major size difference between two old specimens from Zanzibar, these the co-types of *Pionus fuscicapillus* of Jules Verreaux and Des Murs (*vide* Rev. et Mag. Zool., (2), i, 1849, p. 58), and a series of twenty-five other specimens from eastern and southern continental Africa. While it is an indisputable fact that the two *fuscicapillus* co-types as measured by Bowen are indeed larger than mainland examples of the Brownheaded Parrot, recent Zanzibar material is not longer in the wing. Dealing with birds from the eastern coastal lowlands of Africa, Bowen noted a small difference in size between the northern and southern populations, and significant differences in colouration. Most recent workers have had difficulty in comprehending the described variation, and the three races admitted by Bowen (*zanzibarius*, *tanganyikae* and nominate *cryptoxanthus*) are currently not infrequently disregarded by workers, the species being treated binomially.

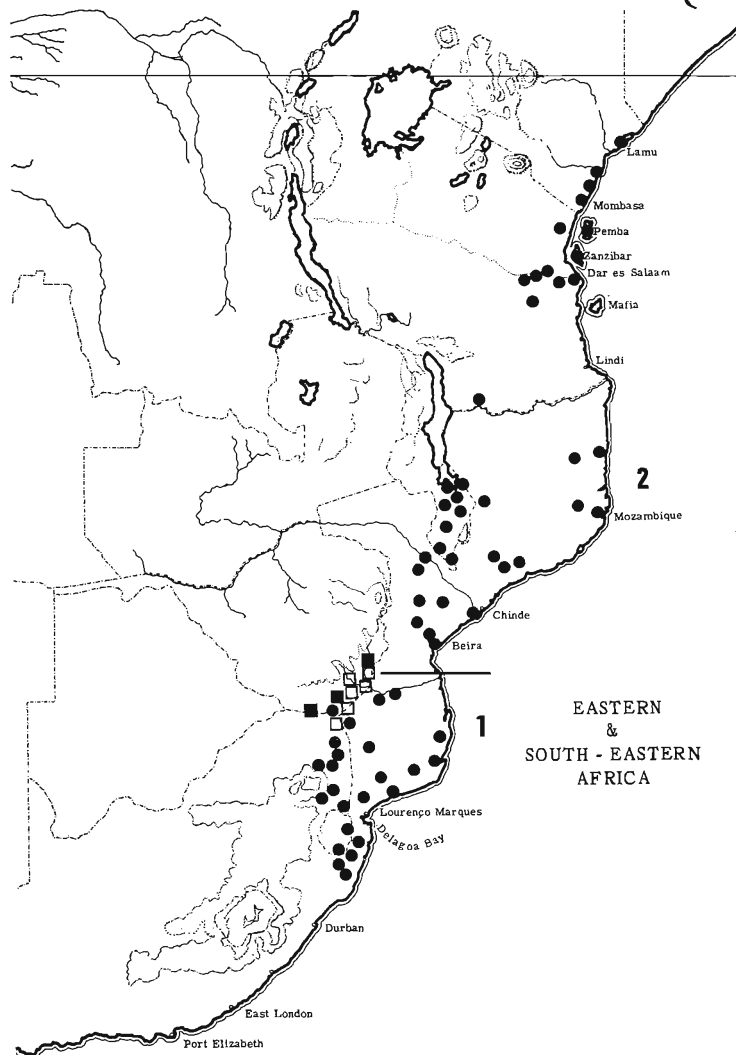
Material taken in recent times on the islands of Zanzibar and Pemba is not mensurally different to that from the mainland to the west, as observed by Jackson (1938). Bowen gives the wing of the single male of *zanzibarius* as 173, that of the female co-type 165 mm. As determined by this study, males from mainland East Africa, south to the Zambesi R., have the wings when flattened 151–162.5, the females rather smaller with the wings 143–154 mm. Mr. C. W. Benson kindly measured the Zanzibar and Pemba skins in the collection of the British Museum (Nat. Hist.), Tring, for me and got for 7 ♂♀ 148–158 (153.0) mm, these figures in close accord with my own findings on mainland birds. He was also unable to detect any constant colour difference between the insular and continental samples. On modern evidence there are, therefore, no grounds for recognising a local race from Zanzibar and Pemba as *P. c. zanzibarius*, the status of

which taxon is highly equivocal. Yet, as the two co-types of *zanzibaricus* are in no way atypical and are markedly larger than any other Brown-headed Parrot specimens available, they are almost certainly not of a taxon synonymous with either of the mainland subspecies, and probably represent an extinct race which formerly inhabited both Zanzibar and Pemba, where now replaced by immigrant *P. c. tanganyikae*.

In the case of the mainland populations, Neumann (1908) believed that birds from the far south of the range were smaller billed than those from the north. A critical examination of this variable reveals that no significant difference exists between birds of comparable age from the entire range of the species and that Neumann was mistaken. Bowen, when proposing *P. c. tanganyikae*, suggested that the northern (East African) population was rather smaller in size than that of the far south (Natal = Zululand). He also postulated differences in head colour, the relative greenness or brownness of the mantle, and in the brightness of the emerald green surfaces between his *tanganyikae* and nominate *P. cryptoxanthus*. Variation in the head and neck colour varies extensively individually and with age. The brightness of the emerald dorsal and ventral surfaces is influenced by insolation, a bluing of such surfaces – analogous to the bluing of basically green feathering in bee-eaters *Merops* spp. — resulting from the action of the sun.

Only two parameters appear to be of use in arranging the contemporary populations of the Brownheaded Parrot into races: (a) a marked increase in the length of the tail in the populations occurring from about the Save R. in Moçambique south to Zululand, which have the tail in ♂♀ 64–78, versus 57–67 mm., and (b) variation in the colour of the interscapular (mantle) surface. Birds from regions south to about the Save have the brown of the dorsal surface restricted to the head and neck, the mantle and scapulars dull Parrot Green, the feathers edged with paler and brighter verditer, whereas from the Save R. south, and in association with the increase in tail-length, the interscapular surface is brown like the head and neck, only the caudad feathering fringed with green. Bowen observed this difference, remarking in the description of *P. c. tanganyikae* “mantle green with much less brown than *cryptoxanthus*,” but it escaped later investigators.

While not actually necessary because of the widely disparate means, I have tested the variation in tail-length exhibited by the sample given in Table I of birds from Zululand, Swaziland and the eastern Transvaal of 20 ♂ and 12 ♀ against the pooled series from eastern Kenya, Tanzania and Malawi of 12 ♂ and 11 ♀, using the standard Student's *t*-test. The value of *t* for males was calculated as 5,7 and that of females 5,4, both values being highly significant.



Poicephalus cryptoxanthus (Peters)

The range by localities of specimens of the Brownheaded Parrot, based on specimens in southern African museums and the British Museum (Nat. Hist.), and the hybrid zone between *P. cryptoxanthus* and *P. meyeri*.

- 1. *P. c. cryptoxanthus* (Peters)
- 2. *P. c. tanganyikae* Bowen
- ■ *P. cryptoxanthus* × *P. meyeri*
(□ mainly like *cryptoxanthus*; ■ mainly like *meyeri*)

Two racial groupings of the present populations of the Brownheaded Parrot require to be recognised in our formal arrangement of the species. In the case of the insular *P. c. zanzibaricus*, one is confronted with a singularly difficult decision to take, as the two original specimens are so much longer winged than any skins of the species taken over the past one hundred years. The size-difference alone precludes the sinking of *zanzibaricus* into *tanganyikae*, and dictates its continued recognition *pro tem.*, as shown hereunder.

(a) *Poicephalus cryptoxanthus cryptoxanthus* (Peters, 1854): Inhambane, southern Moçambique.

Adults with dorsal head, hind and sides of neck and mantle Buffy Olive (Ridgway [1912], pl. xxx), darker over the latter, which surface with Oil Green (pl. V) wash to apices of the feathers. On venter, upper breast with a more or less well-developed Buffy Olive plastron. Tail long: ♂♀ 64–78 mm.

Range: Eastern Zululand, south to the Umfolosi Game Reserve, eastern Swaziland, eastern Transvaal lowveld, Moçambique south of the Save R., and south-eastern Rhodesia, where hybridizing with *P. m. transvaalensis* Neumann, 1899: Limpopo R., western Transvaal.

Remarks: A juvenile specimen in the Transvaal Museum collection from Rustenburg, western Transvaal, is believed to have been in an aviary.

One or two skins of the following subspecies from Beira district, southern Moçambique, show in the browner mantle affinity with the present race rather than with *tanganyikae*.

(b) *Poicephalus cryptoxanthus tanganyikae* Bowen, 1930: Kilosa district, eastern Tanzania.

Dorsal head and hind and sides of neck less saturated brownish in series than last, and ear-coverts averaging more silvery; mantle dull Parrot Green (pl. vi) rather than brown, the feathers fringed bright verditer. Below, with little or no development of a plastron, the green extending anteriorly to the lower throat. Green surfaces variable, but brighter and more intense emerald in series. Tail shorter: 57–67 mm. in ♂♀.

Range: Moçambique north from about the Save R., southern Malawi, eastern Tanzania (including the islands of Zanzibar and Pemba, ? and Mafia), and coastal Kenya north to Lamu island.

Remarks: Some of the *P. cryptoxanthus* × *P. meyeri* hybrids from south-eastern Rhodesia are like *tanganyikae* in the green rather than brown ground to the mantle, and in the absence of a brownish plastron.

(c) *Poicephalus cryptoxanthus zanzibaricus* Bowen, 1932: Zanzibar.

Similar to *P. c. tanganyikae* but larger. Wings of one ♂ 173, of one ♀ 165, against ♂ 151–162,5, ♀ 143–154 mm. in *tanganyikae*.

Range and status: Equivocal. Described on two specimens stated to have been taken on Zanzibar prior to 1849. Probably an extinct form now replaced by *P. c. tanganyikae*.

Remarks: Nothing appears to be on record as to extinction and replacement rates among bird species breeding on the populous larger eastern African off-shore islands, but these probably correspond closely to those determined for insular bird communities on islands off the coast of California and elsewhere (see Jones and Diamond (1976)).

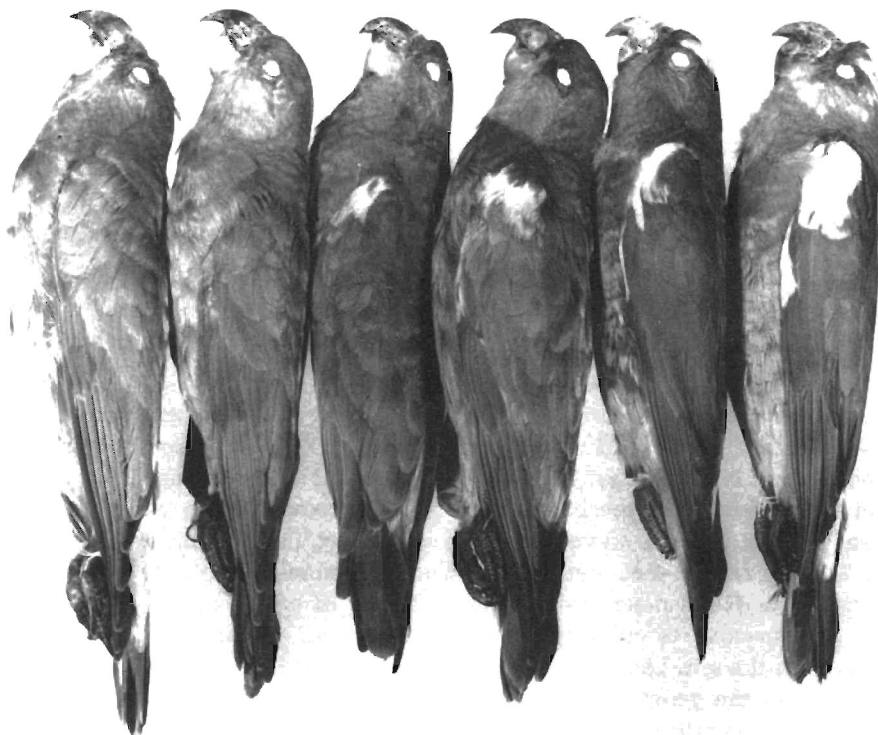
Hybridization between *P. cryptoxanthus* and *P. meyeri*

While allopatric and prima facie not particularly closely related, *P. cryptoxanthus*, brownish over the head and neck and emerald or verditer green over the body and wings, with yellow under-wing surfaces, yellowish-earthen thighs and yellow eyes, and *P. meyeri* with red eyes, earthen brown upperparts and wings, the pileum and bend of the wing ornamented with yellow patches, and the under-wing and thighs yellow, the rump and upper tail-coverts caerulean, and the mid- and lower breast bluish rather than green, the two taxa are now seen as extremely closely allied and components of a common superspecies.

In considering these two parrot species, it is interesting to note that in Africa south of the Zambesi R. *P. meyeri* is a slightly smaller bird than the contiguous *P. cryptoxanthus*, and the sexes are more sharply differentiated in size: wings of 12 ♂ of *P. m. transvaalensis* 150–158,5, \bar{x} 153,8, SD 2,54, in ♀ 142–149, \bar{x} 147,0, SD 268 mm. For comparable measurements in nominate *P. cryptoxanthus* see Table I.

It seems not to be on record that *P. cryptoxanthus* and *P. meyeri* hybridize extensively in at least one major point of contact. Three specimens collected on the Mutale (Motale) R., north-eastern Transvaal, by Messrs F. O. Noomé and A. G. White, taxidermists of the Transvaal Museum, in July, 1935, are all variably intermediate between the two species. While identified by the late Dr. Austin Roberts as *P. cryptoxanthus*, the three skins concerned differ from the norm of this species by the assumption of a large yellow path over the bend of the wing and in the yellow thighs, and in the marked bluing of the venter in at least one specimen.

A more comprehensive sample, much of its collecting of relatively recent date, of the Brownheaded Parrot from the country immediately to the north of the Mutale R., from the middle Limpopo R., north-east to the



Poicephalus cryptoxanthus × *P. meyeri*

Rhodesian and Transvaal specimens to show the hybridization between the Brown-headed and Meyer's Parrots.

Left pair: *Poicephalus cryptoxanthus*
Left: ♂, lower Lundi R., 23 April, 1962 (NM)
Right: ♀, Lundi R., 9 August, 1947 (NM)

Central pair: *P. cryptoxanthus* × *P. meyeri*
Left: ♀, Mutale R., 11 July, 1935 (TM)
Right: ♂, Sabi/Lundi confl., 5 June, 1950 (TM)

Right pair: *Poicephalus meyeri*
Left: ♂, near Salisbury, 25 June, 1955 (DM)
Right: ♂, Sentinel Ranch, Limpopo R., 6 July, 1964 (DM)

Note assumption of yellow patches over the bend of the wing and lack of yellow over the pileum in the two hybrids.

Key: NM = National Museum of Rhodesia, TM = Transvaal Museum,
DM = Durban Museum

Photo: W. S. Yerbury

lower Sabi R., in south-eastern Rhodesia/Moçambique, *i. e.*, from c. 23°–21° S., contains several obvious *P. cryptoxanthus* × *P. meyeri* crosses. Some, while basically similar to the norm of *cryptoxanthus*, showing assumption of yellow over the head, a loss of green over the otherwise brownish back, and marked bluing of the rump and upper tail-coverts, in addition to the features described in the case of the Mutale R., Transvaal, hybrids. Specimens in the National Museum of Rhodesia collection from Chikwarakwara at 22° 20' S., 31° 05' E., the Dumela area and Malipati Dip on the Nuanetsi R., Davata Spring at 21° 15' S., 31° 13' E., the lower Lundi R. and the Sabi/Lundi confluence, and the lower Sabi R. at Chibuwe and Chisumbanje (20° 46' S., 32° 15' E.), show this miscegenation particularly clearly.

Through the kind offices of Mr M. P. Stuart Irwin, Director of the National Museum of Rhodesia, Bulawayo, I have been able to examine a fairly representative series of *Poicephalus meyeri transvaalensis* from south-eastern Rhodesia. In this sample, an adult ♂ from Buby Homestead, Nuanetsi R., dated 4 May, 1958, lacks the coronal yellow of normal *meyeri*, and the yellow over the bend of the wing is reduced. The venter is also greener than in most *meyeri*, and the ground to the dorsum and wings is olivaceous rather than earthen brown. A second adult male of *meyeri* from Buby Homestead reveals the influence of *cryptoxanthus* in having the greater-coverts broadly edged with green. A juvenile from Beit Bridge, on the mid-Limpopo R., dated 9 July, 1959, displays a further manifestation of the genetic instability in the hybrid populations under discussion. This juvenile differs from the norm of young *meyeri* in being paler and warmer brown above and over the wings, with blue rather than green edges and tipping to the scapulars. Below, it is appreciably paler over the plastron than in *meyeri*, with the rest of the venter bluish rather than lemon yellow, merging into green over the flanks, crissum and under tail-coverts. It closely resembles the adult of *meyeri*, but is clearly a juvenile. The N. M. Reg. No. of this particular specimen is 39, 655.

Judging by the Mutale R. skins in the Transvaal Museum collection, which were taken well over forty years ago, hybridization between *P. cryptoxanthus* and *P. meyeri* is not a recent development. Furthermore, it seems not to be the outcome of some breakdown in an ecologically based isolating mechanism, as the region of south-eastern Africa involved has suffered little or no habitat destruction or alteration with the opening up of southern Africa. The evidence available at this stage suggests that the hybridization between the two psittacine species concerned is a simple case of localised late secondary contact between two parapatric forms which had all but attained specific status.

P. cryptoxanthus* and *P. crassus

The Niam-Niam Parrot *P. crassus* is generally considered to be a rare species occurring locally across the north-central African savanna woodlands from eastern Cameroun to the south-western Sudan between 4° and 7° N. It was for a long time thought to be the juvenile stage of the Ethiopian *P. flavifrons* until being shown to be a discrete species in the early years of the present century. *P. crassus* is currently treated as a monotypic species, despite Peters' action in placing it as a subspecies of *P. cryptoxanthus*, the ranges of the two parrots being spatially remote.

P. crassus averages a trifle larger than *P. cryptoxanthus* (excluding the equivocal specimens from Zanzibar described as *P. c. zanzibaricus*), the wings of 4 ♂ 164–168, tails 64–75 (after Forshaw), versus 151–166,5 and 58–78 mm. in males of the latter measured during the course of this research. Dorsally it differs little, but ventrally has the upper breast brownish. However, in this plastron development it does not differ from well-marked examples of the nominate race of *cryptoxanthus*, in which austral subspecies a like character is a subspecifically discriminative feature. The main specific criterion in *crassus* is the green under-wing and thigh colour, as opposed to yellow in *cryptoxanthus*. Nevertheless, even this character tends to be negated by the finding of one or two specimens, particularly from the *P. cryptoxanthus* × *P. meyeri* hybrid zone, with largely green and not yellow under-wings and thighs. A ♂ from Chikwarakwara, south-eastern Rhodesia, taken on 4 December, 1974, in the National Museum of Rhodesia collection (N.M. Reg. No. 81, 330) has largely olive-green under-wings and thighs, while another example taken downstream from Malipati, on the Nuanetsi R., on 30 April, 1961, again in the south-east of Rhodesia (N.M. Reg. No. 74, 096), exhibits considerable green admixture to the yellow of the under-wings.

The final character separating *crassus* from *cryptoxanthus* is the colour of the irides: red in *crassus*, pale yellow in *cryptoxanthus*. In its red iris colour *crassus* is like *meyeri*. Examination of the data labels of specimens from south-eastern Rhodesia reveals that the iris colour ranges from yellow to yellowish brown and even olive, but no *P. cryptoxanthus* × *P. meyeri* crosses are marked as having had red irides, though birds with red eyes must occur within the hybrid zone. It seems as if eye-colour cannot be used with assurance as a specific criterion on its own, because *meyeri*, with which *cryptoxanthus* hybridizes and produces fertile hybrids, is also red eyed.

In his treatment of *P. crassus*, Peters was probably correct in considering it conspecific with *P. cryptoxanthus*. However, much more requires to be known of *crassus* and especially if it hybridizes with the vicinal *P. meyeri* populations (nominate *P. meyeri* [Cretzschmar, 1826]: Kordofan,

Sudan, and *P. m. adolfifriederici* Grote, 1926: near Fort Crampel, Central African Republic) before the question of its precise status can be adequately resolved. If *crassus* and *meyeri* react in the same way as *meyeri* and *cryptoxanthus* do in south-eastern Africa, an irrefutable case for considering *P. crassus* and *P. cryptoxanthus* conspecific could be presented.

Summary

Examination of over a hundred specimens of the Brownheaded Parrot *Poicephalus cryptoxanthus* of coastal eastern Africa confirms that the species exhibits subspecific variation, and that the American worker W. Wedgwood Bowen was fully justified, in 1930, in admitting two mainland races (*P. c. cryptoxanthus* and *P. c. tanganyikae*) on the basis of colour and size differences. Doubt still surrounds his projected insular subspecies *P. c. zanzibaricus*, described on two ancient skins from Zanzibar, as recent specimens from the island are similar to those from the opposite mainland. The suggestion is made that the large-sized *zanzibaricus* may be an extinct race, long since replaced by birds of the mainland facies (*tanganyikae*).

The Brownheaded and Meyer's (*Poicephalus meyeri*) Parrots are now demonstrated as hybridizing freely from the northern Transvaal to the lower Sabi R. valley in Rhodesia, confirming that the two species are closely allied and allospecies of the same superspecies.

In the light of J. L. Peters' action in his World Check-List in treating *P. crassus* as a subspecies of *P. cryptoxanthus*, its status is reviewed on the basis of anticipatory variation now detected in *cryptoxanthus* populations, which tends to substantiate Peters' arrangement, despite the wide allopatry of the two parrot species and intervening *P. rufiventris* and *P. meyeri* populations. No change in the current treatment of *crassus* appears called for, however, until such time as it can be established if *P. crassus* and *P. meyeri* do or do not hybridize.

Zusammenfassung

Die Untersuchung von mehr als hundert Exemplaren des Braunkopfpapageis, *Poicephalus cryptoxanthus*, aus dem Küstengebiet Ostafrikas bestätigt, daß die geographische Variation der Art zur Rassenbildung geführt hat und daß der amerikanische Ornithologe W. Wedgwood Bowen mit voller Berechtigung 1930 aufgrund von Färbungs- und Größenunterschieden zwei Festlandrassen (*P. c. cryptoxanthus* und *P. c. tanganyikae*) unterschied. Zweifelhaft bleibt jedoch die von Bowen angenommene Inselrasse *P. c. zanzibaricus*, die nach zwei alten Bälgen von Sansibar beschrieben wurde. In neuerer Zeit auf dieser Insel gesammelte Vögel sind aber den Stücken vom gegenüberliegenden Festland ähnlich; man kann daher vermuten, daß der große *zanzibaricus* eine inzwischen ausgestorbene Rasse war, die längst durch Vögel der Festlandform (*tanganyikae*) ersetzt worden ist.

Es wird gezeigt, daß Braunkopfpapagei, *P. cryptoxanthus*, und Goldbugpapagei, *P. meyeri*, in einem von Nord-Transvaal bis zum Tal des unteren Sabi in Rhodesien reichenden Gebiet sich in beträchtlicher Zahl vermischen; damit bestätigt sich, daß die beiden Papageien nahe verwandt und als Allospezies in der gleichen Superspezies anzusehen sind.

Im Hinblick darauf, daß J. L. Peters in seiner Check-list of Birds of the World den *P. crassus* als Rasse von *P. cryptoxanthus* behandelt, wird der Status von

P. crassus unter Berücksichtigung der bei *P. cryptoxanthus* gefundenen Variation beleuchtet; das Ergebnis scheint trotz der weiten räumlichen Trennung der beiden Papageien und der Dazwischenkunft von Populationen von *P. rufiventris* und *P. meyeri* Peters' Auffassung zu bestätigen. *P. crassus* sollte aber, wie heute üblich, auch weiterhin solange als eigene Art angesehen werden wie nicht festgestellt ist, ob sich *P. crassus* und *P. meyeri* vermischen oder nicht.

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