

ons land zijn aan te wijzen, waar de kauw weinig of geen schade doet, meenen wij, dat haar in het geheele land de bescherming moet worden onthouden.

Geraadpleegde literatuur:

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On the distribution of *Garrulus glandarius brandti* Eversmann

(with 7 textfigures)

BY

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In the following lines a review is given of the distribution of the Brown-headed Jay of northern and eastern Asia, belonging to the "Formenkreis" *Garrulus glandarius* (L.), formerly referred to the subspecies *G. glandarius brandti* Eversmann.

I am indebted to Messrs. P. A. Hens, J. G. van Marle, and Dr. G. C. A. Junge for the kind manner in which they put at my disposal the material upon which this paper is based. I shall also remember the pleasant discussions I had with Prof. de Beaufort and Mr. van Marle, which have contributed much to the elucidation of my views. I wish to express my thanks to Prof. A. E. H. Swaen for correcting the manuscript.

In the whole of Siberia, including the Altai, eastwards as far as Lake Baikal, we find the oldest named form *G. glandarius brandti* Eversmann. This is the darkest of the Asiatic Jays, with almost foxy-red head and neck. The lores and the region below the eyes are black, forming a continuation of the black moustachial streak. The nasal bristles are almost entirely black with little, if any, brown. Forehead mostly densely striped with black; the brown of the forehead being of the same colour as that of the crown and hindneck. Underparts darker and more grey (without a vinous red tinge); the back only a little darker grey than in the other races. According to Stresemann (1928) wing ♂ : 174, 175, 177 mm, ♀ : 169, 169, 169, 170, 170 mm.

Material examined:

Altai, ad., sine dato (Prof. Brandt, Petersburg; Coll. Leiden Museum):

Wing: 171; tail: 143; bill¹⁾: 19 mm.

Lake Baikal, ♂, sine dato (Mrs. Salles, 1875; Coll. Leiden Museum):

Wing: 175; tail: 149; bill: 19 mm.

Lönnberg (1909) described from Transbaikalia and Manchuria under the name of *G. g. bambergi* a slightly different form with the brown colour of the head and neck paler than in the Siberian form. In the only two specimens which I had the opportunity to examine, the forehead is of a slightly, but distinctly lighter brown coloration than the rest of the head and neck. They agree in this respect with five specimens from Hokkaido, with which I could compare them.

Kuroda (1927) separated the Hokkaido Jay as *G. g. pallidifrons* from the

¹⁾ measured from anterior border of nostril to tip.

Saghalien bird (*taczanowskii* Lönnerberg, 1908), the latter, with the dark brown colour of the head, being probably more closely related to *brandti* than to *bambergi*. But the characters given are the same upon which Lönnerberg based the separation of the Transbaikalian bird from the Siberian one. Besides, the specimens from Hokkaido examined, agree in every respect with the two Manchurian birds. So the name *pallidifrons* Kuroda becomes a synonym of *bambergi* Lönnerberg.

Material examined:

Amoor region, ♂, Dec. (Coll. Snouckaert van Schauburg No 26, in Coll. Sillem-van Marle):

Wing: 178; tail: 155; bill: 22 mm.

Amoor region, ♀, sine dato (von Schrenk, 1864; Coll. Leiden Museum):

Wing: 170; tail: 140; bill: 20 mm.

Japan (subst.: Hokkaido) (Mr. H. van Oordt van Lauwenrecht, 1905; Coll. Leiden Museum):

♂: Wing: 180; tail: 156; bill: 22 mm.

♂: Wing: 178; tail: 153; bill: 21 mm.

♂: Wing: 176; tail: 129; bill: 22 mm.

♀: Wing: 183; tail: 151; bill: 21 mm.

○: Wing: 184; tail: 159; bill: — mm.

Eight Jays, collected in Korla (Balgratsh Gol) in the southeastern foothills of the Tian Shan, are of great interest. As I do not find the Tian Shan mentioned in the distributional area of *Garrulus glandarius* and as the Tian Shan is situated nearest to the area of *brandti*, I was surprised to find them very different from *brandti*, but agreeing with the Manchurian *bambergi*:

The head and neck are of the same light cinnamon colour, spreading well over the greater part of the mantle; the forehead somewhat lighter than the crown and hindneck; the nasal bristles light brown with brownish black tips; the underparts more or less dark isabella (much lighter than in *brandti*). The average measurements of wing, tail, and bill reach far beyond the maximum records of *brandti* and agree with those of *bambergi*, mentioned above.

Material examined: Korla (Chinese Turkestan):

♂, March (Coll. Snouckaert van Schauburg No 1332, in Coll. Sillem-van Marle): Wing: 184; tail: 158; bill: 20 mm.

♂, Febr. (Coll. Snouckaert van Schauburg No 1330, in Coll. Sillem-van Marle): Wing: 181; tail: 155; bill: 20.5 mm.

♂, March (Coll. Snouckaert van Schauburg No 1333, in Coll. Sillem-van Marle): Wing: 176; tail: 152; bill: 20.5 mm.

♂, Febr. 1908 (Coll. P. A. Hens No 171):

Wing: 174; tail: 155; bill: 20.5 mm.

♀, May (Coll. Leiden Museum):

Wing: 182 + x; tail: 155; bill: 21 mm.

♀, Febr. (Coll. Snouckaert van Schauburg No 1331, in Coll. Sillem-van Marle): Wing: 180; tail: 155; bill: 21 mm.

♀, March (Coll. Snouckaert van Schauburg No 1334, in Coll. Sillem-van Marle): Wing: 177; tail: 153; bill: 20.5 mm.

♀, March 1908 (Coll. P. A. Hens No 172):

Wing: 177; tail: 154; bill: 21 mm.

In another respect too, the birds of Korla are remarkable. Stresemann (1928) described a subspecies (*kansuensis*) from the northern slopes of the Tatung-mountains (North-Kansu), which differs from the North-Asiatic subspecies of *G. glandarius* in having the black moustachial streak much restricted, leaving the region below the eyes and the lores brownish red, instead of black.

This character is also found in the Korla birds. In his revision of *G. g. kansuensis*, Meise (1937) mentions that „der Oberkopf ist dunkel rotbraun, es fehlen also Beziehungen zu *bambergi* Lönnerberg, der mongolischen Form" (p. 454). As the Korla birds fully agree with *bambergi* in the brown colour of the head and neck, they cannot be united with *kansuensis*.

In examining the Manchurian and Hokkaido Jays I find, that there is much variation in these birds in the extent of the black of the moustachial streak. The typical *brandti* apparently always has the lores and the region below the eyes black. Of the two Manchurian specimens examined, the first has the lores always wholly black, minutely stained with some light feathers, just before the eyes; the second has a narrow but distinct light brown area before and below the eyes. The five Japanese birds varied in this respect between true *brandti* on the one hand and a design almost the same as in the Korla birds on the other hand.

So there are several points which make the position of the Korla birds remarkable:

1st. Korla birds cannot be separated by the coloration of the head and neck from Manchurian and Hokkaido birds (*bambergi*).

2nd. In the extent of the black of the moustachial streak Korla birds fully agree with *kansuensis*. In this respect certain Manchurian and Hokkaido birds too come very near Korla birds. Concerning the validity of the above named character of *kansuensis* Hartert-Steinbacher (1932) also observed: „doch sind einige *brandtii* (read: *brandti* and *bambergi*) darin auch nicht so deutlich verschieden, weil sie weniger schwarz sind" (p. 21).

3rd. Although the Tian Shan could easily be added, on account of its geographical situation to the distributional area of *brandti*, and although there is an hiatus between the eastern Tian Shan and the area of *bambergi*, Korla birds (eastern Tian Shan) fully agree with *bambergi*. In the following theoretical remarks, however, I will try to show that it is quite unnecessary to give the Korla birds a new subspecific name on account only of their remarkable distribution.

During the maximum extension of the ice in the pleistocene epoch the whole of northern Asia including the Altai and the northern Manchurian mountains were covered with land-ice or glaciers, leaving only restricted forest-refugia in eastern and central Asia. With many other arboreal birds the Asiatic Jays had to leave their original habitation and were actually driven back into some forest-refugium. Since the geological researches of Obrutchev (1930) and the theoretical phyto- and zoogeographical studies of Reinig (1937) we know the exact situation, and more or less the extension of the forest-refugia in eastern Asia. So we may expect, that the Asiatic Jays lived during most of the ice-epoch in the three isolated East-Asiatic refugia: the Manchurian, the rich Southern-Chinese, the Japanese.

Saghalien, Hokkaido, and perhaps also northern Hondo, although not covered with land-ice, probably cannot be considered to have been forest-refugia. At the present time the climate of Saghalien is almost arctic, mainly caused by the cold northern compensation-current in the Sea of Okhotsk, which flows along the Siberian coast to Saghalien, turning northwards along the Kurile Islands to the westcoast of Kamchatka. In the same way Hokkaido and northern Hondo receive a cold sea-current (Oja Schio) which flows along the eastcoast of Kamchatka, southwards along the eastcoasts of the Kurile Islands to Hokkaido and northern Hondo. Owing to the presence of a pleistocene land-connection between Alaska and northern Asia, which closed the Behring Strait, the East-

Asiatic coast could not be cooled by polar sea-currents. So the climate of the coastal regions of East-Asia, including Saghalien and Hokkaido, probably was milder rather than colder during the pleistocene. At the present time the climate of Saghalien at all events is rather arctic, the snow remaining on the mountains there from September to June. Its vegetation is that of the North-Siberian conifer-forests and tundras. Hokkaido on the other hand has a true Manchurian vegetation (*Juglans manschurica*).

Besides, there is the probability of a pleistocene land-connection between the continent and some Japanese islands. According to Kobelt (1902) the distribution of the Japanese mammals requires a connection between Saghalien and Hokkaido with the continent (Gulf of Tartary) on the one hand, and between Kiusiu over Tsu-Shima with Corea (Corea strait) on the other hand. The depths of the named sea-straits measure not more than 100—130 m. As a relative fall of the sea-level during the pleistocene is also observed in western Europe and in many other places of the world it might be supposed to have occurred here as well. The discontinuation between Hondo and Hokkaido was maintained in the form of the ancient Tsugaru Strait, which measures more than 300 m in depth, much more than the Corea Strait and the Gulf of Tartary.

A third sea-current (Kuro Schio), running northwards along the eastcoasts of the southern Japanese islands up to central Hondo, at present carries a warm, almost tropical climate to them. Consequently there is a remarkable discontinuation between the vegetation of Hondo, northwards of Lake Biwa (summer-green plants; *Fagus sieboldi*) and the nearly tropical flora of the southern parts of Japan (evergreens; Magnoliaceae, Lauraceae etc.).

The rich southern Chinese forest-refugium is according to Reinig (1938) separated from the more temperate Manchurian refugium by a zone of löss,

which indicates that during and after the maximum extension of the ice there were no forests but probably only poor steppes in these regions. Discontinuations in the distribution of some East-Asiatic forest-trees, as in that of *Quercus*, *Tilia*, and especially in that of *Acer*, prove this opinion to be probably right. Originating from a probably practically uniform population, the Asiatic Jay occupied three different East-Asiatic refugia viz. Manchuria, South-China, and Japan (probably southwards of central Hondo; at all events excluding Hokkaido and Saghalien), which were isolated from each other.

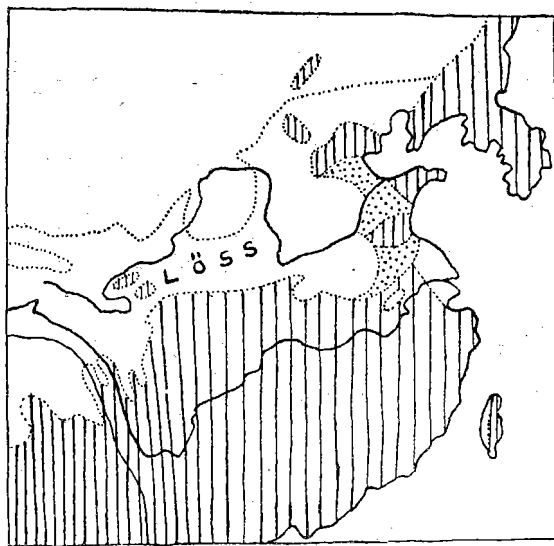


Figure 1. Showing the distribution of the Chinese forests and löss-grounds.

Vertically striped regions formerly covered with forests.

Punctuated regions with holocene or pleistocene löss, formerly covered with forests.

Dotted line: northern limit of pleistocene löss-deposits.

(After Hermann; Reinig, 1938, fig. 7, p. 41).

Owing to the sea-climate of the Japanese islands, or owing to some other unknown factor, the Japanese population maintained the main type of the vinous-coloured Eurasiatic Jay. At present the Japanese bird differs from the still vinous-coloured European Jay chiefly in the greater extent of the black moustachial streak, which occupies the lores and the region below the eyes, thus giving the bird a black "face". This almost European type of Jay (*japonicus* Schlegel) is at present resident, with several slightly different insular variations, in all the Japanese islands except Hokkaido, Saghalien, and the Kurile Islands.

The continental populations changed in a larger degree; the feathers of the head and neck becoming cinnamon, together with the total elimination of the white crest-feathers. On account of their geographical isolation, or through the succession of two or more glacial- and much warmer interglacial periods, there arose slight differences between the Manchurian and the Southern-Chinese populations. At present they principally differ in the dark striations of the head and crest, which in the Manchurian birds (*brandti*-group) have remained unchanged, but in the Southern-Chinese birds (*sinensis*-group) have become almost obsolete.

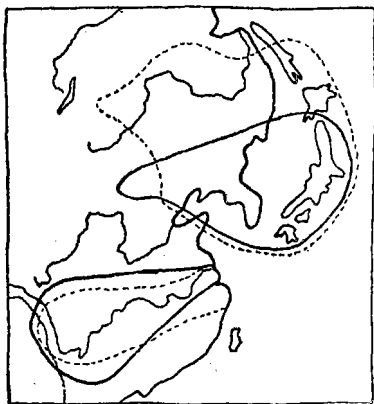


Figure 2. Showing the disjunctive distribution of *Quercus*: — — — subsection *Castaneiformis*, — — — subsection *Daimio*. (After Schwarz; Reinig, 1938, fig. 8, p. 42).



Figure 4. Schematically showing the disjunctive distribution of the East-Asiatic species of *Tilia* (15 species, mentioned by C. K. Schneider, 1912): I. Chinese region: 8 species. II. Manchurian region: 3 species. III. Japanese region: 4 species.



Figure 3. Schematically showing the disjunctive distribution of the East-Asiatic species of *Acer* (32 species, mentioned by C. K. Schneider, 1912): I. Chinese region: 17 species. II. Manchurian region: 3 species. III. Japanese region (excl. Hokkaido and Saghalien): 12 species. Furthermore: a. 1 species, inhabiting Hokkaido, Hondo, Kiushiu, and Ho-pe. b. 2 species, inhabiting the Manchurian and Amoor-region, and Japan south down to Kiushiu.

Consequently the centre of postglacial invasion of the Jays of the *brandti*-type must be placed in the Manchurian forest-refugium; the present Manchurian Jay (*bambergi*) must be considered as the original and eldest form of the *brandti*-group. Spreading from that centre, immediately following the radiating expansion of the forest-trees, they recovered their former area, until now they are found in the whole of northern and central Asia, including Saghalien and Hokkaido. Climatological conditions induced some slight modifications in the birds westwards of Lake Baikal (*brandti*) and perhaps also on Saghalien (*taczanowskii*). In the other distributional regions the birds remained quite unchanged, agreeing with the colour-type of *bambergi*, which can still be found living in the pleistocene Manchurian refugium. So the correspondences in coloration and in measurements between the Manchurian (incl. the Hokkaido) and the Korla birds are easily explained.

It is therefore, that, neglecting the distributional hiatus, I do not think it desirable to name the Korla birds separately.

Concerning the variability in the extent of the moustachial streak, especially in the Manchurian and in the Hokkaido birds, it must be borne in mind, that in the pleistocene refugia we have to see, what Reinig (1938) called after Vavilov "allele¹⁾-centra", eventually causing a relative high variability. The more restricted moustachial streak in the European Jay, in many Jays of the *bambergi*-type and in the *sinensis*-group must be considered as the original, the expansion over the lores and beneath the eyes as the more differentiated state. That in the Asiatic Jays the "gens", which induce the expansion of the moustachial streak were readily inclined to alter in the said way, is shown in the Japanese Jays, which also have black "faces".

According to Bergmann's rule it was to be expected, that the measurements of the Central-Siberian form would be the same, or slightly larger than those of the Manchurian. On the contrary, the measurements given above show that there is a little, but well-marked difference between *bambergi* and *brandti*, the latter being slightly smaller in general. So the validity of this zoogeographical rule is not confirmed in this particular case. According to Reinig (1938) the rule of Bergmann is nothing but a "Zufallsergebnis" and may be substituted by the rule "dass das Merkmal Körpergrösse innerhalb einer Sippe bei allen Vielzellern vom Entstehungs- bzw. Ausbreitungszentrum bis zur absoluten Arealgrenze ausnahmslos abnimmt". The slightly smaller measurements of *brandti*, compared with those of *bambergi*, in contradiction with the rule of Bergmann, agrees with Reinig's new rule. Nevertheless, if the rule of Bergmann is not restricted to subspecies of one "Sippe", radiating from one centre of distribution — as Reinig (1938) wants it — but is extended to specific and even to generic geographical representatives, there remain many facts, which still speak in support of this most valuable zoogeographical rule. Reinig (1938) calls attention to the possibility, that during the glacial period some isolated forests may have remained in the coastal regions of northeast China. Postglacial forests on pleistocene and holocene löss-ground are recorded from the same localities.

It must be noticed that northeast China (north Chih-li (= Ho-pe), Jehol) is inhabited by its own subspecies of Jay, viz. *G. g. pekingensis* Reichenow, which proves to be the transitional form between the northern *brandti* — and the southern *sinensis*-group. If it is right — and it may be —, that during the glacial period the above named forest regions were inhabited by forest birds,

¹⁾ "allele" = a mutated gen.

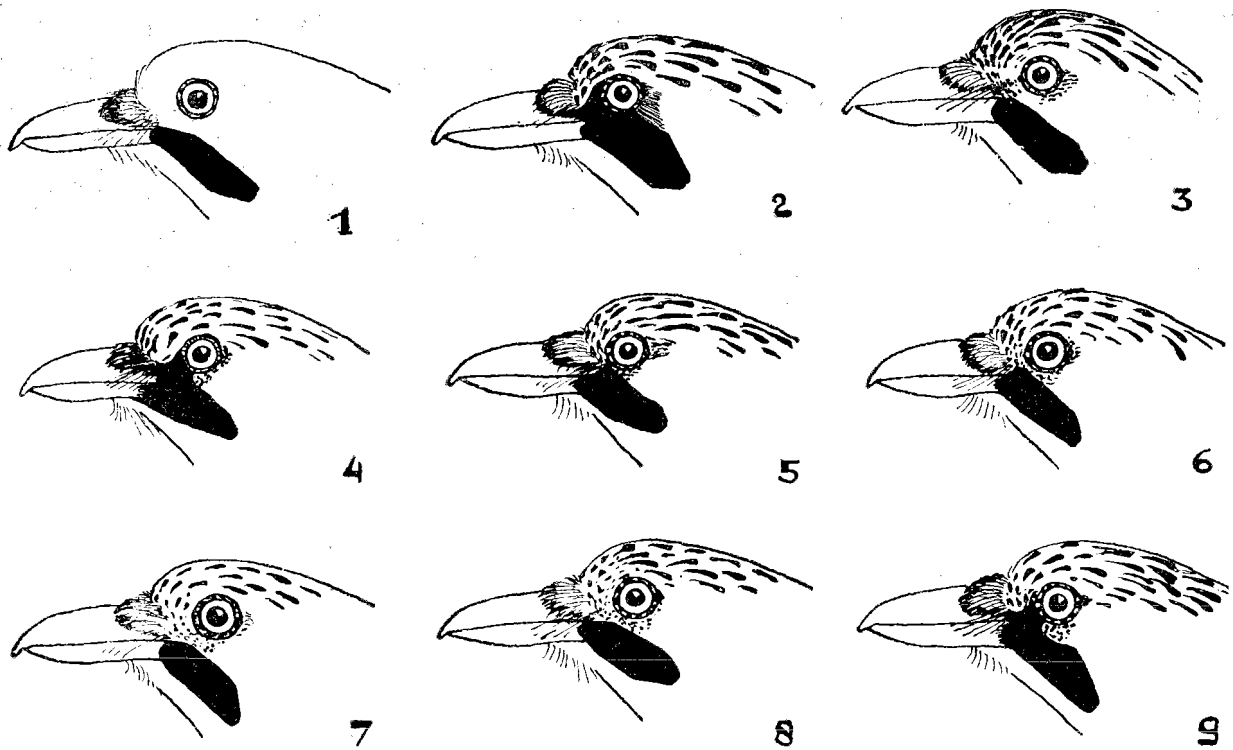


Figure 5. Heads of different subspecies of *Garrulus glandarius* (L.): 1 *sinensis*: Foo-chow, 2 *japonicus*: Hondo, 3 *glandarius*: Holland, 4 *brandti*: Altai, 5 and 6 *bambergi*: Amoor, 7 *bambergi*: Korla (Balgratsh Gol), 8 and 9 *bambergi*: Hokkaido.

Kleiner (1935—38) may be correct in calling *pekingensis* "das beste Beispiel für das Rassenkreis-Prinzip von Rensch, wie weit verschiedene Rassen in einander gleitend übergehen. Sie ist ein Verbindungsglied zwischen der *brandti*- und *bispecularis* (read: *sinensis*-) -Gruppe. Einzige Stücke sind ganz *bambergi* ähnlich. Andere wieder stehen sehr nahe zu *sinensis*. Sie hat die gemeinsame Eigenschaft mit *oatesi*,¹⁾ dass die Kopfstreifen sich nur als feine schwarze Streifen zeigen. Vom *bambergi* ist sie am schwersten zu unterscheiden, weil die hellsten Stücke von *bambergi* ganz *pekingensis* ähnlich sind. Manche Stücke von *pekingensis* haben so deutliches Fuchsrot am Kopfe, dass nur die sehr feinen Kopfstreifen sie von *bambergi* unterscheiden. Die Bälge aus N. Chili hatten einen mehr grauen Rücken, und standen näher zu *bambergi*, als die aus Jehol, deren Kopffarbe oft ganz typische *sinensis*-Farbe hatte" (p. 213). On the other side, postglacial expansion from the Manchurian and the Chinese refugium may have brought together specimens from the *brandti*- and from the *sinensis*-group. The zone of contact may be found in the connecting coastal forests of northeastern China, the recent area of *pekingensis*. Consequently it is possible that the "subspecies" *pekingensis* is of a hybrid origin, which may have led to the above mentioned high variability. As I had no opportunity to examine specimens of *pekingensis* myself, I once more borrow from Kleiner, that extreme specimens of *pekingensis* are very similar to both the original forms: *bambergi* and *sinensis*.

Through lack of material I have not examined *G. g. kansuensis* Stresemann of North-Kansu; so I am not able to judge its status.

The postglacial expansion of *G. g. bambergi* out of the Manchurian refugium in western direction is still going on at the present time. A very extensive transitional zone between the area of the Asiatic *brandti* and those of the European *glandarius* is inhabited by the rather distinctive form *severtzowi*, which is supposed by Stresemann (1919) to be of a hybrid origin. The typical form of *G. g. severtzowi* Bogdanow is much like the European *glandarius*, but may be distinguished by the rufous coloured earcoverts, which usually form two well defined patches on each side of the head, and by the brownish tinge of the feathers of the forehead and crown and of the nasal bristles, which in *glandarius* are more or less white. This form also demonstrates the great variability of a hybrid-race, all the transitional forms between *brandti* and true *glandarius* having been observed, the latter being the rarest (Sushkin, after Stresemann, 1919).

Garrulus glandarius severtzowi is found in European Russia, Finland, and the Baltic countries, probably as far as Livonia. I have examined four birds collected at the Polish-Russian boundaries (Stripuny, Kr. Smorgon: Coll. Hens Nos 835, 836, 837; Coll. Rijksmus. Nat. Historie Leiden), which could not be distinguished from a bird of Sarepta (Volga) and from one of Helsinki (Finland). *G. g. severtzowi* still shows tendencies to go farther westward, as there are two records of *severtzowi*-like birds in Hungary, both collected at Debrecen (XII.25.1936): the first (♀) mentioned by Kleiner (1935—38, p. 198), the second (♂) being preserved in the collection of the Zoological Museum at Amsterdam (No 176).

As the distinctions between *Garrulus japonicus*, *G. bambergi*, and *G. sinensis* have their origin in climatological occurrences during the pleistocene epoch, and as after that geographical influences caused the differences between *brandti* and its original form *bambergi*, and between the several insular forms and *japonicus*, the subspecies recognized are of a totally different value. Following Laub-

¹⁾ *Garrulus g. oatesi* Sharpe: Southeast Assam; West Burma.

mann (1921) this nomenclatural disorder can easily be prevented by assuming a quadrinominal nomenclature as follows:

- G. glandarius japonicus japonicus* Schlegel (1848-Japan; subst.: Hondo).
- G. glandarius japonicus hiugaensis* Momiyama (1927-Hiuga, South-Kiushiu).
- G. glandarius japonicus orii* Kuroda (1923-Jaku-Shima).
- G. glandarius japonicus mamiyei* Kuroda (1922-Tsu-Shima).
- G. glandarius japonicus tokugawae* Taka Tsukasa (1931-Sado Island).
- G. glandarius sinensis sinensis* Swinhoe (1863-South-China).
- G. glandarius sinensis taiwanus* Gould (1862-Formosa).
- G. glandarius pekingensis* Reichenow (1905-Pekin — cage bird! —).
- G. glandarius brandti bambergi* Lönnberg (1909-Transbaikalia).
- G. glandarius brandti brandti* Eversmann (1842-Altai).
- G. glandarius severtzowi* Bogdanow (1871-Kasan and Simbirsk).
- G. glandarius glandarius glandarius* (L.) (1758-Sweden).

Etc.

I do not mean to propose a general quadrinominal nomenclature in bird-systematics. I only wish to show the possibilities as well as the difficulties when nomenclature must be used as a method of expressing relationship.

It is quite possible, following Sushkin (1927), that "the most primitive forms of *Garrulus* inhabit southeastern Asia" (p. 522). Thus, the brown-headed *sinensis*-group would represent the original type. Nevertheless, it seems probable that, in preglacial periods, the palaearctic region was inhabited by a type of Jay, agreeing with the recent Japanese and the analogous European form. For, at present, the same type of Jay can be met with in (1) the Japanese, (2) the North-Persian and (3) the eastern and (4) western mediterranean refugia.

The North-Persian Jay (*G. g. hyrcanus* Blanf.) almost entirely agrees in coloration with the European *glandarius*, mainly differing in those characters, which Stresemann (1928) mentions to be the typical subspecific differentiations of the inhabitants of the rainy Hyrcanian forests: viz. (1) smaller size and (2) more intensive pigmentation than in the European representatives.

The distribution of the subspecies *hyrcanus* — although relatively limited — implies an area which is characterized by an almost Central-European forest-bird fauna.

During the migratory movements, caused by the continued expansion of the land-ice sheet, the Caucasian mountain-forests were preoccupied by a blackcapped type of Jay (*krynickyi atricapillus*), belonging to a group, which probably has a different — more southern — origin than the common stripedheaded Jays, going as far backwards perhaps as pliocene age. During the pliocene the North-African black-capped Jays (Tunisia, Algeria) and their relative forms of Asia Minor, Syria and Mesopotamia may have lived in the same places, but under conditions of much stronger insolation. Consequently they as-

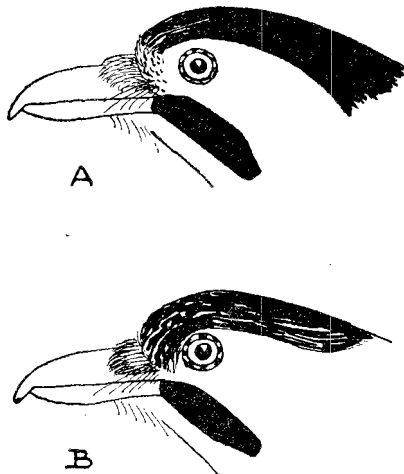


Figure 6. A. Head of a Black-capped Jay: *G. g. krynickyi*: Smyrna. B. Head of a typical form of the supposed "hybrid" race *caspius*: Lenkoran (Caspian Sea).

sumed a pale, almost desert-coloured appearance, with a partial increase of eumelanine on the head.

Owing to the sexual affinity of the black-capped Caucasian race and the striped-headed Hyrcanian one, there probably arose in the plains of Lenkoran (Caspian Sea) a hybrid-race with a very limited distribution: *G. g. caspius* Seeböhm. As I had no opportunity to examine specimens of *hyrcanus* and only saw specimens of *caspius* and *krynickyi*, I could convince myself only of the variability of the Lenkoran race. In accordance with the supposed hybrid origin of the "subspecies" *caspius*, Kleiner (1935—38) states that extreme specimens cannot be distinguished from either *krynickyi* or *hyrcanus*.

Not only in the eastern, but also in the western zone of contact the black-capped *krynickyi* hybridizes with a striped-headed form: viz. with typical *glandarius* in the neighbourhood of Constantinople (Stresemann, 1919).

Laubmann (1914) mentions a bird which more resembles *Garrulus g. caspius* than either *krynickyi* or *glandarius*! So the hybrid origin of the Lenkoran race is confirmed, as occasional hybrids of *krynickyi* with *glandarius* resemble those of *krynickyi* with *hyrcanus*, the latter forming the "subspecies" *caspius*.

In conclusion it seems probable that in preglacial times Europe and Asia were inhabited by a Jay whose type may be reconstructed by considering the joint characters of the races *japonicus*, *hyrcanus*, and *glandarius*. The Japanese race may have remained the black bases of the outer webs of the primaries as an original character. As newly acquired characters of *japonicus* may be considered: (1) the white alar speculum, also possessed by *brandti*, *glandarius*, etc., which in *sinensis* and *leucotis* is white barred with blue; (2) the peculiar colour-design of the head (cf. Sushkin, 1927).

Theoretical reflections, as those given above, always remain highly hypothetical. They must only be considered as feeble efforts to trace lines of connection between the — geographically determined — variability of the species on the one hand, and the geological and climatological occurrences of the country they inhabit on the other hand. If no more is expected from them it cannot be taken amiss that my considerations started from a historical situation which may be considered to be far too simple: it probably cannot be true, that the bird-population of the whole of the palaearctic region, from the Pacific to the Atlantic ocean, was uniform in such a degree, as is supposed to have been

Figure 7.

Sketch-map, schematically showing the distribution of *Garrulus glandarius* (L.). Black areas: brown-headed groups: 1. Chinese and Himalayan subspecies with the heads unstriped: *sinensis*, *taivanus*, *rufescens*, *persaturatus*, *oatesi*, *interstinctus*, *bispecularis*; 2. Siberian subspecies with the heads striped: *banbergi*, *brandti*, *taczanowskii*.

Horizontally striped areas: vinous-coloured groups: 3. Japanese subspecies: *japonicus*, etc.; 4. Hyrcanian subspecies: *hyrcanus*; 5. European subspecies: *glandarius*, *rufitergum*, *hibernicus*, *albipectus*, *fasciatus*, *corsicanus*, *ichnusae*, *cretorum*.

Vertically striped areas: black-headed groups: 6. Farther Indian subspecies: *leucotis*; 7. Caucasian and Asia Minor subspecies: *krynickyi*, *iphigenia*, *africapillus*; 8. North African subspecies: *cervicalis*, *withakeri*, *oenops*.

Dotted areas: supposed "hybrid races": 9. *pekingensis*; 10. *haringtoni* (+ *oatesi* ?); 11. *severtzowi*; 12. *caspius*.

I am not able to give an opinion about the following races: 13. *kansuensis*; 14. *glaszneri*; nor about *rhodius* (Isle of Rhodes).



Figure 7.

the case in comparing the analogous colour-types of the Japanese, the North-Persian, and the European Jays. Owing to the doubtless different geographical conditions in different parts of the great Eurasiatic continent, and owing to preglacial geological influences, the bird-population of Europe and Asia may have had a variability which probably was not less high than those which can be observed at the present time. Nevertheless it is very remarkable that a uniform bird-population in the greater part of the palaearctic region — at all events geographically less varied than at present — proves to be no insufficient starting-point in explaining the recent distribution of some landbirds by way of glacial isolation. A preglacial palaearctic fauna, considered to be practically uniform, also forms the point, from which started the valuable zoogeographical opinions of Reinig (1937, 1938).

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De najaarstrek van den duinpieper, *Anthus c. campestris* (L.)

DOOR

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