

IDENTIFICATION FOR RINGERS

2



The Genus

PHYLLOSCOPUS

by KENNETH WILLIAMSON F.R.S.E.
(Migration Research Officer B.T.O.)

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INTRODUCTION

Anyone who chooses the *Phylloscopi* or leaf-warblers as his subject is immediately conscious of the very great debt he and others owe to the late Dr. Claud B. Ticehurst, whose review of this genus, published in 1938 by the Trustees of the British Museum, brought order out of chaos. Unfortunately, this book has long been out of print and appears to be exceedingly scarce in the second-hand market, so that a rapidly increasing number of ringers are having to take the field without the benefits which familiarity with Ticehurst's work bestows. Thus there seemed to be every justification for making the second of the present series of B.T.O. *Identification Guides* a study of this important genus, by general consent one of the most difficult groups of small passerines.

Scope of the work

At the outset I expected it would be sufficient to follow Ticehurst's monograph fairly closely, merely incorporating the little new work that had been done in the intervening years, but a growing familiarity with the group as my study developed led me to adopt a rather different approach to the problems raised by the distribution and inter-relationships of these fascinating birds. I have come to different conclusions as to how the group can best be organized, and my views are summarized in the resumé which precedes the treatment of the thirty species. In order that the picture shall be more complete I have dealt with all the continental forms, even though some are resident or practically so, and never likely to occur in western Europe, as several of the migratory Asian forms have done on a few occasions. I have not concerned myself, however, with the tropical leaf-warblers of the islands of Indonesia.

As in the case of *Identification Guide No. 1* (which dealt with the genera *Locustella*, *Luscinola*, *Acrocephalus* and *Hippolais*), my main aim has been the presentation of facts which I think will assist the bird-ringer to make a correct identification of the species, and even (in some cases) of the geographical race. Essentially this is a guide to the bird in the hand, not a field-guide, but under each species I have summarized what is known of habitat

preferences, song and call-notes, in the hope that this additional information might be helpful in some cases. Most of these data, and some of the information on soft-parts and moult, are taken from Ticehurst (1938); but measurements and wing-formulae have been taken *de novo* from birds in the large collection in the British Museum (Natural History), with the addition of other specimens kindly lent by the American Museum of Natural History, Universitetets Zoologiske Museum (Copenhagen), Royal Scottish Museum, and the Bolton Museum and Art Gallery.

The notes on distribution are based mainly on Ticehurst (1938), Vaurie (1945, 1959) and Ripley (1961).

Measurements

Once again I have had the invaluable help on the statistical side of Mr. T. B. Bagenal, who has prepared the data for the tables on pp. 76-80. The measurements throughout are in millimetres, and the weights are in grammes. In this genus the sexes are alike in plumage, but there appears to be a tendency in some species for ♂♂ to be larger than ♀♀. I have not attempted to separate the sexes in Tables 1 and 2, partly because I do not have complete confidence in the sexing shown on museum labels, but also because the overlap is too wide for wing-length and tail-length to have much value in indicating the sex of trapped birds. In Table 3 ♂♂ and ♀♀ wing and tail measurements are given separately for those species in which a sex difference is most marked, partly to give an idea of the degree of difference, but also because the results extend the range of overlap shown in Ticehurst's work. The tables give the size of each sample measured, the means and standard deviation, and a theoretical range calculated from the means \pm three times the standard deviation—within which virtually any example might be expected to fall.

One of the characters used by Ticehurst (1938) is the 'wing/tail ratio', i.e. tail-length expressed as a percentage of wing-length. This is much more variable than the single value given by Ticehurst would lead one to suppose, and in most cases reliance on 'wing/tail ratio' as an aid to identification would prove misleading. However, there are a few closely similar species and subspecies in which the difference is sufficiently well-marked to be a useful guide, and in these cases I have indicated the range obtained from examination of twenty or more specimens.

Wing-formula and Moult

An ascendant numbering of the primaries has been used in stating the wing-formula, and a descendant numbering for describing the moult: the reasons for this seeming inconsistency were fully explained in the introduction to the previous guide (pp. 7-8). Briefly, they are that an ascendant numbering is used by *The Handbook of British Birds* and practically all other authorities in recording wing-formulae, but the majority of moult studies use a descendant enumeration because this is the direction in which the renewal of the primary wing-feathers proceeds. In the wing-formula section the values shown are the amounts in millimetres by which each feather falls short of the longest primary or wing-point. The symbols '+' and '-' are shorthand for 'longer than' and 'shorter than', 'p.' and 's.' represent 'primary' and 'secondary' (with 'pp.' and 'ss.' as the plural), and 'p.c.' indicates 'primary coverts'.

In the *Phylloscopi* pp. 3-5 are emarginated and this fact is not repeated under each form; however, a statement is made concerning the presence or absence of emargination on the outer web of p. 6, since this is often important for identification.

Some species have a complete moult between the cessation of breeding and the onset of migration; in others, the post-nuptial moult is partial and the wing and tail feathers are not renewed until the birds reach winter quarters. This difference is important, since the condition of the plumage in autumn provides an easy means of age discrimination in species which belong to the latter category, adults being substantially more worn and 'bleached' in appearance than young of the year.

English Names

One of the worst bugbears has been in choosing from among the plethora of English names. Many authors have used the term 'willow-warblers' for the *Phylloscopi* but I have stuck to the alternative 'leaf-warblers' (except for the ground-feeding species), rejecting the former because many species have nothing whatever to do with willows, and because this is the long-accepted name of *Ph. trochilus*. The eastern forms present the greatest problem, for while some of the names used in the standard bird-books may be appropriate enough within a limited area, they seem quite inappropriate when the leaf-warblers are considered as a whole.

Some of the names that have been given are unnecessarily cumbersome—'Assamese Lesser White-tailed Leaf-warbler' for hybrid *reguloides* × *davisoni* probably takes the prize! Where it has seemed to me that a name has the authority of widely accepted usage, I have kept it; where it appeared to lack such authority, and was at the same time inappropriate, I have felt compelled to make a change.

The 'Key'

Finally, I have attempted to compile a 'key' to the continental members of the genus (omitting the tropical forms of *Ph. olivaceus* and *Ph. trivirgatus* in the islands of S.E. Asia). It was compiled without reference to the 'key' in Ticehurst (1938: 24-25) and when I compared the two afterwards I found that while his has the advantage of greater simplicity, I had gone further in attempting to cater for atypical specimens and the better-defined geographical races. As Ticehurst remarked, it is impossible to devise a 'key' that will work for every single example, and my effort is perhaps too ambitious: however, a 'key' has little practical application unless it attempts to cover most eventualities. It is perhaps no great disadvantage to have two different 'keys' available, so that those who are able can use one to check the findings of the other in doubtful cases.

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PREFACE TO THE SECOND EDITION

Little that is new to knowledge of taxonomy and distribution has come to light since this Identification Guide was published in May 1962, except that Ben King has collected and observed a number of the lesser known Asiatic species in Thailand. He is currently working with E. Dickinson, Allen Tubb and Martin Woodcock on a 'Field Guide to the Birds of Continental S.E. Asia', and I am grateful to him for allowing me the benefit of his wide experience.

My thanks are also due to Roy H. Dennis (Fair Isle), George Evans (Bardsey), R. F. Rutledge (Great Saltee), R. E. Scott (Dungeness) and P. Wilkinson for weight-records of the rarer species. H. E. Axell (Minsmere) has kindly sent me notes of recently captured Radde's Warblers.

KENNETH WILLIAMSON

The Genus PHYLLOSCOPUS

The *Phylloscopi* or leaf-warblers are in general alpine or subalpine in habitat, and the great mountain systems surrounding the Tibetan plateau show the richest variety of forms. Europe, where the extent and diversity of alpine habitats is relatively poor, has fewer species, and these include three (*borealis*, *trochiloides* and *inornatus*) which are in process of colonizing from Asia. There are two species, *trivirgatus* and *olivaceus*, in the mountainous archipelagos of S.E. Asia from the Philippine Is and New Guinea west to Malaya, *trivirgatus* occurring in a number of insular races. These tropical leaf-warblers are outside the scope of this work.

Ticehurst (1938) defined the *Phylloscopi* on a combination of structural characters such as the form of the bill, the prominence of rictal bristles and nasal hairs, the wing/tail ratio, and the relative length and stoutness of the tarsi. I found that by placing greater reliance on primary plumage characters—such as the presence or absence of wing-bars, dark coronal bands, a yellow rump-band, and pale edges to the tertials—I got what seemed to me a more natural grouping than is given by subgenera founded on bill-shape and other external structural characters. (For example, the subgenus *Acanthopneuste* contains species which do not appear to be closely related, such as *borealis* and *reguloides*). I conclude that in this as in many other groups of birds the bill, tarsus, rictal bristles and nasal hairs are more plastic and highly adaptive than the basic plumage-pattern.

As regards coloration, there are broadly two types, depending upon the amount of melanin in the plumage. The more usual type is some shade of greenish or olive above and yellowish below, while at the other extreme an increase in melanin leads to a combination of brownish upper parts and whitish under parts suffused with buff. There are species in which one or other plumage-type is exclusive, and others in which there is a clinal change from one extreme to the other. In the *Phylloscopi* as a whole one finds that geographical races have been described according to the relative amounts of melanin in the plumage in

different areas, so that poorly-defined intermediate forms are not uncommon in species with a continuous range. There are a few difficult cases in which the cline is irregular (cf. *collybita fulvescens* and *trochilus acredula*) and both plumage-types occur in the same population. The subspecies that have been described from such areas are not very satisfactory.

The genus, for convenience, may be divided into two broad groups. One group is Asiatic, with winter quarters from India east to the mainland and islands of S.E. Asia, and the other is mainly European, with winter quarters largely in Africa. As has been said, the Asiatic group is the more prolific of species, and these may be subdivided according to the presence or absence of certain plumage-characters as outlined below. These are not merely subdivisions of convenience: I believe they are also natural groupings in that they serve to bring together closely related species.

I—Asiatic Leaf-Warblers.

In subdividing the Asiatic leaf-warblers it is convenient to start with the group which shows most of the primary plumage-characters I have used in this survey, and work through to the subdivision which shows the fewest. The order of species within each subdivision is haphazard—except that I have endeavoured to keep related species together—and does not imply that one is either more 'primitive' or more 'advanced' than another.

(a) Yellow-rumped leaf-warblers and their allies: *Phylloscopus pulcher*, *maculipennis*, *proregulus*, *subviridis*, *inornatus*. The plumage characters are: (a) a well-defined supercilium, (b) a pronounced double wing-bar, (c) dark coronal bands separated by a pale mesial stripe, more pronounced in some than in others, (d) the tertials with pale outer edges and tips, (e) a yellow rump band, prominent in some but only faintly indicated in others, (f) white on the three outermost tail feathers in the first two species but not in the others. Arboreal.

(b) Crowned leaf-warblers and their allies: *Phylloscopus occipitalis*, *coronatus*, *reguloides*, *davisoni*, *cantator*, *ricketti*. The characters are: (a) a strongly marked supercilium, (b) a double wing-bar in all forms but one, (c) well-defined dark coronal bands and a pale mesial crown-stripe, (d) a variable amount of

white in the three outermost tail-feathers. These birds are *without* pale edges and tips to the tertials and the yellow rump-band. Arboreal.

(c) Arctic and Greenish Warblers and their allies: *Phylloscopus borealis*, *trochiloides*, *nitidus*, *plumbeitarsus*, *tenellipes*, *magnirostris*, *tyleri*. The plumage characters are: (a) a well-defined supercilium, (b) a double wing-bar, but the upper one slight or even absent in some forms, (c) crown often darker than mantle, but no development of dark lateral coronal bands as in the previous two categories, (d) a slight whitish margin to the inner webs of the three outermost tail feathers. There are no pale edges and tips to the tertials, and no yellow rump band. Arboreal.

(d) Remaining Asiatic species, *Phylloscopus fuscatus*, *fuligiventer*, *schwarzi*, *griseolus*, *armandii*, *affinis*. They are mainly ground-feeders or haunt low vegetation, and have a considerable amount of melanin in the plumage. Apart from a well-marked supercilium they have none of the primary plumage characters of the three groups dealt with above.

II—Mainly European Leaf-warblers.

There are six species: *Phylloscopus collybita*, *sindianus*, *neglectus* (forming a species-group), *trochilus*, *sibilatrix*, *bonelli*. They lack the plumage features shown by groups (a), (b) and (c) above, except for a moderately well-developed supercilium. This group combines the 'olive and yellow' with the 'brown and white' plumage-types to a greater degree than any of the others. All are arboreal.

1. ASIATIC LEAF-WARBLERS

(A) YELLOW-RUMPED LEAF-WARBLERS

Small size. Double wing-bar strongly developed. Dark or dusky coronal bands divided by pale crown-stripe broadening on nape (obscure in *inornatus*). Supercilium strongly developed. Tertiaries with pale edges and tips. Yellow rump-band (but poorly defined in *subviridis*, and even more so in *inornatus*). Tail with considerable white in *pulcher* and *maculipennis*, not in others. Plumage predominantly greenish above, yellow or yellowish-white beneath. Round-winged, 6th p. emarginate. Bill weak. Arboreal.

PHYLLOSCOPUS PULCHER Blyth

*Orange-barred Leaf-warbler**Ph. pulcher pulcher* Blyth

Mantle dark brownish-olive, rump pale yellow. Crown sooty, with a rather indistinct yellowish-green mesial stripe, broadest on nape. Prominent yellow supercilium extending almost to nape; lores, eye-streak and ear-coverts dusky olive; cheeks dull yellow mottled olive. Under parts pale yellow suffused greyish on breast and olive-buff on flanks and under tail-coverts. Bend of wing, under wing and axillaries pale yellow. Wings and tail dark brown edged olive-green, tertiaries with broad yellowish-white tips to outer webs. Double wing-bar, dark brown greater coverts broadly tipped orange, tips of median coverts smaller and rather duller. Three outer tail feathers white with dark brown wedge extending two-thirds of the way along outer web of outer feather from its tip, and half-way along outer webs of penultimate and third feathers, the last also having a broad dark brown tip on inner web (see fig. 1).

An arboreal bird of conifers and also above tree-level in juniper and rhododendron scrub. Song of rapidly vibrating notes forming a weak, high-pitched trill increasing in depth of tone and loudness to a climax, reminiscent of song of WOOD WARBLER. Call-note a loud, thrush-like *zip* or sharp *twick*, constantly repeated.

Colours of soft parts. Bill: black, lower mandible dark horn, its base yellowish or yellowish-brown. Legs: variously described as pale brown, grey-brown, yellow-brown. Mouth: yellow.

Measurements. Wing, ♂♀ 51-63. Tail, ♂♀ 35-46 (48). Bill, 11-13. Tarsus, 18-21. See Tables on pp. 76 *seq.*

Weight. 5.3 to 7.5 (mostly 6 to 6.5), average 6.33 gm. (breeding).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 7-11 (13) + p.c.

Wing-point 4th = 5th, occasionally = 6th, otherwise 6th, $\frac{1}{2}$ -1 $\frac{1}{2}$. 3rd, 1-3; 7th, 4-5 $\frac{1}{2}$; 8th, 6-8; 10th, 8 $\frac{1}{2}$ -11.

2nd, 7-13 = 9th or is shorter.

Moult (pp. descendant). The post-nuptial moult is complete during July and August, and the pre-nuptial moult of body feathers takes place from mid-February to mid-April. A late bird from Sakden, Bhutan (9,000 feet), 22.x., is only just finishing pp. 7-10, with the ss. and tail new.

Distribution. Himalayas from Nepal eastward to Sikang, N.E. Tsinghai, Szechwan, south to N. Burma and N. Yunnan, breeding at elevations from 7,000 to 14,000 feet and descending in winter to between 5,000 and 9,000 feet. In winter fairly common in N.W. Thailand above 5,000 feet.

Ph. pulcher kangrae Ticehurst

A fairly well differentiated form *kangrae* has been described from the Kharshu oak forest and conifer regions of N.W. Himalayas, at elevations of between 9,500 and 13,000 feet. Brighter, more yellowish-olive above, and a purer yellow below, the grey suffusion on breast being much reduced; coronal bands paler, dusky-olive, and the mesial stripe usually more noticeable. Measurements and wing-formula as in *pulcher*.

NOTE: A form *vegetus* Bangs described from W. Szechwan is not considered separable from the typical race (Ticehurst, 1938: 98), nor is the intermediate *erochroa* (Gray) of central Nepal Valley worthy of recognition.

PHYLLOSCOPUS MACULIPENNIS (Blyth)*Ashy-throated Leaf-warbler**Ph. maculipennis maculipennis* (Blyth)

Mantle and edges to wings and tail bright olive-green; rump yellow; head brownish-grey with an interrupted whitish crown-stripe. Long, well-defined whitish supercilium; lores and eye-streak dark brown; cheeks whitish mottled olive. Chin and throat pale grey; breast, belly and under tail-coverts bright yellow. Under wing-coverts and axillaries yellowish. Wings and tail dark brown, tertials with whitish tips to outer webs. Prominent double wing-bar, greater coverts broadly and median coverts narrowly tipped yellowish-white. Inner webs of three outermost tail feathers usually pure white, so that the tail looks quite white from below.

A forest bird keeping well up in the tops of trees. Call-note like that of *Ph. proregulus*, a constantly repeated *zip*.

Colours of soft parts. Bill: dark or blackish-brown, base of mandible dull fleshy yellow. Legs: variously described as brownish-yellow, greenish-brown, dark olive; toes yellowish-olive. Mouth: yellow.

Measurements. Wing, ♂♀ (43) 45-53 (55). Tail, ♂♀ 30-37 (39). Bill $8\frac{1}{2}$ - $10\frac{1}{2}$. Tarsus, $16\frac{1}{2}$ - $18\frac{1}{2}$, mostly 17-18. See Tables on pp. 76 seq.

Weight. Ripley gives 4.5 to 6.0 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. ($6\frac{1}{2}$) 8-10+ p.c.

Wing-point 4th=5th, often=6th, otherwise 6th, $\frac{1}{2}$ -1. 3rd 2-3; 7th, 2-3 $\frac{1}{2}$; 8th, 4-6; 10th, 6-8 $\frac{1}{2}$.

2nd, 8-9, falls shorter than 10th.

Moult (pp. descendant). The post-nuptial moult is complete, in August; Ticehurst found no evidence of pre-nuptial moult.

Distribution. Himalayas from Nepal eastward to Sikang and W. Szechwan, N. Burma, N.W. Thailand (Doi Inthanon, 8,400 feet); and probably N. Yunnan, N. Tonkin and S. Annam (Langbian Peak), at elevations of 7,000 to 10,000 feet, descending in winter.

Ph. maculipennis virens Ticehurst

The race *virens* in the N.W. Himalayas represents the end of a cline of decreasing saturation, but the colour differences are not well marked.

NOTE: The name *centralis* Ripley, W. Nepal, represents an intermediate stage on the cline. This species is similar in plumage to the GREY-HEADED FLYCATCHER-WARBLER *Seicercus xanthochistos* but has a shorter tail, iron grey (not blue-grey) head with a supercilium, and pale (not bright) yellow under parts (Sálim Ali, 1962).

PHYLLOSCOPUS PROREGULUS (Pallas)

*Pallas's Leaf-warbler**Ph. proregulus proregulus* (Pallas)

Upper parts and edges to wings and tail bright olive-green; indistinct dusky olive coronal bands on either side of pale crown-stripe; lemon-yellow band across rump. Well-marked superciliaries golden yellow in front of eye, paler behind, meeting the similarly-coloured crown-stripe at base of bill to give a golden forehead. The long superciliaries and the crown-stripe tend to break up into pale yellow mottling on the hind-crown and sides of neck. Cheeks golden, ear-coverts pale yellow mottled dusky olive, eye-streak dark olive. Under parts dull white, tinged yellow on flanks: under tail-coverts pale yellow. Wings and tail brown; pale yellow or whitish tips and edges to outer webs of tertials. Prominent double wing-bar formed by yellow tips to greater and median coverts.

All races are at once distinguishable from other *Phylloscopi*, except *pulcher* and *maculipennis*, by the canary-yellow rump-band. They can be told from *pulcher* by the yellow, not orange, wing-bars; from *maculipennis* by the golden, not grey 'face'; and from both by the absence of white in the tail. *Frontispiece*.

PALLAS'S LEAF-WARBLER has a characteristic habit of fluttering, like a GOLDCREST (*Regulus regulus*), outside the bough of a tree to pick insects off the leaves, and the yellow rump is very conspicuous at such times. Frequent 'flycatching' sallies are also reported. The typical race is a bird of pine forest in the breeding season; *chloronotus* and *simlaensis* also inhabit deodar, and the latter is found in Kharshu oak and rhododendron. In winter they are found in lighter growth, often in scrub along river

beds, or in mixed woodlands in hunting parties with TITS, GOLDCRESTS, etc. Song pleasing and strongly uttered, consisting of various notes repeated four or five times; recorded as singing on passage and in winter quarters. The usual call-note is a shrill, high-pitched *sivee* or *seep*, more prolonged and less squeaky than in GOLDCREST; while a metallic *choot* reminiscent of the flight-note of a REDPOLL *Carduelis flammea*, and a double *choo-ee* with the second syllable higher than the first, are also recorded (R. E. Scott, 1964).

Colours of soft parts. Bill: dark or blackish brown, base of lower mandible pale brown or yellow. In *chloronotus* the lower mandible is more often dark, almost to the base, than in *proregulus*. Legs: sepia, dark brown or greyish-brown, but pale brown in *simlaensis*. Mouth: yellow.

Measurements. Wing, ♂♀ 46-57. Tail, ♂♀ 31-45. Bill, 9-11½, mostly 9½-11. Tarsus, 15½-18. See Tables on pp. 76 *seq.*

Weight. Ticehurst gives 4.5 to 7.0 (breeding), 6.0 to 7.5 (passage), 4.5 to 6.3 gm. (winter). Shaw (1936) gives for 35 ♂♂ and 15 ♀♀, 5-7, average 6 gm. One at Spurn (Yorkshire), 23.x., 4.6 gm; one at Dungeness (Kent), 31.x., 5.4 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 6-8½ + p.c.

Wing-point 4th = 5th, rarely = 3rd, otherwise 3rd, ½-1½; 6th, 1-3; 7th, 3½-6½; 8th, 5-9; 10th, 7½-11.

2nd, 6-7½, falls between 7th-9th. For variations in *chloronotus* and *simlaensis* see below. 6th-10th pp. and all ss. sharply pointed.

Moult (pp. descendant). The post-nuptial moult is complete in August and September on the breeding ground. A ♀ from Trashiyangsi, E. Bhutan, 17.ix., at 11,000 feet, has pp. 1-6 new and the remainder growing together; ss. are moulting and tail, tertials and coverts have finished. A moult of body feathers takes place in March and April.

Distribution. S.W. Siberia from N.E. Russian Altai and Tannu Ola Mts north to Riv. Angara at 58° 30' N., 97° 20' E. and eastward to S. Transbaikalia and N. Mongolia (Khangai and E. Kentei Mts), S.E. Yakutia, Stanovoi Mts, basins of Rivs. Argun, Amur and Ussuri, and Sakhalin. On passage through Outer Mongolia, Manchuria, Korea and most of China except the east coast, to winter quarters in China south of the Lower Yangtze Valley west to Yunnan and Szechwan.

Has occurred as a vagrant at Orenburg (Russia) 18.x.; Hel Peninsula (Poland) 21.x.; Aaland Is (Finland) 30.x., Rossitten and other localities in E. Europe, 29.ix. to 4.xi. and 5.iv., S. Sweden 4.x. and 22.x., Heligoland (W. Germany) 6.x. to 29.x., Texel (Holland) 28.xi., Cap Gris Nez (France) 26.x. and in Belgium

and Dalmatia. In Britain it has appeared at Cley (Norfolk) 31.x.1896, Monks' House (Northumberland) 13.x.1951, Holme (Norfolk) 17.xi.1957, Sandwich Bay (Kent) 23.xi.1958, Walton-on-the-Naze (Essex) 16.x.1960, Spurn Point (E. Yorks) 22.x.1960, and Hartlepoons (Co. Durham) 12-13.x.1962. There was a spate of no fewer than six in 1963 distributed as follows: Holme 27-29.x., St Catherine's Point (I.O.W.) 27.x., Dungeness (Kent) 31.x., St Agnes (Scilly Is) 31.x., Spurn Point 3.xi. and Walberswick (Suffolk) 16.xi. (Scott, 1964). There were birds in 1965 at St Agnes 22-23.x., Portland Bill (Dorset) 25.x., Spurn Point 24-28.x., and 11-13.xi.; and in 1966 at Fair Isle 11.x., St Agnes 30.x., and Minsmere (Suffolk) 4.xi., making twenty British occurrences in the past fifteen years.

Ph. proregulus chloronotus (Gray)

The form *chloronotus* is a greyer greenish-olive, not so bright, above, and is dull yellowish, not white, on the under parts: the yellow markings of the head are less pronounced so that it lacks the striking golden-coloured face of the typical race. It is a slightly larger form: wing ♂♀ to 60, tail ♂♀ to 47. In wing-formula it differs in having a generally longer 1st p. (6-12½ + p.c.) and shorter 2nd p. (6-11½, falling between 8th and tips of ss. and most often between 9th-10th). Song rich and modulated, recalling that of WILLOW WARBLER; call *sip-sip*.

Distribution. High elevations (8,000-13,000 feet) in E. Himalayas from Sikkim and Bhutan to N.W. Yunnan (Yangtze-Mekong Divide and Likiang Range), Sikang and N. Szechwan, descending in winter to the foothills and valleys and penetrating south to Burma and N.W. Thailand.

Ph. proregulus simlaensis Ticehurst

The race *simlaensis* is brighter above, more yellowish-green, than the other races and has the under parts paler yellow than in *chloronotus*: the cheeks, supercilium and coronal stripe are a brighter yellow but not so prominently golden as in *proregulus*, and the coronal bands are not so dark. The measurements fall within the range of that form, and the wing-formula is much as in *chloronotus*, the 2nd p. falling between 9th and tips of ss. Song a short, twittering *wai-a-wai-a-wai* rapidly repeated with a faint, sibilant shivering note.

Distribution. It is found on the Safed Koh (Afghanistan—N.W. Pakistan), throughout Hazara and Kashmir, east to Gharwal and W. Nepal, at elevations of 7,500-11,000 feet, descending to 1,200-6,000 feet in the foothills of N.W. Himalayas in winter.

NOTE: The form *kansuensis* Meise (N. Kansu) is best synonymized with *proregulus* (Vaurie, 1954: 16). The names *newtoni* Gaetke, *forresti* Rothschild and *yunnanensis* La Touche are synonyms of *chloronotus*—see Ticehurst, 1938: 116-9.

PHYLLOSCOPUS SUBVIRIDIS (Brooks)

Brooks's Leaf-warbler

Upper parts and edges to wing and tail feathers yellowish-olive, the rump paler, sometimes an indistinct yellow rump-band. Head with rather obscure dusky olive coronal bands with a yellowish mesial stripe between. Well marked yellow superciliaries becoming golden in front of eye and joining in a 'bridge' above base of bill, as in *proregulus*. Lores and eye-streak dusky olive, cheeks golden, ear-coverts yellow tinged with olive. Under parts, under wing-coverts and axillaries pale yellow (in some yellowish-white). Wings and tail brown, whitish or yellowish-white tips and edges to tertials. Double wing-bar formed by broad tips to median coverts (yellowish-olive) and greater coverts (yellowish-white). Upper parts are more olive, less yellow, in late winter and spring.

Arboreal in coniferous forests (7,000-12,000 feet) in the breeding season, and in acacias and similar trees in winter. Song very distinct, *pi-pi-piaz-z-z-z* (Whitehead). Call-note a peculiar shrill tinkling *tiss-yip* with a marked rise between the two notes and almost slurred into one syllable (Brooks).

Colours of soft parts. Bill: dark or blackish-brown above, base of lower mandible yellow or pale horn. Legs: dark or blackish-brown, toes greyer or olive-brown. Mouth: yellow.

Measurements. Wing, ♂♀ (49) 51-59 (62). Tail, ♂♀ 37-45 (47). Bill, 10-12. Tarsus, 16½-18½. See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 5-10+p.c.

Wing-point 4th=5th. 3rd, ½-2; 6th, 1-2; 7th, 3½-6½; 8th, 5½-8; 10th, 8-12.

2nd, 6½-10, usually between 8th-9th, occasionally between 7th-8th or 9th-10th. 3rd=6th or a little longer.

Moult (pp. descendant). Probably a complete post-nuptial moult on the breeding-ground, and a partial change of body feathers in February or later.

Distribution. Boundary of Afghanistan-Pakistan (Safed Koh); perhaps in Tadzhikistan (*vide* Zarudny); Gilgit in W. Kashmir. At lower elevations there and in N.W. Himalayas on passage, wintering in foothills and plains of N.W. Pakistan, Punjab and N. India. Recorded as a vagrant from Orenburg (Russia), ix. 1882.

PHYLLOSCOPUS INORNATUS (Blyth)

*Yellow-browed Warbler**Ph. inornatus inornatus* (Blyth)

Upper parts and edges to wing and tail feathers bright greenish-olive; head darker and rump lighter. Broad yellow supercilium extending almost to nape, contrasting with dark lores and eye-streak; sometimes a very faint pale mesial crown stripe. Under parts white with a varying amount of yellowish; under tail-coverts, under wing-coverts and axillaries yellowish-white. Wings and tail dark brown; tertials edged, and secondaries and inner primaries tipped, yellowish-white in fresh dress. Conspicuous double wing-bar formed by yellowish-white tips to greater and median coverts.

Spring. The upper parts are browner after the spring body-moult, the wing-bars and under parts whiter. The upper parts wear more greyish-brown, though the rump retains its greenish wash, and the yellow disappears except from the under-wing and fore-part of the supercilium. Rictal bristles and numerous nasal hairs extend half-way up the nasal groove (cf. *humei*).
Frontispiece.

Avoids dense evergreen forest but has a wide variety of habitats—gardens, groves, etc.—in winter and on passage, and is fond of willows. Often in hunting parties with other *Phylloscopi* and TITS (*Parus* sp.). Song consists of a few plaintive notes, a poor and feeble variation of the call-note, which is characteristically a loud *weest*, though sometimes a disyllabic *wees-weest*.

Colours of soft parts. Bill: brown, base of lower mandible yellowish-flesh. Legs: olive-brown or ochraceous brown.

Measurements. Wing, ♂♀ 51-59. Tail, ♂♀ (34) 36-45. Bill, 10-11½. Tarsus, 17-20, mostly 18-19. See Tables on pp. 76 *seq.*

Weight. Autumn vagrants at British bird observatories range from 5.4 to 7.0, average 6.4 gm. (23 weighed). Ticehurst gives 4.3 to 6.2, average 5.6 gm. (winter); and 6.0 to 6.5, average 6.4 gm. (passage).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 4-7, mostly 5-6+p.c.

Wing-point, usually 3rd=4th=5th, but occasionally 3rd or 5th, ½-1 shorter. 6th, 1½-3; 7th, 4½-6½; 8th, 7-8½; 10th, 9-12.

2nd, 5-7, usually = 7th or falls between 7th-8th; occasionally between 6th-7th.

Moult (pp. descendant). A complete post-nuptial moult takes place on the breeding-grounds from late July to late August. There is a moult of body feathers only during March.

Distribution. From Riv. Pechora and N. Ural Mts across N. and central Siberia to Yeneseisk, Kansk, and Krasnoyarsk Dists north of W. and E. Sayan Mts (where replaced by *humei*); east to Lake Baikal and Transbaikalia, Outer Mongolia (Khentei Mts), basins of Rivs. Amur and Ussuri, Stanovoi Mts, possibly Manchuria (Great Khingan Mts) and Korea. Extends northwards to mouths of Rivs Lena, Kolyma and Anadyr, where it is a lowland species. On passage through China to winter quarters in Sikkim, Bengal, Assam, Burma, Malaysia, Thailand, Indo-Chinese countries and S. China. Said to have occurred once in May in Hondo (Japan).

The most regular vagrant in W. Europe of all Siberian species. Over eighty specimens were recorded on Heligoland between 1846 and 1887. It has occurred in W. Russia, Czechoslovakia, Austria, E. Germany, Denmark, Norway, Holland, S. France and Italy, but once only in Sweden (Ottenby, Öland, 27.x.1961). It is almost annual at Heligoland (17.ix. to 9.xi.) and Fair Isle (29.viii. to 29.x., mostly last week of September). In Britain it is fairly regular at most east coast bird observatories, scarcer on the English Channel and Irish Sea coasts, and rarely seen inland. Numbers recorded in recent autumn seasons have been as follows: 1960, twenty, at least eleven at Fair Isle and seven at Cape Clear Is (Co. Cork); 1961, fourteen, between 17.ix. and 14.x.; 1962, fifteen, between 21.ix. and 15.x., one staying till 6.xi.; 1963, fifteen, including four as late as early November; 1964, twenty-three, including five at St Agnes (Scilly Is.); 1965, about twenty, between 26.ix. and 16.x.; and 1966, fourteen, four of which were trapped at Fair Isle, 28.ix.

It is extremely rare in W. Europe in spring but is recorded from Heligoland (25.iv. and 25.v., also several in 1932), the Naze (Essex), 16.iii.1961, and once at Fair Isle (11.iv.); also once on the Scottish mainland (Dumfriesshire, 31.iii.). There have been sight-records in Madeira, Egypt (19.iv. and 10.xi.), Malta and Pantellaria (9.iv.) and a wintering record in Israel (1.i.).

Ph. inornatus mandellii (Brooks)

Upper parts darker and browner than *inornatus*, except for greenish rump. Dark coronal bands and pale mesial stripe faintly indicated. Supercilium and under parts dirty yellowish-white, centre of belly more yellowish. Upper wing-bar and pale edges to tertials less distinct.

An inhabitant of poplar and willow forest, also spruce, at about 7,500 feet, and in bush growth above tree limit to 12,000 feet in breeding quarters. Call-notes *tjis-jipp* or *biest-biest* (Weigold), and a tit-like *si-si* when moving in family parties.

Colours of soft parts. Bill: dark brown, basal half of lower mandible dull orange-yellow. Legs: pale yellowish-brown or greenish-brown.

Measurements. Wing, ♂♀ (51) 54-60. Tail, ♂♀ (36) 38-45 (47). Bill and tarsus as *inornatus*.

Wing-formula (pp. ascendant). As *inornatus* but wing-point 4th=5th or nearly so, with 3rd=6th or shorter; and shorter 2nd, a few falling between 7th-8th but more usually shorter and often between 9th-10th.

Distribution. W. slopes of Ala Shan in Ninghsi, S. Nan Shan in Tsinghai and N. Kansu; other mountain ranges in Kansu and Szechwan to S.E. Tibet and possibly N. Yunnan. Winters in Sikkim, Bengal, Assam, Burma and Thailand.

Ph. inornatus humei (Brooks)

Upper parts and edges to wing and tail feathers duller, more greyish-olive, giving a mealy appearance; yellow of head, under parts and wing-bars replaced by buffish-white. Upper wing-bar less pronounced. Few nasal hairs apparent, only just visible above the feathers of forehead (cf. *inornatus*).

Breeds on lightly-forested hillsides, particularly in silver firs above 7,500 feet, and in sunny glades on the higher reaches, among larch and pine-cedar. Also in birch and juniper above the pine belt. Call-note a loud, ringing *chil-ip*, *tiss-yip* or *te-twee-up*, whereas *inornatus* usually has a monosyllabic call.

Colours of soft parts. Bill: very dark brown, base of lower mandible dull orange or yellowish. Legs: olive-brown or very dark brown (F. Ludlow). Mouth: yellow.

Measurements. Wing, ♂♀ 51-60 (62). Tail, ♂♀ 36-45 (47). Bill and tarsus as *inornatus*.

Wing-formula (pp. ascendant). As *inornatus*, with 3rd usually longer than 6th and just short of wing-point, 4th=5th. 2nd, 6-9, falls between 7th-9th or is occasionally shorter.

Moult (pp. descendant). According to Ticehurst, complete on the breeding grounds, August and early September. A ♂ from Muddapur, 20.xi., however, is just finishing the wing and has all the tail feathers short of full length; while a ♀, 23.xi., has pp. 7-9 and ss. 5-6 finishing (p. 10 and alula new) and the outer tail feathers nearly full grown. The pre-nuptial moult in March and April is confined to body feathers.

Distribution. Higher wooded parts of N.W. Himalayas at 8,000 to 11,000 feet: W. Pamirs, Hissar and Alexandrovski Mts and Tian Shan system, Dzungarian Ala Tau Mts, Tarbagatai Mts, Russian Altai Mts in upper part of forest zone, slopes of W. and E. Sayan Mts, Tannu Ola Mts, Khangai Mts in Mongolia. Winters in W. Himalayas and over much of peninsula India.

1. ASIATIC LEAF-WARBLERS

(B) CROWNED LEAF-WARBLERS

Medium to small size. Wing-bars: lower bar well developed, upper one generally so (except *coronatus*). Dark or dusky coronal bands divided by pale crown-stripe. Supercilium strongly developed. No pale edges and tips to tertials. No yellow rump-band. Tail with variable amount of white on inner webs of three outer feathers. Plumage predominantly greenish above, yellow to pale yellowish-white beneath. Round-winged, 6th p. emarginate. Bill fairly stout. Arboreal.

THE CROWNED LEAF-WARBLERS

In this group I include, among others, *Ph. occipitalis*, *Ph. coronatus*, *Ph. reguloides* and *Ph. davisoni*, the last two of which occur in several races. All have the same plumage-pattern and are obviously closely allied, probably forming a species-group. In plumage-pattern they agree with a number of island forms in S.E. Asia formerly considered to be races of *Seicercus trivirgatus*, and with two continental forms, *cantator* and *ricketti*, which were formerly put in this genus, but all of which are better placed in *Phylloscopus* (Mayr, 1944).

Vaurie (1959) and others have placed *coronatus* as a race of *occipitalis*, because their ranges are mutually exclusive: however, there is a good deal to be said for Ticehurst's argument (1938:162) that the very wideness of separation of their breeding ranges makes one hesitate to accept their conspecificity. He points out that it is characteristic of continental *Phylloscopi* that the forms of every species have a continuous distribution so that intergrades are common, and that over the 2,500 miles stretch of country which separates *occipitalis* in the Himalayas from *coronatus* in N.E. China there are no intervening forms. "That is quite unique," he comments. "It is easy, of course, to infer that the intervening forms—the missing links—have died out, but that is no more than guesswork."

Actually there is no need for any such inference since this gap is filled by a very similar species in *Ph. reguloides*: at the Himalayan end we have in the form *kashmiriensis* a bird superficially like its larger neighbour *occipitalis*, while at the other extreme, in Kansu and Sikang, is a form *claudiae* similar in coloration to *coronatus* and even approaching it in size. The larger birds may well be the relics of an early invasion which had time to develop

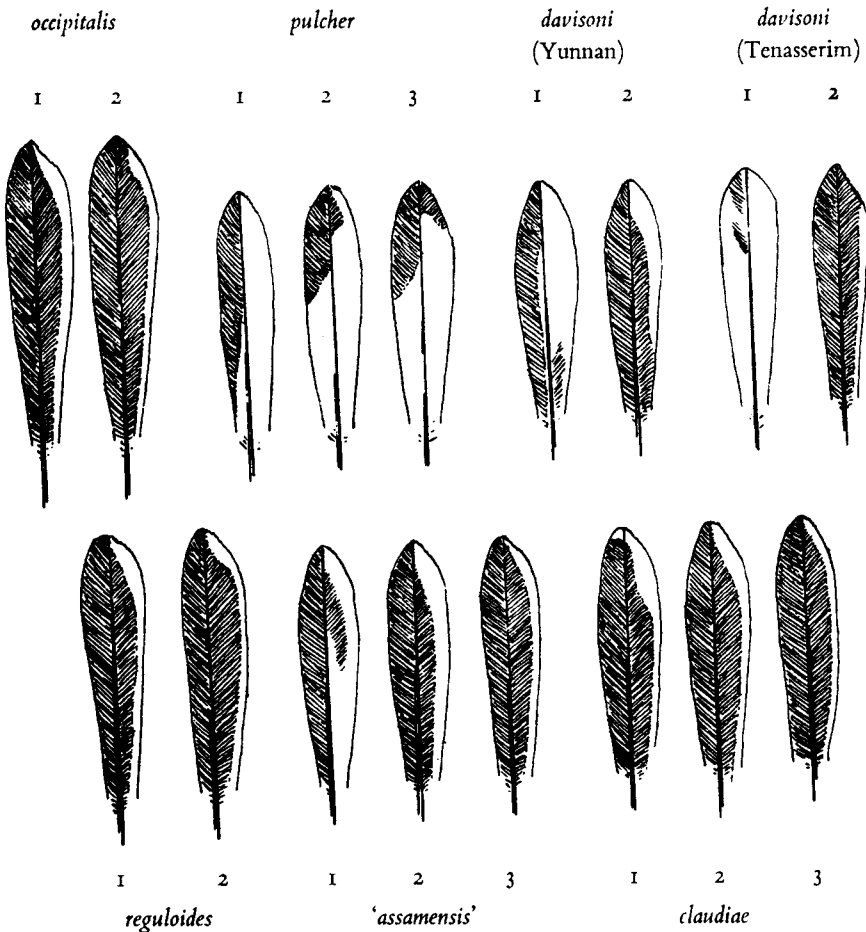


Fig. 1.—Distribution of white in tail feathers of some *Phylloscopi*:
 (1) outermost, (2) penultimate, (3) next innermost feather.

specific characters in isolation before the region was reinvaded by *Ph. reguloides* from the same parent stock. The forms *occipitalis* and *kashmiriensis* now overlap to a considerable extent in N.W. Himalayas, but *coronatus* and *claudiae* appear to be rather widely separated, though it should be mentioned that Weigold claimed that the former breeds in N. Sikang (Ticehurst 1938: 161).

The relationship of *Ph. davisoni*, for lack of adequate field-work, is not clear, but while such forms of it as *ogilvie-granti* and *disturbans* apparently breed alongside races of *Ph. reguloides* and remain distinct, there can be little doubt that the nominate forms of both species meet in Assam and N. Burma, where such barriers to interbreeding as maintain their distinctness elsewhere break down. Indeed, such is the intergradation in size, general coloration and pattern of white in the three outer tail feathers in this region that I regard so-called 'assamensis' (which Vaurie synonymized with *reguloides*) as a hybrid swarm of *reguloides* × *davisoni*.^{*} It would seem that the more recent offshoot, *Ph. davisoni*, although it has been able to expand and maintain its identity to the north and east, has been absorbed in N. Burma and Assam by its predecessor and has so failed to penetrate to the range of true *reguloides* and the western form *kashmiriensis* in the Himalayas proper.

Ticehurst (1936: 171) has commented on the interesting parallelism shown by the two species. The vividness of green above and yellow below (and in the supercilium etc.) are most marked in the southern pair, *r. ticehursti* and *d. klossi*. In N.W. Fukien *r. fokiensis* and *d. ogilvie-granti* are only a little less saturated, while the reduction of green and yellow is most marked in *r. claudiae* and *d. disturbans* in Sikang and Kansu.

* There are two interesting specimens in the British Museum collected at Kambaiti, Myitkyina Dist., Burma, at 7,000 feet on 22-23.v.1935: one, a juvenile just out of the nest, has true *davisoni* tail feathers, but the breeding ♀ taken in the same area has 'assamensis' tail feathers, though on coloration and size it is near *davisoni* (wing 54, tail 40). In this respect it agrees with others, some indeterminate, collected in N. Burma. Indeed, a ♀ shot off a nest with three eggs at Mooleyit, Burma, 2.ii.1877, by William Davison, and marked as a co-type of *davisoni*, has outer tail feathers of 'assamensis' type (see fig. 1).

PHYLLOSCOPUS OCCIPITALIS (Blyth)*Western Crowned Leaf-warbler*

Upper parts and edges to wings and tail light yellowish-olive, often with a blue-grey cast on the mantle in fresh plumage. Broad coronal bands dusky olive, often blackish on nape, with a mesial stripe varying from yellowish with a broken blue-grey margin to greyish-white. Supercilium well-marked, primrose yellow; lores and eye-streak dark olive; cheeks yellowish. Under parts white tinged greyish on breast and flanks and streaked with yellow on breast and belly. Under wing-coverts and axillaries yellow, under tail-coverts white with a slight yellow tinge. Double wing-bar of narrow yellow tips to greater and median coverts, not very distinct. Wings and tail brown, outer and penultimate tail feathers tipped and narrowly edged white on inner webs, third pair with a white spot at tips (fig. 1).

Rictal bristles and nasal hairs prominent. Bill rather wide at base, tarsi stout.

A bird of hazel and willow scrub and open coniferous forest to tree limit; arboreal but descending to bushes to feed. Has a distinctive habit of moving restlessly among boughs and foliage, waving one wing and uttering a monotonous, repeated *chip*. Pugnacious in the breeding season, but gregarious in winter. Song a high-pitched, rather monotonous *cha-chi* or *wee-chwee* rapidly repeated.

Colours of soft parts. Bill: dusky brown above, yellow or orange below. Legs: variously described as pale brown, greyish-brown, olive-brown tinged with greenish, plumbeous brown with feet yellower. Mouth: pale yellow.

Measurements. Wing, ♂♂ 62-70 (72), ♀♀ 56-64 (a few longer than this may be wrongly sexed). Tail, ♂♂ (44) 47-55, ♀♀ (41, 42) 45-50. Bill, 13-15. Tarsus, 17-19 (20). See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th, but not as sharply as in most species. 1st p. $6-8\frac{1}{2} + p.c.$

Wing-point 4th, sometimes = 3rd or = 5th; otherwise 3rd, $\frac{1}{2}-2\frac{1}{2}$; 5th, $\frac{1}{2}-1$; 6th, $1\frac{1}{2}-4$; 7th, $6-8\frac{1}{2}$; 8th, $8-10\frac{1}{2}$; 10th, $11\frac{1}{2}-14$ (15). 2nd, 7-11, falls between 7th-9th (rarely = 7th or = 9th).

Moult (pp. descendant). Of the post-nuptial moult Ticehurst (1938: 157) says: "Complete; the only one seen was from Srinagar, Kashmir, on September 10. The comparatively few autumn and winter birds from the peninsula of India show no moult of wings and so presumably this moult is performed on or near the breeding grounds, where all adults are in worn dress till mid-August." Nevertheless, some March-April birds have very fresh wing and tail feathers and appear to have recently completed a full moult, whereas a majority are quite worn at this season. A bird from Hissar, Punjab, 20.viii., was without tertials, and one from Kangra Valley, Punjab, 9.x., has p. 9 just short of full length, with ss. 5-6 short of full length, the remainder of the plumage being new.

Distribution. Hissar and Zarafshan Mts, W. Pamirs, borders of Afghanistan and N.W. Pakistan (Safed Koh), whole of Kashmir from 6,000 to 10,000 feet, N.W. Himalayas east to Nepal. Winters over much of peninsula India.

PHYLLOSCOPUS CORONATUS (Temminck & Schlegel)

Eastern Crowned Leaf-warbler

Upper parts dark green (autumn) to dark brownish-olive (spring). Coronal bands dusky olive, mesial stripe yellowish to greyish and sometimes rather indistinct. Prominent supercilium yellowish to above eye, whitish behind; lores and eye-streak dark olive; cheeks pale yellow mottled olive. Under parts white faintly streaked pale yellow, contrasting with yellow under tail-coverts. Under wing-coverts and axillaries yellow. Single wing-bar formed by yellowish-white tips to greater coverts. Thin yellowish border to inner webs of outer and penultimate tail feathers.

Rictal bristles and nasal hairs stiff and prominent. Bill strong, broad at base. Japanese birds have a slightly broader bill than those from S.E. Siberia.

Affects open deciduous woodland on lower mountain slopes; not found in subalpine coniferous forest. In Japan occupies the zone below *Ph. xanthodryas*, below 3,000 feet. Song two repeated short syllables followed by a longer, drawn-out one—*djip-djip, djip-djip, jee* (Austin and Kuroda); often lacking end-note and main part sometimes repeated three or four times (Yamashina).

Colours of soft parts. Bill: upper mandible rich reddish umber, cutting edge and lower mandible orange. (King gives blackish, with commissure and tip yellow, mandible fleshy yellow). Legs: greyish or greenish-brown to dark brown, toes and claws

yellower. Mouth: orange. Labels of Japanese birds give bill black above, yellow below; legs dark horn.

Measurements. Wing, ♂♂ 60-65, ♀♀ 57-61, with a very few of each sex outside these ranges. Tail, ♂♀ 42-50. Bill, (12) 13-15. Tarsus, 17-19. Japanese birds are slightly longer in the wing, ♂♀ 60-66, and tail, ♂♀ 44-52. See Tables on pp. 76 *seq.*

Weight. 8-10.5, average 8.8 gm. Shaw (1936) gives for 11 ♂♂, 9-12, average 10 gm.

Wing-formula (pp. ascendant). Emarginated 6th, but less clearly than in most species, and hardly apparent in many birds. 1st p. 3-6+p.c.

Wing-point 4th or 3rd=4th, rarely=5th; otherwise 3rd and 5th, $\frac{1}{2}$ -1 $\frac{1}{2}$; 6th, 4-5; 7th, 7-10; 8th, 9-12; 10th, 12-15.

2nd, 6-9, falls between 6th-7th, rarely=6th or=7th.

Moult (pp. descendant). Post-nuptial moult complete, July-August. Pre-nuptial moult of body feathers only from late February to mid-March, according to Ticehurst; but a ♂ in British Museum (misidentified as *claudiae*) from 17° 40' N. on Riv. Mekong, 28.ii., is finishing moult of ss. 3-6, with pp. and tail new.

Distribution. Manchuria (Great Khingan Mts), region of Rivs Argun, Amur and Ussuri in S.E. Siberia, central and S. Korea, Japan. Perhaps also N. Szechwan. Migrates through China to winter in Indo-Chinese countries, Malaya, Sumatra and Java. Probably the breeding range is more extensive than is at present known—see Ticehurst (1938: 161). Gätke (1895) recorded one at Heligoland (Germany), 4.x.1843.

PHYLLOSCOPUS REGULOIDES (Blyth)

Blyth's Crowned Leaf-warbler

Upper parts and edges to wings and tail olive-green, the shade varying according to race. Coronal bands varying from dark olive to almost blackish, darkest on hind-crown where a pale mesial stripe expands to form a yellowish spot. Well-marked yellowish supercilium; lores and eye-streak dark olive; cheeks and ear-coverts yellowish. Under parts whitish with a varying amount of yellow depending on race; under-wing and under tail-coverts yellowish. Wings and tail dark brown. Greater coverts broadly and median coverts narrowly tipped with yellow forming a double wing-bar; bend of wing bright yellow. Tip and inner web of three outer tail feathers narrowly edged white (fig. 1).

The race *kashmiriensis* inhabits rhododendron and Kharshu oak at about 8,000-10,000 feet in the breeding season; Schafer found 'assamensis' in deciduous stands among conifer forests in autumn. La Touche describes the song of *fokiensis* as *chi, chi, chi*, repeated three times; that of *claudiae* is said to consist of a warbling trill reminiscent of WOOD WARBLER. Call-note *kee-kew-i* constantly repeated in *reguloides* (H. G. Alexander), a single *cheep* in 'assamensis' (S. D. Ripley). *Frontispiece*.

Colours of soft parts. Bill: upper mandible blackish-brown, cutting-edge and lower mandible yellow to orange. Legs: some shade of brownish or yellowish (*reguloides*, 'assamensis'), bluish-green or lavender blue becoming greenish-yellow on toes (*kashmiriensis*), brownish-grey, yellower on toes (*claudiae*). Mouth: bright fleshy yellow.

Measurements. Wing, ♂♀ 53-62 (64) in all races except *claudiae*, 57-68. Tail, ♂♀ 39-49 (50) except in *claudiae*, 41-50 (52). In 'assamensis', as one might expect from a *reguloides* × *davisoni* hybrid, measurements are somewhat smaller, wing 52-61, tail 36-45. Bill, 11-13. Tarsus, 16-18½. See Tables on pp. 76 seq.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 7½-12 + p.c.

Wing-point 4th=5th (5th occasionally ½ shorter). 3rd, ½-2; 6th, 1-2½; 7th, 4½-7; 8th, 6-9; 10th, 10-12.

2nd, 8-10½, falls between 7th-10th. The wing is roundest (i.e. most like *davisoni*) in 'assamensis', 2nd falling mostly between 9th and tips of ss, and most pointed in *claudiae*, 2nd being rarely as short as 9th.

Moult (pp. descendant). There is a complete post-nuptial moult from July to early September. A ♂ *kashmiriensis* from Simla, Punjab, 4.viii., has renewed the tertials and pp. 1-2 and has pp. 3-6 and the tail in moult. A *claudiae* from Kwanhsien, Sikang, 6.viii., has already finished except for pp. 8-10, growing; while two 'assamensis' from Shillong, Assam, 20 and 27.viii., are at about the same stage. A ♀ *kashmiriensis* from Simla, 2.ix., has pp. 6-10 and ss. 1-3 growing, the tertials old and the tail in moult, while another dated 4.ix. has finished the tertials, tail and body but has pp. 8-9 incomplete and ss. 3-6 all partly grown. There is a pre-nuptial moult of body feathers in February and March.

Distribution. Throughout the Himalayas from Kashmir at 8,000-10,000 feet (*kashmiriensis*),? Nepal, Sikkim, Bhutan and S. Tibet at 6,000-10,000 feet (*reguloides*), Sikang, Kansu and Szechwan at similar elevations (*claudiae*), mountains of N.W. Fukien in S.E. China (*fokiensis*), and Langbian Peaks in S. Annam (*ticehursti*). Doubtless more widely distributed in the east and southeast of its range than the few records suggest. The unstable form 'assamensis' is found at elevations between 7,000-14,000 feet in the mountains of Bhutan, Assam, Manipur and N. Burma. Descends in winter, some moving a little way south into India, Burma and Indo-Chinese countries.

PHYLLOSCOPUS DAVISONI (Oates)

Oates's Crowned Leaf-warbler

General description as for *Ph. reguloides*, the tone of green and yellow varying according to population. The present species is smaller, and has a larger amount of white in the three outer tail feathers—most prominent in typical *davisoni*, least so in *disturbans*. In *klossi* this has a distinctly yellow tinge. See fig. 1.

It appears to be a bird of open evergreen forest at higher elevations than *Ph. reguloides*. Thus, near Maymyo in Mandalay Dist., and at Pyinmana, Yamethin Dist., Burma, *reguloides* were collected from November to March at 400-1,500 feet, and *davisoni* in April, June and October at 3,500-4,000 feet. Other specimens of *davisoni* come from 3,700-4,500 feet, in February and March, and as high as 7,000 feet in Myitkyina Dist. in May. The form *klossi*, however, several of which were collected at 5,000 feet in S. Annam, may live at a lower elevation than *r. ticehursti*, four of which come from between 6,000 and 7,500 feet on the Langbian Peaks. The form *ogilvie-granti* breeds in damp mountain forests at 6,000-6,500 feet in N.W. Fukien (La Touche); according to Caldwell and Caldwell (1931) it builds its nest into the moss covering standing trees, logs and stumps at 4-5 feet above ground level, whereas its opposite number *r. fokiensis* nests on the ground.

Colours of soft parts. Bill: brown or black above, yellow or orange below (*ogilvie-granti*, *klossi*). Legs: grey (*ogilvie-granti*), olive to greenish-plumbeous (others).

Measurements. Wing, ♂♀ 47-57. Tail, ♂♀ 36-43. Bill, 10-12. Tarsus, 17½-19. (All races). See Tables on pp. 76 seq.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 8-12+p.c.

Wing-point 4th=5th, usually=6th, otherwise 6th ½ shorter. 3rd, ½-2; 7th, 2-3½; 8th, 3½-5½; 10th, 6½-9.

2nd, 6½-9, falls between 8th-9th in some *disturbans* and *ogilvie-granti*, but is otherwise shorter, often=tips of ss.

Moult (pp. descendant). Complete post-nuptial moult from late June to late August. A bird from 3,600 feet at Maymyo, Mandalay Dist., Burma, 30.vi., has the tail in pin, tertials growing, the wing-coverts and pp. 1-3 new, s. 1 and pp. 4-5 growing. A ♂ from Sadon, Myitkyina Dist. at 4,500 feet, 16.viii., has finished except that p. 9 and ss. 5-6 are not fully extended, and chin, throat and under parts are still in moult. Some birds may moult later in the year: one from

4,000 feet in the Karen Hills, N. Burma, 15.i., is in quite fresh plumage, and so also is a ♀ from Karennee, Burma, 15.iii. A *klossi* from Dalat, S. Annam, 3.v., has the middle pair of tail feathers half grown.

Distribution. E. Sikang, Burma south to N. Tenasserim, Yunnan, N. Tonkin, N. Laos, (*davisoni*); Szechwan south to ? Yunnan (*disturbans*); Yunnan, N. Annam and Fukien province, S.E. China (*ogilvie-granti*); S. Laos and S. Annam (*klossi*). In Thailand the form *davisoni* is common above 4,000 feet in the N.W., while *klossi* inhabits evergreen forest at 2,500-5,400 feet in the extreme S.E.

NOTE: There is practically no difference in the shade of olive on the mantle between birds from Annam and those from Fukien, though the former show a tendency to be yellower beneath: the distinction is a poor one, especially as so few specimens are available and the range may well be continuous. Burmese *davisoni* have a greyish-olive cast on the mantle so that it is less pure than in other races. Birds from Szechwan, Tonkin, Taloun and Laos (*disturbans*) are barely separable from *ogilvie-granti* on the upper parts but are whiter beneath. *Ph. r. claudiae* is slightly browner above than *Ph. d. disturbans*, and the coronal stripe and supercilium are whiter making a better contrast in the head plumage. There is no plumage difference between *Ph. r. ticehursti* and *Ph. d. klossi*, but sex for sex the former is the bigger bird, has a longer tail, and less white on the outer tail feathers. After studying a series collected in S.E. Thailand by Ben King, H. G. Deignan has synonymized the form *intensior* with *Ph. d. klossi*.

PHYLLOSCOPUS CANTATOR (Tickell)

Yellow-faced Leaf-warbler

Upper parts and edges to wing and tail feathers bright greyish-green. Coronal bands dark olive, sooty not black as in *ricketti*; broad yellow mesial stripe, becoming wider on hind-crown; well-marked yellow supercilium. Cheeks and ear-coverts yellow with an olive wash; lores and eye-streak dark olive. Chin, throat, upper breast and under tail-coverts bright yellow contrasting with white lower breast and belly; flanks greyish. Indistinct double wing-bar formed by yellow tips to greater coverts and paler, slighter tips to median coverts in fresh plumage. Wings and tail dark brown; axillaries yellowish-white. Broad yellowish-white margin to inner webs of three outermost tail feathers.

In winter in Burma likes luxuriant vegetation close to water (bamboo clumps, teak plantations) where it associates freely with other *Phylloscopi*. Call-note a loud, continuous *pio, pio*.

Ageing. 1st w. has upper parts duller and under parts paler, yellowish-white.

Colours of soft parts. Bill: upper mandible brown, lower mandible straw yellow. Legs: fleshy yellow to horny yellow.

Measurements. Wing, ♂♀ (48) 50-57. Tail, ♂♀ 35-43. Bill, 11½-13. Tarsus, 16½-18.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 6-10+p.c.

Wing-point, 4th=5th, sometimes=3rd; otherwise, 3rd, ½-2; 6th, 1-3; 7th, 4-6; 8th, 6½-8; 10th, 9-11.

2nd, 7-10½, =8th or falls between 8th-10th.

Moult (pp. descendant). Apparently there is a complete moult in July.

Distribution. Himalayas from Sikkim east to Assam and N. Burma; has been collected in N.W. Thailand.

PHYLLOSCOPUS RICKETTI (Slater)

Slater's Leaf-warbler

Ph. ricketti ricketti (Slater)

Upper parts and edges to wings, coverts and tail deep olive-green. Wide lateral coronal bands black, mesial stripe yellow. Well-marked though narrow bright yellow supercilium; lores and eye-streak black. Under parts, under wing-coverts and axillaries uniform bright yellow, flanks washed with olive. Wings and tail black. No white in tail, but a narrow pale yellow border to distal parts of inner webs of outer and penultimate feathers. Double wing-bar of fairly broad yellow spots at tips of four or five outermost greater coverts, and slighter yellow tips to median coverts.

Arboreal in light evergreen forest. Sociable in winter, flocking with other *Phylloscopi* etc.

Colours of soft parts. Bill: blackish above, fleshy yellow below. Legs: yellowish-brown or grey-brown.

Measurements. Wing, ♂♂ 54-59, ♀♀ 51-54. Tail, ♂♂ 37-44, ♀♀ 34-38. Bill, 11½-13. Tarsus, 16½-18.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 5-10 (usually 7-8)+p.c.

Wing-point, 3rd=4th=5th. 6th, 1½-2; 7th, 5-6; 8th, 7-8; 10th, 10-11.

2nd, 6-8½, falls between 7th-9th.

Distribution. S.E. China, in N.W. Fukien and Kweichow provinces, N. Annam, N. Tonkin and S. Yunnan. Also known from Laos and Thailand.

Ph. ricketti goodsoni Hartert

A smaller edition, known only from the type from S. Hainan. Paler above, coronal bands not so black, under parts sulphur-yellow tinged olive-green on sides, indistinctly striated pale grey (Hartert, 1910). Wing, ♂ 54, tail, ♂ 40: 2nd p.=10th, 3rd p. shorter than 6th (longer in *ricketti*).

1. ASIATIC LEAF-WARBLERS

(c) ARCTIC AND GREENISH WARBLERS AND THEIR ALLIES

Large to medium size. Wing-bars: lower one present in all forms (but very faint in *tyleri* and wearing faint in others); upper one present in some, though often lost by abrasion (but retained in *plumbeitarsus*). No coronal bands or pale crown-stripe but head darker than mantle in some. Supercilium usually long and broad, extending to nape. No pale edges and tips to tertials. No yellow rump band. Tail: white margin to inner webs of two or three outer feathers. Plumage predominantly greenish above (but brown in *tenellipes*), whitish beneath with a variable amount of yellow. Long-winged in migratory, round-winged in mountain forms; 5th or 6th pp. emarginate. Bill-structure very variable, even within the species (e.g. *borealis*). Arboreal.

THE ARCTIC WARBLER

Since the publication of Ticehurst's monograph the only major revision of the ARCTIC WARBLER has been that of Portenko (1938), who split the species into five races, naming the first two as new—*talovka* for birds from the Ural Mts and to the west, *transbaicalicus* for the populations immediately to the east, nominate *borealis* from N.E. Siberia and Alaska, *xanthodryas* from Kamchatka, Commander Is and Japan, and *hylebata* from Ussuriland and Amurland. He thus synonymized *kennicotti* (Alaska) with *borealis*, and *examinandus* (Kamchatka, Commander and N. Kurile Is) with *xanthodryas*, and resuscitated *hylebata* although this name was applied by Swinhoe in 1860 to a quite indeterminate migrant from Amoy, S. China.

Vaurie (1959) follows this arrangement as being the last review based largely on breeding material, with the exception that he recognizes the Alaskan race (Vaurie, 1954: 17-20). He has kindly

examined the type of *examinandus* (a wintering bird from Bali, Sunda Is) on my behalf, and we believe that this name is correctly placed as a synonym of *xanthodryas*. In such breeding material as I have examined I have been unable to make out any constant differences, either of coloration or size, which would support Portenko's arrangement: *Ph. borealis* is a variable species, and the only forms which show any degree of constancy are the New World *kennicotti* and Japanese *xanthodryas*, and these are valid on bill-structure as much as coloration. Over the whole of its continental range in Eurasia, except perhaps for Kamchatka, I cannot see that any advantage is to be gained by recognizing other than nominate *borealis*. Allowing for individual variation I can find no difference in the tone of upper and under parts between six breeding adults from Pasvik (Norway), four from Riv. Lena (N.E. Siberia), and a long and somewhat variable series from Riv. Yenesei (central Siberia) at about 69° N. Two from N. Mongolia and single birds from Anadyr Bay and Bering Is (N.E. Siberia) substantially agree.

PHYLLOSCOPUS BOREALIS (Blasius)

Arctic Warbler

Ph. borealis borealis (Blasius)

Upper parts and edges to wings and tail olive with a greyish or brownish cast, brighter on rump, darker on crown. (Western populations are a purer greenish-olive after autumn body-moult, but in eastern birds there is little change). Conspicuous yellowish-white supercilium reaching almost to hind-crown, often slightly upcurved at rear; lores and eye-streak dark olive; cheeks and ear-coverts yellowish-white mottled dusky olive. Under parts dull creamy-white with a variable amount of yellow, often in streaks; breast often mottled dull grey; sides of breast and flanks suffused brownish-olive. Axillaries and under-wing yellowish-white; under tail-coverts pale buffy yellow, the longest ones with brown at either side of the white shaft. Wings and tail dark brown. Narrow creamy bar at tips of outer greater coverts, and a slight yellowish bar at tips of median coverts; this often disappears with wear, and the distal bar may also disappear from one or both wings. Tip and inner web of the three outer tail feathers narrowly margined white.

'Field characters which I thought useful were: long, upturned supercilium, rather large pale bill, pale feet, *zik* call, restless feeding behaviour with much tail and wing flicking, and a preference for walls or fences rather than crops' (Roy H. Dennis). For comparisons with GREENISH and YELLOW-BROWED WARBLERS see Williamson (1951); for other useful notes see Swanberg and McNeile (1958) and P. Davis, *Bull F.I.B.O.*, 4: 127. *Frontispiece and plate 1.*

A bird of damp forest (especially in river valleys) of birch, pine, willow and poplar. In winter arboreal, but on passage also found in bushes and tall grass. The song is distinctive, a shivering *ziz-ziz-ziz* repeated about fifteen times followed by a short whistling *tseers*. Call-note a loud and husky *tswee-ep* (Ticehurst), or a hard *zik* (own notes) or *chik* (P. Davis); sometimes a scolding chatter not unlike a LESSER WHITETHROAT (*Sylvia curruca*).

Ageing. In western populations 1st w. birds are a darker greenish olive above and yellowish beneath than autumn adults, which are a paler, brighter colour: the difference is roughly that between WILLOW and WOOD WARBLERS, though 1st w. ARCTIC is an altogether brighter bird than the former. In eastern populations autumn adult and 1st w. body plumage is much alike. Adults have wings and tail a faded pale brown in autumn, and have often lost the upper and sometimes one (rarely both) of the lower wing-bars. In 1st w. the remiges and rectrices are a fresh dark brown, and although the upper wing-bar may sometimes be lost by September, the lower one seems always to be conspicuous.

Colours of soft parts. Bill: dark brown above with yellowish cutting-edge, lower mandible orange-yellow (adults) to pale brown or yellowish-flesh, dark on underside towards tip (1st w.). Legs: pale or yellowish-brown, often with greyish tinge in front. Mouth: orange (adults). (Own notes, and P. Davis).

Measurements. Wing, ♂♀ 60-70. Tail, ♂♀ 40-50 (52). Bill, 12½-15. Tarsus, 18-21½. See Tables on pp. 76 *seq.*

Weight. Shaw (1936) gives for 45 ♂♂, 9-15, average 11 gm.; 25 ♀♀, 8-13, average 10 gm. Ticehurst gives 7.5 to 11.0, average 9.4 gm., for passage birds. Average of nine at Fair Isle, 9.5 (8.2-11.5) gm. Tory Is. (Co. Donegal), i.ix., 9.2 gm.

Wing-formula (pp. ascendant). NOT emarginated 6th. 1st p. from 2— to 3+ p.c.

Wing-point 3rd or 3rd=4th, rarely 4th to 1 shorter. 5th, 1-3; 6th, 6-9; 7th, 9-12; 8th, 12-14; 10th, 14-18.

2nd, 4-6, falls between 5th-6th (occasionally=6th, rarely shorter). The inner pp. have pale pointed tips in fresh plumage.

Moult (pp. descendant). Adults have a body moult after breeding, from the end of July. A 1st w. bird from Fair Isle (Shetland), 30.vii., was renewing the two middle pairs of rectrices. The pre-nuptial moult is complete and takes place in the winter period, the first seen in change being a ♀ from Thailand, 30.i., with pp. 1-4 growing; a ♂ from Tenasserim, 5.ii., has in addition pp. 5-6 missing and s. 1 half-grown. The first in tail moult is a ♂ from Amboina, Indonesia, 14.ii., with one half old and the other half new (pp. 5-6 growing). A bird from Philippine Is, 21.ii., has only just started wing-moult. Two from Mt Madang, W. Buru, 26.ii., again show an unusually irregular moult of the tail, one having all the rectrices just out of sheath (pp. 6-7 and s. 3 growing), and the other having six old feathers and the rest in pin (pp. 7-8 growing). Of birds from Thailand a ♀, 4.iii., has the tail old (pp. 4-5 growing); a ♀, 15.iii., has no tail at all and shows heavy head and body moult (p. 9 and ss. 4-5 in sheath); and a ♀, 9.iv., still has four old tail feathers and the rest in pin (p. 8 half-grown).

Distribution. From Finmark, N. Norway, across N. Finland and N. Russia east to Bering Strait, northward to the limit of forest growth, southward to about 68° N. in Finland and 61° N. in W. Siberia. East of Riv. Yenesei the range extends farther south into forested mountains (Minusins, Tannu Ola Mts, E. and W. Sayan Mts), including Khentei and Khangai Mts in Mongolia, and across S. Transbaikalia to the mouth of Riv. Amur and shores of Sea of Okhotsk. On passage through most of E. China, Japan and N. Indo-Chinese countries to winter quarters in much of S.E. Asia including Malay Peninsula, Andaman and Philippine Is, Sumatra, Java, Borneo, Sumbawa, Flores, Timor and Molucca Is.

Vagrant, almost annually, to W. Europe, where it has been recorded from Heligoland (Germany), Holland, Italy, and many times from Britain, especially at Fair Isle (Shetland) (ads. 30.viii., but mostly 1st.w. between 1.ix. and 18.x., though one of four in 1964 was unusually early, 14-19.viii.). Once Ireland, at Tory Is. (Co. Donegal), 1.ix.1960.

Ticehurst says (1938: 126-7): "It appears that the migration of this species from Arctic Norway, N. Russia and N. Siberia etc., passes eastwards through E. Mongolia, Dauria and Manchuria, avoiding the deserts of Sinkiang and Mongolia, since there are no records in W. Mongolia, Turkestan, India and Tibet, and then it passes mostly down the east of China to reach the winter quarters." This circumambient route must take the western population some 7,000-8,000 miles to winter quarters, a journey equalled only by that of *Ph. trochilus yakutensis* between N.E. Siberia and E. Africa.

Ph. borealis xanthodryas Swinhoe

Like *borealis* but the upper parts a brighter greenish-olive without a greyish or brownish cast, and the under parts much

yellower. Supercilium and cheeks yellow not creamy. The bill is noticeably broader at the base.

Inhabits high birch-conifer forest (4,000 feet to tree limit) above the zone of *Ph. coronatus*. Said to skulk in thick cover in winter. Thin, penetrating song vaguely recalls that of CHIFFCHAFF, *chi-chirra* repeated as a continuous trill. Call-note a loud, single *chink*.

Measurements. Wing, ♂♀ 66-73 (75). Tail, ♂♀ 44-54. Bill, 13-15½, markedly broader than in *borealis*. Tarsus, 19-21½. See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). NOT emarginated 6th. 1st p.= to 5 + p.c., apparently never shorter than p.c.

Wing-point 3rd or 3rd=4th; otherwise, 4th, ½-1; 5th, ½-3; 6th, 6-9; 7th, 10-13; 8th, 12-15; 10th, 15-19.

2nd, 5½-8, falls between 5th-6th, rarely=6th or shorter.

Distribution. Japan and S. Kurile Is, probably also Kamchatka (a ♂ from Karaginsk, 22.viii., is this form on size of bill and plumage). On passage in Korea, S.E. China, Formosa, Quelpart and Ryukyu Is; wintering in Borneo, Sarawak, and other parts of Indonesia. Spring specimens seen from Selangor, Malaya (8.v.) and N.E. peninsula Thailand (30.v.).

NOTE. According to *A Handlist of the Japanese Birds* (Ornithological Society of Japan, Tokyo, 1958), true *xanthodryas* is confined to Honshu, Seven Is of Izu and Shikoku, the birds of Hokkaido being intermediate between this form and *borealis*.

Ph. borealis kennicotti (Baird)

The Alaskan race is similar to *borealis*, though perhaps yellower below. It has a weak bill more like that of *Ph. trochiloides*. Vaurie (1954: 18-20) discusses the validity of this form and gives the following measurements: wing (17 adults) 62-69, bill from skull (16 adults) 12½-14½; 1st w. birds are often smaller. This, the only *Phylloscopus* to have invaded the New World, has a 'back-track' migration to S.E. Asia, where it winters commonly in the Philippine Is and sparingly in Indo-Chinese countries, Malaysia and East Indies (K. C. Parkes and D. Amadon, *Condor* 50: 86-7). It passes through E. China (Shantung, Yunnan) on migration and the British Museum has an undated specimen from the Kurile Is.

THE GREENISH WARBLERS

The *trochiloides* group is often cited as a classic example of a 'subspecies chain' whose terminal links have made secondary

contact following a slow encirclement of the Himalayas and mountain ranges of Chinese Turkestan, with the result that characteristics developed during their long separation now militate against interbreeding. In other words, their relationship in the region of overlap is that of two perfectly good species.

The forms which thus demonstrate one of the ways in which speciation can arise are the GREENISH WARBLER *viridanus* whose westwards expansion through Europe is bringing it increasingly to the notice of bird-watchers in Britain and Scandinavia, and its far eastern representative *plumbeitarsus*. The area in which they have met and behave as discrete populations is a fairly considerable one in S. Siberia around the W. Sayan Mts and the headwaters of the Riv. Yenesei. This is not the whole story, since the GREENISH WARBLER also overlaps another closely-related form *nitidus* in E. Afghanistan and S. Russian Turkestan, and here also the two forms do not interbreed.

Six closely-related members of this widely distributed group are currently recognized between N.E. Europe and Russian Turkestan (*viridanus*), the Caucasus and N. Iranian regions (*nitidus*), the Himalayan massif from Kashmir east to Kansu (*ludlowi-trochiloides-obscuratus*), and throughout E. Siberia (*plumbeitarsus*). The forms *viridanus-ludlowi-trochiloides-obscuratus* have a continuous distribution and intergrade one with another. The last and northernmost of this series is rather poorly defined; it shows a trend in certain characters towards *plumbeitarsus*, but the two populations are not now in contact though they may well have been in the distant past. Here the chain seems to have snapped, for between *obscuratus* in the Nan Shan Mts and *viridanus* in the Gobian Altai range on the one hand, and *plumbeitarsus* in the Great Khingan Mts of N. Mongolia on the other, there are respectively 500 and 750 miles of apparently untenanted country.

The situation, therefore, is that whilst *viridanus* forms an unbroken subspecies chain with *ludlowi-trochiloides-obscuratus* in the Himalayas and mountain ranges to the northeast, it also meets the otherwise isolated forms *nitidus* and *plumbeitarsus* and each maintains its distinctness in the zone of overlap. Ticehurst (1938) placed these three as races of *trochiloides*, though not without reservation in the case of *nitidus*; while Vaurie (1959), though he accorded species rank to *nitidus*, kept the other two as races of *trochiloides*. Since no intergrades are known between *viridanus* and

either of its immediate neighbours to west and east, and since *plumbeitarsus* is no longer in contact with the Himalayan group and is constant over a vast area from the W. Sayan Mts east to Ussuriland, I consider it more convenient to treat this as well as *nitidus* as a separate species.

Full accounts of the distribution and variation of the several forms are given by Ticehurst (1938: 135-155) and Vaurie (1954: 20-21; 1959: 290-293).

PHYLLOSCOPUS TROCHILOIDES (Sundevall)

Greenish Warbler

Ph. trochiloides viridanus Blyth

Upper parts similar to WILLOW WARBLER but usually with a decidedly greyish cast, especially pronounced in autumn; head slightly darker than mantle. Well-marked pale yellowish supercilium contrasting with dark eye-streak and lores; cheeks and ear-coverts dull yellowish-white mottled olive. Under parts sullied white with sparse yellowish streaks, greyish on flanks; under tail-coverts yellowish-white. Wings and tail brown, the former with a narrow whitish bar on tips of greater coverts, the latter with smoky white outer webs. Under wing-coverts and axillaries yellowish-white.

A bird of mountains at moderate elevations to 11,000 feet, though breeding at or near sea-level in the northern parts of its range. In winter in undergrowth and trees in deciduous and coniferous forests. The song, of short duration, is loud and vehement, recalling that of a WREN (*Troglodytes troglodytes*). Call-note a loud *chee-wee*.

For field-notes see K. Williamson, *Scot. Nat.* 62: 18-20, *Brit. Birds* 44: 119-120 and 49: 42-43; P. W. P. Browne, *ibid.* 45: 413-414 and 46: 456; Roy Thearle, *ibid.* 47: 408; A. G. S. Bryson, *ibid.* 49: 43-44. Also Carl Fredrik-Lundevall, *Fauna och Flora* 48: 229-234, and photographs by Gosta Hakansson in *Brit. Birds* 48, plates 57-59. *Frontispiece*.

Ageing. Young in autumn are brighter than adults, but not nearly so bright as *nitidus* which entirely lacks any greyish suffusion above

and is markedly yellow beneath. Some 1st w. are a purer greenish-olive above than others (see H. E. Axell, *Brit. Birds*, 51: 125-126). Adults have the tail and wing feathers, including coverts, much worn and faded in autumn, and the wing-bar is reduced and may even be absent.

Colours of soft parts. Bill: upper mandible dark brown, lower light pinkish-brown or flesh, but orange in a June example. Legs: dark greyish-brown, purplish-horn. (Own notes). Mouth: yellow.

Measurements. Wing, ♂♂ 59-65, ♀♀ 55-62. Tail, ♂♂ 42-50, ♀♀ 41-47. The above are from 30 Turkestan etc.: birds from Kashmir tend to be slightly longer in the tail, ♂♂ measuring to 53. Bill, 11½-13. Tarsus, 18½-20½. See Tables on pp. 76 seq.

Weight. Average of ten weights from bird observatories, 7.4 gm. 1st w. at Isle of May, 27.viii.-3.ix., increased from 6.8 to 8.2 gm. in seven days. Ticehurst gives 6.5 to 10.5, average 7.9 gm. (breeders), and 7.0 to 9.3, average 7.8 gm. (wintering birds).

Wing-formula (pp. ascendant). Emarginated 6th. 1st, 6-10 + p.c.

Wing-point, 4th, occasionally = 3rd, but more usually 3rd and 5th are ½-2 shorter; 6th, 2-4; 7th, 5-8; 8th, 7½-10; 10th, 10-13.

2nd, 6-9½, = 7th or falls between 7th-8th (once, between 8th-9th). The above applies to sixteen from Turkestan etc.: in Gilgit and Kashmir there is a marked tendency towards a lengthening of the 1st p. (7-12 + p.c.) and a shortening of the 2nd (usually falls between 8th-9th). In these areas *viridanus* grades into *ludlowi*.

Moult (pp. descendant). Ticehurst says, "Complete moult in winter quarters beginning in February with moult of wings; this advances well before the body and tail feathers are renewed." Some have not begun by 24.ii., others have finished by 24.iii., and the latest seen is a ♀, Madras, 24.iv., just completing p. 9. The post-nuptial change is confined to body plumage.

Distribution. S. Sweden, Finland, E. Germany and former Baltic States eastward to about 64° N. and southward to about 53° N. in Ural Mts; across the southern part of W. Siberia locally to Riv. Yenesei, south to W. Sayan Mts and east to Khangai and Gobian Altai Mts in N.W. Mongolia; thence southwest through the Tian Shan and neighbouring systems to W. Pamirs, Gilgit and parts of Kashmir, where it intergrades with *trochiloides* as the form *ludlowi*. Winters throughout peninsula India (not Ceylon) but is rather scarce except as a passage migrant in the north.

Recent range-expansion of the Greenish Warbler. The recent and continuing range-expansion of *viridanus* into N.W. Europe deserves a special note. Välikangas (1951) has linked this expansion with the higher summer temperatures of

recent years, showing that the spread began towards the end of the last century, but then received a setback over a period of some thirty years during which lower summer temperatures prevailed in Scandinavia. Gätke (1895: 299) recorded three occurrences at Heligoland, the first for W. Europe. Of these one was a 1st w. bird, 25.ix.1878, but the others were adults which had overshot their breeding range, ♂ and ♀, 30.v.1879 and 3.vi.1880. Ticehurst (1938: 138) notes that it was first seen at Rossitten on the Baltic in 1905 and at a number of localities in E. Prussia from 1923. It spread to Danzig and Pomerania in 1932-33 and west to Lake Müritz in 1935, by which time it was spreading west also in Finland. The first Swedish record was in 1939 but there was no other until ten years later. Authors who discussed this spread in the 1930's were H. Grote (*Jour. f. Orn.* 80: 300-9) and H. Snomalaenen (*Orn. Fennica* 13: 89-124).

Since the war the spread has received a greater impetus and this has been reflected in the growing number of records in the British Isles; there have been well over a score in the period, and although most of these are of autumn birds, mostly identified as 1st w., several are due to adults 'overshooting' on spring migration. It appears to be a late migrant, reaching European Russia between the third week and end of May, and Scandinavia in early June. There were no occurrences in Britain between the first at North Cotes (Lincs.), 5.ix.1896, in the early phase of expansion, and the second at the Skaw of Whalsay (Shetland), 12.ix.1945. In 1949 a spring migrant was trapped at Fair Isle, 2-3.vi., and a bird appeared at Spurn (E. Yorks), 21.viii. Others followed at Fair Isle, 19.ix.1950; Blakeney Point (Norfolk), 6.ix.1951; and Great Saltee (Co. Wexford), 23.viii.1952, the first for Ireland. In the same year Denmark had its first, at Als off the coast of W. Jutland, 5.vi. (Palm, 1953), and in the same week several observations were made at Oland off S.W. Sweden, while Pynnönen observed it on five occasions as far north as 62° N. in Finland. Breeding followed in Sweden in 1953 and there was a minor 'irruption' in the spring of 1954 (Lundberg *et al.*, 1954), reflected in the appearance of a singing male on Bardsey (Caerns.), 16.vi., the first for Wales. In 1955 there were summer records at Fair Isle, 15-24.vii., and the Isle of May (Firth of Forth), 27.viii.-3.ix. One was trapped at Dungeness (Kent), 17.ix.1957, and one stayed 'off-passage' at Great Saltee from 19-28.ix. in that year.

There were three autumn occurrences in 1958—at Gibraltar Point (Lincs.), 3.ix., Lundy (N. Devon), 2-6.xi., and Wisbech (Lincs.-Norfolk), 23.xi.; and again in 1959—at the Crumbles (Sussex), 10.ix., and Cape Clear Is. (Co. Cork), 17-24.x. and 30.x.-1.xi. In 1960, after an adult at Spurn Point, 4-5.vi., young birds appeared at Skokholm (Pembs.), 31.viii., Spurn Point, 4.ix., and Fair Isle, 7-9.ix. These appear to represent a small invasion which resulted in the first record of wintering in W. Europe, one being present with several CHIFFCHAFFS at Perry Oaks (Middlesex) from January 1st to early March. There were more records in the autumn of 1961—at Skokholm (Pembs.), 30-31.viii.; Fair Isle, 19.viii and 4.ix.; Whitley Bay (Northumberland), 17.ix.; Dungeness, 24.ix.; Cape Clear Is., 14.x. and Redcar (N. Yorks) 20.x. There were 'overshooting' birds in summer 1962 at Dungeness (Kent), 9.vi. and the Calf of Man, 27.vii., followed by autumn occurrences at St Agnes (Scilly Is), 15-21.ix. (two), Selsey Bill (Sussex), 27.ix. and The Crumbles (Sussex), 19.x. Birds appeared in 1963 at Sandwich Bay (Kent) between 30.viii. and 6.ix. and

again at St Agnes (26-27.xi. and 6.ix.) where there was an even later bird in 1964, from 20.xii. into January 1965. Cape Clear Is. recorded three in 1964, on 25.ix., 10.x., and 4.xi., while others appeared at Dollis Hill (N.W. London) 1.x. and Verne Common (Dorset) 21.xi. There were four in 1965, at Bamburgh (Northumberland) 4-7.ix., The Crumbles, 17.ix., St Agnes, 7-14.x., and Malin Head (Co. Donegal) 18-21.x. Another stayed at Bamburgh 30.viii.-5.ix. 1966 and one appeared at St Abb's Head (Berwickshire) 15.ix. 1966.

Ph. trochiloides trochiloides (Sundevall)

Upper parts and edges to wings and tail a rich, dark olive, noticeably darker on the head. Supercilium yellowish-white contrasting with dark olive-brown lores and eye-streak. Under parts yellowish-white, washed with grey on sides of breast and flanks. Wings and tail dark brown, tips to greater coverts forming a single narrow wing-bar, in some birds an indication of a second slight bar on median coverts. Bend of wing, under wing-coverts and axillaries pale yellow.

A forest bird at all seasons. Song described as a few musical tit-like chirps. Call-note disyllabic. Anxiety note, *errk*.

Ageing. 1st w. are a little brighter olive than adults, which have worn wings and tail and reduced wing-bar in autumn.

Colours of soft parts. Bill: practically black, lower mandible dull yellow to orange at base, dusky towards tip. Legs: variously described as greenish-plumbeous, dark olive, horn brown. Mouth: yellow.

Measurements. Wing, ♂♀ 54-69, mostly 58-65, Tail, ♂♀ 43-56, mostly 45-55. Bill, 12-13½. Tarsus, 19½-21. See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 7-15 + p.c.

Wing-point, 4th = 5th. 3rd, ½-2 (once 3); 6th, 1-2½ (once 4); 7th, 5-7; 8th, 7-9½; 10th, 10-12.

2nd, 9-13½, is shorter than 8th and not infrequently falls below tips of ss.

Moult (pp. descendant). Complete in winter quarters, 7.iii. to 8.iv., according to Ticehurst. The post-nuptial moult is confined to body feathers, inner tertials and central tail feathers.

Distribution. Himalayas from Nepal and Sikkim eastward across Sikang and Szechwan to Tsinling Mts in Shensi, south to Likiang Mts in S. Yunnan. At 6,000-14,000 feet, descending in winter, some migrating to N.E. India and Burma. In Thailand and Indo-Chinese countries the winter range is generally north of that of *Ph. plumbeitarsus*.

Ph. trochiloides ludlowi Whistler

The race *ludlowi* is the link between *viridanus* and *trochiloides*, occupying the Himalayas from Kashmir east to Kumaon and wintering in the plains of India. It is decidedly paler and greyer above than *trochiloides*, with less greyish wash on the under parts, and slightly greyer than *viridanus* and a little larger. Wing, ♂♂ 60-66, ♀♀ 56-60; tail, ♂♂ 45-52 (55), ♀♀ 44-50. 1st p., 8-12+p.c.; 2nd, 10-12, falls between 8th-10th.

Ph. trochiloides obscuratus Stresemann

A poorly differentiated form from the mountains of Tsinghai and Kansu, brighter on upper parts and wing-edges than *trochiloides*, near *plumbeitarsus*, than which it has a darker crown. It has two yellowish wing-bars (wearing whitish) and yellowish-white under parts. Wing, ♂♂ 59-66, ♀♀ 55-59; tail, ♂♂ 46-55, ♀♀ 42-46. 1st p., 8-12+p.c.; 2nd=8th or 9th or falls between.

CAUTION. See the note under *Ph. magnirostris*, p. 46.

PHYLLOSCOPUS NITIDUS Blyth

Bright Green Leaf-warbler

Very similar to WOOD WARBLER but a brighter and purer green, less yellow-green, above. Under parts with a varying amount of fairly uniform yellow. Supercilium—more prominent than in *viridanus*—and cheeks bright yellow, wing-bar on greater coverts pale yellow; in quite fresh dress there is often a slight bar on median coverts. Lores and eye-streak olive-brown; bend of wing and axillaries yellow.

A bird of wooded mountains to tree limit, in beech, thick undergrowth, juniper etc. Arboreal in winter. The song is an oft-repeated strophe in the rhythm of WILLOW WARBLER, and the call-note is a cheerful *chi-wee* identical with that of *viridanus*.

Ageing. 1st w. birds are similar in plumage to adults after autumn body-moult, but adults have the wing and tail feathers very worn and the wing-bar much reduced at this season.

Colours of soft parts. Bill: upper mandible dark brown with whitish tip merging with a whitish line along the cutting-edge; lower mandible creamy at base, brownish in the middle, whitish

at tip. Legs: variously described as leaden-grey, olive-grey, dark olive-green.

Measurements. Wing, ♂♀ (56) 58-67. Tail, ♂♀ 41-51 (53). Bill, 11½-14. Tarsus, 18-20. See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th, but less sharply so than in most species. 1st p. 4-10+p.c.

Wing-point, 3rd=4th (rarely 3rd ½-1 shorter), rarely=5th, otherwise 5th, ½-2; 6th, 3-6; 7th, 6½-9; 8th, 9-12; 10th, 11-15.

2nd, 6-9, falls between 6th-7th or=7th.

Moult (pp. descendant). The complete moult takes place in winter quarters: one, Ceylon, is finishing pp. 9-10 and ss. 5-6 on 15.iii., but another, Madras, is at the same stage nearly a month later, 10.iv. One without locality, 10.ii., has the wing and tail complete except for the half-grown outer pair. Another dated 15.iii. is in tail-moult and lacks the four outer pp. in each wing, so that the wing-moult is probably a rapid process. According to Ticehurst the post-nuptial change includes body feathers, tertials and sometimes central tail feathers.

Distribution. Caucasus Mts from Black to Caspian Seas, N. Iran, N. Afghanistan and perhaps east to W. Tadzhikistan (Vaurie, 1954: 20-21). Migrates through India to the southern states and Ceylon. Said to have been taken in the Crimea, i.1856, and recorded from Heligoland (Germany), 11.x.1867.

Spring and autumn migrations appear to follow different routes: Ticehurst notes that the former penetrates well into the Himalayas to at least 5,000 feet in Sikkim, Nepal Valley, Kumaon, and Kashmir, whereas the latter passes through N. Baluchistan, Sind and Bombay.

PHYLLOSCOPUS PLUMBEITARSUS Swinhoe

Two-barred Greenish Warbler

Upper parts, including head, darker and greener (less brown) than in 1st w. WILLOW WARBLER, and the sullied whitish under parts have little yellow. Lores and ear-coverts dark contrasting with the yellowish supercilium and mottled cheeks. Greener (less grey) than *viridanus* and with a broader, longer supercilium, but the most reliable plumage distinction is probably the double wing-bar formed by broad yellowish-white tips to greater and median coverts. There are often yellowish flecks at the tips of lesser coverts in fresh plumage. Narrow white edges to inner webs of two outermost tail feathers.

A bird of forested mountains, arboreal in habit. In winter in great clumps of garden bamboo on plains. Call-note said to be

like that of ARCTIC WARBLER but more drawn-out, a clear sibilant double call.

Ageing. Adults have worn remiges and rectrices in autumn, with whitish wing-bars; 1st w. birds are in fresh plumage, their wing-bars yellow.

Measurements. Wing, ♂♂ 56-62. ♀♀ 54-58. Tail, ♂♂ 42-49, ♀♀ 40-45. Bill, 11½-13. Tarsus, 18½-20. See Tables on pp. 76 *seq.*

Weight. Shaw (1936) gives for 28 ♂♂, 8 to 11, average 8.6 gm.; 17 ♀♀ 6-10, average 8 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 6-10+p.c.

Wing-point, 4th, occasionally=3rd or=5th, but 3rd sometimes to 2 and 5th to 1 shorter. 6th, 2-4; 7th, 5½-8; 8th, 8-11; 10th, 10-14.

2nd, 8-11,=7th (twice), but normally falls between 7th-9th (once=9th).

Moult (pp. descendant). Complete moult, early February to late April, in winter quarters. A ♀, Lower Pegu, Burma, 8.iii., has only pp. 1-2 and ss. 1-2 new; a ♂, Cochín-China, 23.iii., has pp. 7-8 and s. 5 nearly full-grown. A ♀, Koh Lak, Siam, 8.iv., and ♀, Hué, Indo-China, 10.iv., have pp. at the same stage as the last but the ss. less advanced. (Both were tentatively identified as *obscuratus* by Ticehurst, according to the labels, but on colour do not differ from *plumbeitarsus*; wing-formula, of course, is no help). In both the tail is moulting from the centre outwards, the middle section being new, the outer pair just out of sheath, and the penultimate pair half grown. Another ♀ from Koh Lak, 19.iv., has finished.

Distribution. Siberia north to about 63°-64° N. from Riv. Yenesei eastward to Sea of Okhotsk, thence south to Mongolia, Manchuria, and Rivs Amur and Ussuri. (In Mongolia west to E. Gobian Altai Mts, but replaced by *viridanus* in Khangai Mts). Westward penetrates to the region of Krasnoyarsk, Minusinsk and W. Sayan Mts, where it breeds alongside *viridanus*. Migrates through Manchuria, Korea and China to winter in Indo-Chinese countries south to peninsula Thailand.

CAUTION. Though slightly larger, *Ph. plumbeitarsus* could easily be confused with the YELLOW-BROWED WARBLER, *Ph. inornatus*. The best distinction is that while the latter shows yellowish outer edges and tips to the tertials the former has these feathers uniform with the secondaries. In the majority of *inornatus* (including *humei*) the tail is 67-76 per cent of the wing-length; in *plumbeitarsus* the majority have the tail 75-80 per cent of the wing-length.

PHYLLOSCOPUS TENELLIPES Swinhoe*Pale-legged Leaf-warbler**Ph. tenellipes tenellipes* Swinhoe

Upper parts brownish-olive; brighter, near rust-colour, on rump and edges to wing feathers; dark grey to grey-brown on head and nape, with paler forehead. Well-marked long creamy-white supercilium contrasting with dark brown lores and eye-streak; cheeks buffish mottled with brown. Under parts white, sides of breast washed dull brownish, flanks rusty-buff, under tail-coverts pale buffish-yellow. Wings and tail brown, underside of edges to secondaries cinnamon-white; under wing-coverts and axillaries yellow. Double wing-bar formed by yellowish tips to greater and median coverts. Faint white edge to three outermost tail-feathers.

A bird of broad-leaved deciduous forest in river valleys, in Japan in moist fir-hemlock forests from highlands of central Honshu northwards, most abundant from 3,000 to 4,500 feet. Keeps to undergrowth and lower branches of trees. Call-note a distinct metallic *tik-tik* or *pit-pit*; song a slow, quiet, thin metallic three-syllable note (Yamashina); a tit-like *hee-tsu-pee* (Austin and Kuroda).

Colours of soft parts. Bill: dark horn, paler below, and flesh-colour at base of lower mandible. Legs: pale flesh or pale bluish-brown, claws pale horn.

Measurements. Wing, ♂♀ 55-66. Tail, ♂♀ 41-50. Bill, 12-14. Tarsus, 18-20. See Tables on pp. 77 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th, but less sharply so than in most species. and barely noticeable in some individuals. 1st p. 3-7+p.c.

Wing-point usually 4th (once, 3rd) or 3rd=4th, occasionally=5th; otherwise 3rd and 5th, $\frac{1}{2}$ -1 $\frac{1}{2}$; 6th, 2-6; 7th, 6-10; 8th, 9-12; 10th, 12-16.

2nd, 6-9, usually between 6th-7th, occasionally slightly longer or shorter.

Moult (pp. descendant). None seen, but judging by the condition of autumn migrants there is a complete moult before departure.

Distribution. Japan (Hokkaido, N. and central Honshu), Kurile Is, Sakhalin, Ussuriland, N. Korea. Migrates across Yellow Sea and through coastal provinces of China to winter through Indo-Chinese countries to Malaya and Lower Burma.

NOTE: The populations inhabiting Japan and the Kurile Is have been separated as *borealoides* Portenko on the basis of a longer wing and tarsus and greener upper parts, in this respect showing an approach towards *ijimae*.

Ph. tenellipes ijimae (Stejneger)

Upper parts greenish-olive, brightest on rump and edges to wing and tail feathers, a brownish cast on mantle and markedly brown on head and nape. Long, rather narrow yellowish supercilium; lores and ear-coverts dusky olive admixed with yellowish. Under parts white suffused pale primrose, washed with greyish-olive on sides of breast and flanks. Under tail-coverts yellow. Axillaries yellowish-white. Single wing-bar formed by yellow tips to outer webs of greater coverts; narrow whitish border to inner webs of three outer tail feathers.

Inhabits mixed woodlands and shrub growth, especially alder thickets. Call-note a thin *phi-phi-phi*; song *pee-chopi-chopi-chopi* (Austin and Kuroda).

The colours of soft parts, measurements and wing-formula appear to be much as in *tenellipes* (Ticehurst gives: wing ♂♀ 56-65, tail ♂♀ 41-47); the emargination of the 6th p. is very slight, as in that form, but there is only one wing-bar.

Distribution. Confined to the Seven Is of Izu east of Honshu, Japan; migrates through Ryukyu Is to the northern Philippines.

NOTE. Ticehurst (1938: 162) regarded this as a race of *Ph. coronatus*, and it has also been made a race of *Ph. occipitalis*. Vaurie (1954: 22) gives it specific rank, but it has all the characteristics of *Ph. tenellipes* except for a more phylloscopine coloration, and I believe it to be an insular derivative of that species. Song and call-note appear to differ from *tenellipes*, but this is not unusual among conspecific forms of *Phylloscopus* (cf. *collybita*, *inornatus*).

PHYLLOSCOPUS MAGNIROSTRIS Blyth

Large-billed Leaf-warbler

Upper parts dark olive, a little brighter on edges to wings, tail and wing-coverts. Prominent yellowish-white supercilium offset by dusky olive lores and eye-streak; cheeks and ear-coverts

yellowish-white mottled with olive. Under parts sullied yellowish-white, brighter on belly, tinged with olive on flanks; under tail-coverts uniform pale yellow. Wings and tail brown; a faint white edge to inner webs of outer, penultimate and third tail-feathers. Under wing-coverts and axillaries yellowish-white. Single wing-bar formed by dull white or yellowish-white tips to greater coverts, with sometimes an indication of an upper bar on median coverts.

The bill, long and robust, has a small but distinct hook-like process at the tip (not present in juveniles in which the bill is short and deep, 10-10½, laterally compressed). Rictal and nasal bristles are strongly developed, reaching forwards to the end of the nasal groove.

In the breeding season a bird of wooded ravines, near water; in winter, haunts evergreen forest and shady trees, keeping more to boughs than to leaves. Bates and Lowther (1952) describe the song as a 'distinctive five-noted call, the second and third, and the fourth and fifth of which are lower in the scale than the first note and the preceding pair respectively'; also a 'quieter double call-note, the second and higher note pitched in the same key as the first note of the song'. It has been variously written as *dir-tee*, *pe-pi*, and an interrogative *whee-chi*?

Ageing. Adults in autumn differ from 1st w. in having worn and faded remiges and rectrices.

Colours of soft parts. Bill: upper mandible blackish, cutting-edge and base of lower mandible flesh. Legs: variously described as pale plumbeous, bluish-steel, blue-grey. Mouth: dull yellowish.

Measurements. Wing, ♂♂ 67-73, ♀♀ 60-66. Tail, ♂♂ 49-56 (58), ♀♀ 45-54. A few birds outside these ranges may be wrongly sexed. Bill, 13-15. Tarsus, 19-20½. See Tables on pp. 77 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. (4½) 6-12 + p.c.

Wing-point 4th or 4th=5th (rarely=3rd); otherwise 3rd, ½-2; 5th, ½-1; 6th, 2-4; 7th, 6-9; 8th, 10-12½; 10th, 12½-15 (17).

2nd, 8-12, usually falls between 7th-8th, occasionally=8th or falls between 8th-9th.

Moult (pp. descendant). Complete moult in winter quarters from about the end of January to mid-April. A ♂, Ceylon, 26.ii., has renewed pp. 1-6 and has p. 7 and most tail feathers in sheath, with tertials new and ss. 2-3 growing. Another ♂, Ceylon, 13.iii., has pp. 7-8, s. 3 and the tail growing, and a bird

from N. Andaman Is, 6.iv., has nearly finished (pp. 9-10, ss. 5-6 growing) but still has most of the tail feathers old or in sheath.

Distribution. Higher valleys (6,000-10,000 feet) in the Himalayas from Kashmir eastward to Sikang, thence through W. Szechwan, S. W. Kansu and N.E. Tsinghai to S. Nan Shan Range. Also Safed Koh (N.E. Afghanistan—N. Pakistan), Likiang Range (N. Yunnan) and Adung Valley (N.E. Burma). At lower elevations in winter, some migrating to Yunnan, Assam, Lower Burma, peninsula India and Ceylon.

CAUTION. *Ph. magnirostris* and *Ph. t. trochiloides* (p. 38) are rather alike in colour, each with a single wing-bar (often the indication of a second), and can easily be confused. The most useful characters for separating them are: (1) the rather long, robust bill of *magnirostris* has a distinct hooked process at the tip of the upper mandible, while the lower mandible is dusky flesh (in *trochiloides* usually yellow); (2) the longer 2nd p. in *magnirostris* is mostly longer than 8th, whereas in *trochiloides* it is usually shorter than 9th (in a small percentage of both, 2nd falls between 8th-9th); and (3) head much darker than mantle in *trochiloides*, dark greyish-olive not greenish as in *magnirostris*.

PHYLLOSCOPUS TYTLERI Brooks

Slender-billed Leaf-warbler

Upper parts and edges to wings and tail olive-green. Prominent yellowish-white supercilium reaching to well behind eye; lores and eye-streak dusky olive; cheeks and ear-coverts yellowish-white with dusky mottling. Under parts, under wing-coverts and axillaries yellowish-white streaked with brighter yellow on throat, breast and belly. Faint pale tips to greater and sometimes median coverts in quite fresh plumage, but insufficient to form a bar. Wings and tail dark brown.

Bill peculiarly long and thin; rictal bristles short and weak and nasal hairs not apparent.

A bird of pine forest from 8,000 to 10,000 feet, especially frequenting clearings and sunny margins. Song distinctive (has been rendered 'let's kiss him') but call-note feeble.

Ageing. 1st w. birds are rather yellower below and greener above than adults.

Colours of soft parts. Bill: horn colour, yellowish-brown at base of lower mandible. Legs: greenish-brown to dark olive.

Measurements. Wings, ♂♀ 53-62. Tail, ♂♀ 36-45. Bill, 12-14. Tarsus, 18-20. See Tables on pp. 76 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 5-8 ($9\frac{1}{2}$) + p.c.

Wing-point 4th = 5th. 3rd, $\frac{1}{2}$ -1; 6th, 1-3; 7th, $4\frac{1}{2}$ -6; 8th, 6-8; 10th, $8\frac{1}{2}$ -11.

2nd, $6\frac{1}{2}$ -9, falls between 7th-9th (once, between 9th-10th).

Moult (pp. descendant). Complete, mid-July to mid-September, on or near the breeding ground. Specimens dated 16.vii., 18.vii. and 12.viii. have not started but a ♂ from Gulmerg, Kashmir, 26.vii., has pp. 1-2 half-grown and pp. 3-4 have appeared; the tertials are growing and the wing-coverts are new; body moult is proceeding and the tail has a few old feathers remaining.

Distribution. Himalayas from Gilgit east to Kashmir. Winters at lower elevations and mainly down the west side of India to Goa.

1. ASIATIC LEAF-WARBLEDERS

(D) REMAINING ASIATIC SPECIES

Large to medium size. No wing-bars. No crown-markings. Supercilium varying from well developed (*schwarzi*, *fuscatus*) to ill-defined in mountain forms. No pale edges and tips to tertials. No yellow rump-band. No white in tail (except *affinis*). Plumage: greenish largely or wholly replaced by dark brown above, yellow strongly suffused or even replaced by buffy-olive or brownish-olive beneath. Markedly round-winged, 1st p. nearly half as long as 2nd, 6th p. emarginate. Bill-structure variable. Ground-feeders, or haunting low vegetation.

THE DUSKY WARBLERS

In his monograph Ticehurst recognized three different species in this group, *Ph. fuscatus* with its race *weigoldi*, *Ph. fuligiventer* and *Ph. tibetanus* but he made the caveat that further field-work might well reveal that the last two are conspecific. He had only four specimens of *tibetanus* and the breeding-grounds of this and *fuligiventer* were then very imperfectly known.

Vaurie (1954: 9-16), with the results of further collecting by Ludlow in 1938 before him, placed both as races of *Ph. fuscatus*. If all four forms are indeed conspecific, then the difference in plumage between the terminal races *fuscatus* and *fuligiventer* is quite remarkable for *Phylloscopi*, the two showing greater dissimilarity than exists between most species. There is no

doubt that *fuscatus* and *weigoldi* on the one hand, and *fuligiventer* and *tibetanus* on the other, are very closely allied and each pair shows the kind of subtle intergradation that is suggestive of a continuous distribution. Both Ticehurst (1938: 89) and Vaurie comment on the relationship of *fuscatus* and *weigoldi* where their ranges impinge in N.W. Szechwan, the former saying that *weigoldi* is "the Tibetan high alpine form which on the edge of its distribution meets with, and at somewhat lower elevations is then replaced by *fuscatus*".

It might be mentioned that *fuligiventer* and *tibetanus* have a softer, more copious plumage than *fuscatus*: this may be an adaptation to the more rigorous conditions of high altitudes. Also, the cline in the coloration of the upper parts is curiously irregular if all are races of a single species, since *tibetanus* is the darkest form, with *weigoldi* to the east and *fuligiventer* to the west a somewhat brighter brown. Ripley (1961) does not accept Vaurie's arrangement, maintaining that *fuligiventer* and *tibetanus* comprise a separate species; and as he and Ludlow (1944, 1951) base their judgement largely on field experience of all four forms it seems best to follow them in the present state of knowledge.

There is a considerable area of central Sikang on either side of the Yangtze Valley which at present appears to separate *weigoldi* and *tibetanus*. Practically all the *tibetanus* so far collected come from the mountains on either side of the Tsangpo Riv. in S.W. Sikang: that its range extends farther east still is indicated by a bird collected by Bailey at Poda, Sangachu Dzong, central Sikang (lat. 29° 18' N., long. 97° 05' E.) on 26.vi.1912, and which has been identified (mistakenly, in my opinion) as *weigoldi* (see Ludlow, 1944: 198; Vaurie, 1954: 11-12).

PHYLLOSCOPUS FUSCATUS (Blyth)

Dusky Warbler

Ph. fuscatus fuscatus (Blyth)

Upper parts, wings and tail brown. Distinct supercilium whitish in front, rusty white over and behind eye; lores and eye-streak dark brown; cheeks and ear-coverts rusty. Throat whitish, breast and belly creamy-white with a greyish wash, especially on sides; flanks fulvous; under tail-coverts, under wing-coverts, axillaries and inner edges to secondaries fulvous-white.

The Handbook (II, 24) suggests that in plumage it is more like a REED WARBLER *Acrocephalus scirpaceus* than a *Phylloscopus*, but P. Davis points out that it is not nearly reddish enough above or below, and in shape and carriage recalls the CHIFFCHAFF. The Fair Isle bird fed in the open on short turf, flicking the wings and tail repeatedly (P. Davis, *Brit. Birds* 55: 190-2). One at St Agnes also fed much on the ground, among leaf-litter (B. P. Austin and B. S. Milne, *Brit. Birds* 59: 112-13). *Frontispiece*.

Frequents *Carex* and willow swamps by rivers, swampy larch forest, subalpine zone in pine, birch, dwarf willow etc. In winter in gardens, hedges, and a variety of damp situations feeding on and near the ground. Always a skulker. The strong, sweet but rather monotonous song has been rendered *tia-tia-tia-tia* and recalls that of GREENISH WARBLER. Call-note a *Sylvia*-like *tack* or *tek* (H. G. Alexander), a hard low *chak* frequently repeated.

Ageing. Young birds in autumn often show a little yellow in the centre of the belly.

Colours of soft parts. Bill: upper mandible and tip of lower dark brown, remainder yellow. Legs: reddish-brown in front, but yellowish or greenish-brown behind. Mouth: yellow. (P. Davis).

Measurements. Wing, ♂♂ 58-68; ♀♀ 53-61. Tail, ♂♂ 46-59; ♀♀ 43-51. A few odd birds outside these ranges may be wrongly sexed. Bill, 11½-13. Tarsus, 21-23½. See Tables on pp. 77. *seq.* Tail slightly rounded, outer pair 7-8 shorter than central.

Weight. 8.7-9.9, average 9.3 gm. (winter); 7.7-11.0, average 9.9 gm. (passage); 9.3-11.5, average 10.3 gm. (breeding). A 1st w. bird at Fair Isle, 14.x., 8.1 gm.; one at St Agnes, 19.x., 9 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 9-11½ + p.c.

Wing-point, 4th = 5th. 3rd and 6th, ½-2; 7th, 3½-5; 8th, 5½-8; 10th, 8-11.

2nd, 7-11, usually = 9th or = 10th or falls between, and sometimes shorter. Only occasionally falls between 8th-9th.

Slight notch on inner webs of 3rd and 4th about 20 and 16 from tips respectively.

Moult (pp. descendant). According to Ticehurst there is a complete post-nuptial moult in August and a pre-nuptial moult of body plumage, innermost tertials and usually central tail feathers from mid-March to mid-April; but a ♂ with worn wings from Konang-Tcheon-Wan, China, 8.iv., has most of the tail growing, and a spring bird from Amoy, S. China, has outermost and

penultimate pairs growing and is just finishing wing-moult with s. 6 about a quarter grown. A ♂ from 58° N. on Riv. Yenesei, 18.viii., is very tattered but moult has not begun.

Distribution. Siberia from Riv. Ob eastward through Russian Altai and Sayan Mts to S. Baikal, Transbaikalia and Amur Riv., north to Yakutia, Verkhoyansk Mts and Anadyr basin, Ussuriland and Sakhalin. Also mountains of Mongolia, Kansu and N.W. Szechwan ('*robustus*'). Migrates through Korea, China, Szechwan, S. Tibet, Sikkim and Bhutan at high altitudes and winters in Nepal, Sikkim, Pakistan, N. India, Indo-Chinese countries and S. China.

The migration is evidently protracted, some remaining on the breeding-grounds into September (early, N. Yunnan, 25.vii.; late, Ussuriland, 9.x.). Has appeared in W. Europe at Heligoland (Germany), 24.x.1876; Auskerry (Orkney), 3.x.1913; Fair Isle (Shetland), 14.x.1961; St Agnes (Scilly Is), 19.x.1964; Spurn Point (E. Yorks.), 26-31.x.1965. One was caught near Krynica Morska on the Baltic coast of Poland, 21.x.1965.

Ph. fuscatus weigoldi Stresemann

A darker form inhabiting the mountainous country of N.W. Szechwan, neighbouring Tsinghai and E. Sikang. The supercilium, cheeks and under parts are greyish-white with only a slight isabelline wash. Young birds are distinctly yellowish on the belly. The bill (except for base of lower mandible), tarsi and toes are said to be nearly black. Wing, 56-62; tail, 45-52. Slightly longer 1st p., usually 10-14 + p.c.

Other races, *homeyeri* (Kamchatka), *robustus* (N.W. Szechwan), *altaica* (Russian Altai) and *mariae* (Manipur) have been described but the characters given appear to fall within the range of individual variation (Ticehurst, 1938: 90; Vaurie, 1954: 15-16).

PHYLLOSCOPUS FULIGIVENTER (Hodgson)

Smoky Warbler

Ph. fuligiventer fuligiventer (Hodgson)

Upper parts dark sooty brown with a slight olive tinge in fresh dress. Ill-defined dusky yellow supercilium. Under parts dusky yellow washed with dark olive at sides and on under tail-coverts. Under wing-coverts and axillaries deep olive with a yellowish tinge.

Haunts rocks and boulders on open ground in and above the rhododendron zone, 12,000 to 14,500 feet. In winter quarters prefers streamside vegetation close to the ground. Flicking of wings, and especially tail, incessant. Call-note *tak* or *tek*, like LESSER WHITETHROAT *Sylvia curruca*, but softer.

Ageing. 1st w. birds are dark olive brown above and brighter yellow beneath.

Colours of soft parts. Bill: black, yellowish to horn-brown at base of lower mandible. Legs: brownish-black, dark horn-brown.

Measurements. Wing, ♂♀ 51-61. Tail, ♂♀ 40-50. Bill, 12-14. Tarsus, 19½-22½. See Tables on pp. 77 *seq.*

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 9½-14 + p.c.

Wing-point, 4th = 5th, sometimes = 6th, otherwise 6th to 1½ shorter. 3rd, 1-2; 7th, 1½-4; 8th, 3-6; 10th, 5½-10.

2nd, 6-10, usually = 9th or shorter, often shorter than ss.

Moult (pp. descendant). The post-nuptial moult apparently begins in August. A ♀ which has replaced pp. 1-4 (5-6 in sheath) and tertials, but has not yet started ss., is from 12,000 feet in Karna La Valley, S. Tibet, 24.viii., so presumably still on the breeding ground. A ♂, Kang La, E. Bhutan, 25.viii., is also moulting wings and tail. Body feathers, innermost greater coverts and tertials moult again in March-April; ♀♀ in tail-moult were collected at Sadiya, Assam, i., and Naga Hills, Burma, 17.iv.

Distribution. Bhutan west to Sikkim and probably Nepal above tree limit, descending in winter to foothills from Assam west to Kumaon.

Ph. fuligiventer tibetanus Ticehurst

The Sikang race is a little darker than *fuligiventer* above but less yellow beneath, this colour entirely disappearing in worn plumage so that the under parts are different shades of grey, lightest in the centre of the belly. Short greyish-white supercilium; under-wing and axillaries without yellow. Young are slightly more olive-tinged above than adults and yellower beneath. Measurements and wing-formula do not differ and have been included with *fuligiventer*. The moult may be a little later; one from Mira La, S.E. Tibet, 15.viii., has only just begun with pp. 1-2 new and p. 3 and the whole tail half grown.

Ludlow (1944:199) found it only in the alpine zone above the conifer belt, in boulder-scrub among dwarf juniper, rhododendron etc. The alarm note was similar to that of a WREN (*Troglodytes*) and its movements about the boulders and scrub reminded him of that species.

PHYLLOSCOPUS SCHWARZI (Radde)

Radde's Warbler

Spring. Upper parts brownish-olive, browner on head, becoming greenish-olive on rump (wears browner). Broad conspicuous supercilium from base of bill to hind-crown, buffish to yellowish-buff as far as ear-coverts, whitish beyond; lores, eye-streak and an 'eyebrow' line above supercilium blackish-brown; cheeks and ear-coverts buff mottled with brown. Chin and throat clear white; a brownish-buff pectoral band more distinct in some than in others, occasionally washed with greyish. Centre of belly dull white with a variable amount of yellow streaking; sides of breast and flanks brownish-buff often with a yellow tinge, deepest on vent and under tail-coverts. Bend of wing pale yellow, under-wing and axillaries buffish. Wing and tail olive-brown, outermost tail feathers tipped white.

Autumn. Upper parts greenish-olive, head browner, and more markedly greenish on rump. Chin and throat not clear white but the whole under parts infuscated with brownish-buff streaked yellow, palest in middle of belly. See note under *Ageing* below.

Five or six rictal bristles reach to nostrils; nasal hairs stiff and numerous. Bill stouter and broader than in *Ph. fuscatus*. Stout tarsi and strong grasping toes.

A taiga species inhabiting clearings and edges of pine forests; in winter in bushes and tall trees; particularly addicted to rhododendrons. A bird at Cley frequently left cover to feed on open ground, but in its winter home it is said to be a skulker, keeping well concealed. Song a loud warbling trill, short, not musical. Call-note a nervous *twit, twit* (J. D. La Touche); a hard *chik* (R. Richardson). An excellent account of this bird, with photographs, is given by Neufeldt (1960). *Plate II*. The notices of British occurrences are detailed below.

Ageing. This species appears to be dimorphic. Neufeldt (1960) says the juvenile differs from the adult "in its strong suffusion of sulphur-yellow below and olive-yellow above. The 1st winter dress is similar to that of the freshly moulted adult except that the breast and lower throat are brownish and the belly is yellower". A number of these yellow-bellied birds, however, are from the winter and spring, two as late as 4.vi, and 25.vi. Mostly they are short in the wing, which suggests they are predominantly ♀♀.

In plumage they could be confused with *Ph. subaffinis*, but the bill is much bulkier.

Colours of soft parts. Bill: blackish above, pale flesh to pale brown on cutting edge, lower mandible orange horn with dusky tip. Legs: yellowish-straw tinged pink. Mouth: bright chrome-yellow (R. Richardson). Legs: brownish-yellow, Mouth: flesh or whitish-flesh (B. King). Examples at Minsmere had lower mandibles pink and yellowish-brown with dark tips; legs pale pinkish-straw and pale flesh; lower part of orbital ring yellowish-buff; inside of mouth yellow. (H. E. Axell.)

Measurements. Wing, ♂♂ 62-67, ♀♀ 55-63. Tail, ♂♂ 51-60, ♀♀ 45-54; slightly rounded, outers 4-7 shorter than middle pair. Bill, 12-14, breadth at nostrils, 3½-4. Tarsus, 21-23 (24). See Tables on pp. 77 seq.

Weight. ♂♂, 11.3-12.7; ♀♀ 8.5-11.3 gm. (winter). British records are: Cley, 3.x., 13.5 gm.; Walberswick, 4.x., 10 gm.; Dungeness, 3.x., 10.2 gm. and 7.x., 10.6 gm.; Minsmere, 15.x., 13.5 gm. and 20.x., 10.5 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 9-14+p.c.

Wing-point 4th, often=5th, rarely=3rd and once=6th; otherwise, 3rd and 5th to 1½ shorter. 6th, 1-3; 7th, 4-6; 8th, 6-8; 10th, 9½-12.

2nd, 8-9, always shorter than 8th, usually=9th. There is a notch on inner web of 2nd, 16-20, about opposite tip of long 1st p. or somewhat shorter.

Moult (pp. descendant). Complete moult on or near the breeding ground, probably during August-September. A ♂ from Korsakov, Sakhalin, 29.vii., has not begun. In some there is apparently a moult of tail feathers in the spring: a ♂ from Toungoo Dist., Burma, 24.iii., has all except one old feather in sheath, and a March bird from Lower Pegu, Burma, has six new rectrices, two old and the remainder missing.

Distribution. Siberia from Russian Altai eastward to Transbaikalia, Manchuria, Amurland and Sakhalin. Migrates through E. and central China to winter in S. Burma and Indo-Chinese countries. There have been ten records in W. Europe, six of them since 1961: the first was at North Cotes (Lincs.) on 1.x.1898, followed by Heligoland (Germany) 18.x.1930 and 12.x.1940, and the Camargue (S. France), 12.x.1957. Recent occurrences and their appropriate references are: Cley (Norfolk), 3-4.x.1961 (R. Richardson *et al.*, *Brit. Birds* 55: 166-8); Ottenby, Öland (Sweden), one collected and another trapped, 25 and 29.ix.1962 (P. Ljungdahl, *Vår Fågelvärld* 23: 223-7); Dungeness (Kent), 3-8.x.1962. (P. L. Britton and R. E. Scott, *Brit. Birds* 56: 420-1). Isle of May (Fife), 8-10.x.1962 (K. Williamson, *Scot. Birds* 2: 367-8) and Walberswick (Suffolk), 4.x.1964. (G. L. Clarke and D. J. Pearson, *Brit. Birds* 59: 155-6). Two 1st w. birds were trapped at Minsmere (Suffolk), 15.x. and 20.x. 1966 (H. E. Axell).

PHYLLOSCOPUS GRISEOLUS Blyth

Sulphur-bellied Warbler

Upper parts, wings and tail dark brown with edges to wing-feathers greyish-white, entirely without green or olive. Prominent supercilium bright orange-yellow before and over the eye, pale yellow behind; cheeks yellowish mottled with brown. Under parts sulphur yellow, deepest on belly, infuscated with brownish-buff on sides of breast and flanks; under tail-coverts pale buffy yellow. Bend of wing yellow, axillaries rusty buff.

In the breeding season a bird of high elevations (up to 15,000 feet) on open, boulder-strewn hillsides with sparse scrub; sometimes in thin juniper forest. Its actions recall those of an ACCENTOR (*Prunella* sp.). In winter and on passage it skulks in undergrowth, often on rocky ground, old walls etc., but is also arboreal, and has a peculiar habit of perching sideways on tree-trunks. Song a single note repeated four to six times. Call-note a harsh, chipping *quit* or *quet*; or *pick* (Sálim Ali).

Colours of soft parts. Bill: blackish or dark brown above, lower mandible yellowish-buff or flesh. Legs: yellowish-brown or olive-brown.

Measurements. Wing, ♂♀ (55) 57-69. Tail, ♂♀ 41-45. The few ♀♀ available suggest that this is the smaller sex. Bill, 12-15, mostly 12½-14. Tarsus, 19½-21½. See Tables on pp. 77 *seq.* Tail 72-83 per cent of wing-length (cf. *armandii*).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. (6) 8-15+ pp., mostly 10+p.c. or more.

Wing-point 4th=5th. 3rd and 6th, ½-2; 7th, 2½-5½; 8th, 5-8; 10th, 8-11.

2nd, (5) 7-11, =9th or shorter (once=8th).

Moult (pp. descendant). Complete before migration, July and August, according to Ticehurst, but adults from Naltar Valley, Gilgit, 29.vii., Tian Shan, 12 and 21.viii. and Punjab, 25.viii., have not begun. A ♂, Spiti, Punjab, 27.viii., is well advanced with pp. 1-3 new and 4-5 growing, tertials missing from one wing and nearly full-grown in the other, ss. worn and faded, tail new but outer pair incomplete. A ♂, Baltistan at 12,000 feet, 15.ix., still has sheaths at bases of pp. 9-10, ss. 5-6 half-grown and tail new. The pre-nuptial moult involves body feathers in February and early March.

Distribution. Mountain systems of south-central Asia in E. and N. Afghanistan and Pakistan (Hindu Kush, Safed Koh), Himalayas east to Ladakh Range and perhaps W. Tibet, and from the Pamirs in the west through the Tian Shan and Kun Lun systems to Tarbagatai Mts, central Russian Altai, Outer Mongolia and Nan Shan in Tsinghai. Enters India in the northwest to winter over a considerable part of the peninsula. Has been recorded near Karkaralinsk, north of Lake Balkhash, 15.viii.

PHYLLOSCOPUS ARMANDII (Milne-Edwards)

Milne-Edwards's Warbler

Upper parts and edges to wing and tail feathers brownish-olive. Well-marked supercilium buffish-white in front of eye, whiter behind; lores and eye-streak dark olive. Under parts dull yellowish-white with whiter throat streaked with bright yellow; flanks washed greyish-olive; under tail-coverts yellowish-buff. Wings and tail brown, under wing-coverts and axillaries pale buff edged with yellow.

A bird of willow and poplar groves, but also in spruce and thickets of bushes at high elevations. An inveterate skulker. Song pleasing and abrupt. Call-note a bunting-like *zit*; warning note a slight *click*.

Colours of soft parts. Bill: dark brown above, lower mandible yellowish. Legs: yellowish-horn.

Measurements. Wing, ♂♀ 55-69, mostly 59-65. Tail, ♂♀ (47) 51-60. The few sexed specimens suggest that ♂♂ are seldom below 61 (wing) and 52 (tail), and ♀♀ seldom above 62 (wing) and 54 (tail). Bill, 12-13. Tarsus, 19-21. See Tables on pp. 77 *seq.* Tail 84-92 per cent of wing-length (*cf. griseolus*).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. ($7\frac{1}{2}$) 9-13 + p.c.

Wing-point 4th = 5th (once = 6th); 3rd, $\frac{1}{2}$ -2; 6th, $\frac{1}{2}$ -1; 7th, 3-5; 8th, 5-7 (9); 10th, 8-11.

2nd, $7\frac{1}{2}$ -11 $\frac{1}{2}$, = 9th or is shorter.

Moult (pp. ascendant). Complete in August, according to Ticehurst.

Distribution. Mountains of N. China and Inner Mongolia west to Kansu and E. Tsinghai, south through Szechwan and Sikang to N. Yunnan and possibly the higher hills of N. Burma. Winters in Burma and northern parts of Indo-Chinese countries.

The race *perplexus* Ticehurst (S. Szechwan to N. Yunnan), said to be darker, is impossible to differentiate among migrants and wintering birds.

TICKELL'S AND OGILVIE-GRANT'S WARBLERS

Ticehurst (1938: 72-8) and Vaurie (1959: 278-9) tentatively treat *Ph. affinis* and *Ph. subaffinis* as two different species, recognizing, however, that they may eventually prove to be one. The ranges of the two meet in N. Yunnan, Sikang and W. Szechwan. Ticehurst records that in N. Yunnan both have been taken in the Likiang Range in the breeding season at 10,000-12,000 feet, and that while *subaffinis* breeds at the same elevation in the Mekong-Yangtze Divide at 27° N. *affinis* has also been taken there in April and in the Mekong Valley at 28° N. in August.

There are many birds in the British Museum from the same general area which are typical of neither one nor the other. Of eleven specimens collected by Col. G. Rippon at Gyi-Dzin-Shan, east of Talifu, N. Yunnan, in March 1902, all are brown above, as in *subaffinis*, but while seven are characteristically deep buff beneath, four have some yellow admixture and in this respect recall *affinis* (with which, indeed, they had been placed). Three from the Likiang and Talifu Valleys, between 7,600 and 10,600 feet, are brown enough above for *subaffinis*, but only two are deep buff beneath, one being much yellower. A ♂ from Kansu, 11.v., is like *subaffinis* below but too greenish above, and a ♀ from Mekong Valley in N.W. Yunnan, 27.viii., is similar. Likewise a ♀ from Chuan Chi Mine, near Pei-pei, Szechwan, is very near *affinis* above but has dull buffish-yellow under parts and a wing of 48 mm., characters which accord with the eastern form.

A similar mixture of characters is to be found in wintering birds from Manipur and Upper Burma, and birds presumably on passage through Szechwan. These intergrades strongly suggest that the two forms, which are distinct enough over the greater part of their respective ranges, interbreed where they meet, and I have no hesitation in regarding them as conspecific.

PHYLLOSCOPUS AFFINIS (Tickell)

Tickell's and Ogilvie-Grant's Warblers

Ph. affinis affinis (Tickell)

Upper parts and edges to wings and tail olive-green. Supercilium, under parts and under-wing bright yellow, deepest on

belly and under tail-coverts. Ear-coverts dusky yellow. Narrow white tip and border to inner web of three outer tail feathers, most marked on outer and penultimate.

A ground-feeder. In the breeding season found in open alpine scrub, rocky valleys with bushes of furze, rhododendron and dwarf willow, and open plains with light juniper cover. Never in forests. In winter in old cultivation and adjoining scrub, gardens and secondary jungle. More gregarious than other leaf-warblers. Song a single note uttered four to six times in rapid succession, preceded by a single high-pitched *pik*. Call-note a feeble, monosyllabic, sparrow-like *tsip*. Alarm, *tak-tak* rapidly repeated.

Colours of soft parts. Bill: blackish-brown above, yellow to orange below. Legs: shiny olive-brown to pale yellowish-brown.

Measurements. Wing, ♂♀ 52-62. Tail, ♂♀ 40-49. Bill, 11-12½ (13). Tarsus, 18½-20 (21). See Tables on pp. 77 *seq.* Tail 72-82 per cent of wing-length (cf. *subaffinis*).

Weight. 5.5-7.8, average 6.9 gm. (breeding).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 7-12+p.c.

Wing-point 4th=5th, often=6th, though 6th is sometimes ½ shorter. 3rd, ½-2½; 7th, 1½-3; 8th, 4-6; 10th, 6½-9.

2nd, 6½-11, falls between 9th and tips of ss.

Moult (pp. descendant). Complete on or near the breeding ground from mid-July to early October. One from Kharta, S. Tibet, 11.viii., is already half-way through wing and tail moult, but a worn bird, 17.vii., has not yet started. A ♂ from Spiti, Punjab, 25.viii., has pp. 6-9 and ss. 1-4 growing (p. 10 and alula are missing), while the two outermost tail feathers are finishing. Two from localities in Ladakh, 6.ix. and 19.ix., have renewed the tail, tertials, wing-coverts, pp. 1-6 and ss. 1-2, and in the bird of 19.ix. ss. 3-6 are moulting together. According to Ticehurst the pre-nuptial moult is restricted to body feathers.

Distribution. At high elevations (11,000 to 16,000 feet) in the Himalayas from Gilgit east to Kansu, intergrading with *subaffinis* in Sikang, N. Yunnan and W. Szechwan. At lower elevations on passage, wintering south to peninsula India (not N.W. Plains), Assam and Burma.

Ph. affinis subaffinis (Ogilvie-Grant)

Upper parts and edges to wings and tail dark brownish-olive, typically without any greenish tinge. Supercilium, axillaries and under parts bright yellowish-buff, becoming golden-brown on sides of breast. Flanks washed with olive. Cheeks and ear-coverts brownish-buff.

In open bush-covered country at elevations of 6,000-12,000 feet in the breeding season, and down to 4,000 feet in grass and bush jungle in the winter. Recorded in pine forests of the Likiang range at c. 12,000 feet. Has a sharp double call-note *tslick* (B. King).

The bill is more slender than in *affinis* and much of the lower mandible is dark brown.

Colours of soft parts. Bill: dark brown or blackish, base of lower mandible yellow. Legs: dark or deep olive-brown or yellow-brown.

Measurements. Wing, ♂♀ 48-56. Tail, ♂♀ 39-49. Bill, (10½) 11-12. Tarsus, 18½-20. See Tables on pp. 77 *seq.* Tail 81-91 per cent of wing-length (cf. *affinis*).

Weight. 6.3-7.5, average 7.1 gm. (breeding).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 9-12. + p.c.

Wing-point 4th=5th, rarely=3rd, otherwise 3rd, 1-2; occasionally=6th, otherwise 6th, ½-1; 7th, 1-3; 8th, 3-5; 10th, 6-8.

2nd, 7-10, falls between 9th and tips of ss.

Moult (pp. descendant). Complete on or near the breeding ground in August and September, the pre-nuptial moult being confined to body feathers. A ♂ from the Likiang Range, N.W. Yunnan, ix., has the wing and body moult well advanced, pp. 6-9 being short of their full length, p. 1 and alula in sheath, ss. only partially moulted and the outer tail feathers finishing.

Distribution. Mountain ranges (4,000-12,000 feet) in N. Yunnan, Sikang, Szechwan, east to N.W. Fukien province of S. China. In winter at lower elevations south to N. Burma, N. Laos, N. Tonkin, N. Annam and N.W. Thailand.

The description of three birds collected by Ripley in January in W. Nepal, far from the nearest wintering area of *subaffinis* (see Vaurie 1955: 8-9), suggests that the name *arcanus* given to them refers to an intergrade.

II. MAINLY EUROPEAN LEAF-WARBLERS

Large to small size. No wing-bars. No crown-markings. Supercilium not strongly developed. No pale edges and tips to tertials and no yellow rump (except in some *bonelli*). No white in tail. Plumage varying from brown above and whitish suffused buff below, to greenish above and yellowish below. 5th or 6th pp. emarginate. Bill generally weak. Arboreal.

THE CHIFFCHAFFS

As indicated in the introduction, it is convenient to recognize two species, the CHIFFCHAFF *Ph. collybita* with the races *canariensis* and *exsul* (Canary Is), *ibericus* (N. Africa and Iberia), *collybita* (W. Europe), *abietinus* (E. Europe) and *tristis* (Siberia) forming (with the exception of the island forms) a continuous distribution across Eurasia; and the MOUNTAIN CHIFFCHAFF *Ph. sindianus* isolated in Sinkiang, the Pamirs and N.W. Himalayas, with a closely allied race *lorenzii* in the Caucasus Mts. As noted by Vaurie (1959: 273) a cline of decreasing colour saturation runs from N. Africa northwards through Iberia to N. Norway. If one end of this cline is given an acceptable name, *abietinus* (Nilsson) with its type-locality at Nord Trondelag, Norway (see H. Holgersen, and K. H. Voous, 1955), then the other terminal should bear one too, and I cannot agree with Vaurie (1954: 3) that *brehmii* Homeyer (= *ibericus* Ticehurst) should be synonymized with the nominate form. The breeding-birds of this region are at least as distinct from *collybita* as is *exsul* from *canariensis*, and many poorer forms have found acceptance among the *Phylloscopi*.

From N. Norway across N. Eurasia the distribution is continuous, and whilst in general there is a reduction from west to east in the brightness of plumage, the cline is not an even one as it is in W. Europe. Over a large part of central and W. Siberia, and again in N.E. Iran and S.W. Transcaspia (Vaurie 1954: 4-5), the form is unstable; and although Vaurie follows Russian authors in accepting the name *fulvescens* Severtzov for birds from these areas, they appear to constitute hybrid populations arising from the intermingling of *tristis* expanding its range from the east, and *abietinus* spreading from the west.

This spread has taken *abietinus* in fairly recent time into the Caucasus Mts, where it now overlaps geographically (but probably not ecologically) the old-established form *lorenzii*, and the two do not apparently interbreed. They are quite distinct morphologically, the latter being very close to the neighbouring mountain form *sindianus*. It has been suggested that *lorenzii* should stand as a monotypic species; but as there is no longer contact between *sindianus* and its eastern offshoot *tristis*, it seems to me that no violence is done to taxonomic principles if the

primitive MOUNTAIN CHIFFCHAFFS are combined under one species name, *sindianus*, and those with a continuous continental distribution are included under another, *collybita*.

PHYLLOSCOPUS COLLYBITA (Vieillot)

Chiffchaff

Ph. collybita collybita (Vieillot)

Upper parts brownish-olive, slightly more yellowish-olive on the rump. Yellowish-white supercilium, not very pronounced; cheeks and ear-coverts mottled buff and olive. Under parts sullied white, streaked yellow on breast, suffused with buff on flanks. Under tail-coverts yellowish-white; under wing-coverts, axillaries and bend of wing yellow. Wings and tail brown with light yellowish-olive fringes.

In woods, copses, gardens etc. with good canopy and secondary growth, from sea-level to tree limit. Distinctive rhythmic song *chiff-chaff-chiff* etc. Call-note a plaintive *hoo-ee*.

Colours of soft parts. Bill: dark horn, yellowish-brown at base of lower mandible. Legs: dark brown.

Measurements. Wing, ♂♂ mostly 57-63 (65), ♀♀ mostly 53-62. Tail, ♂♂ mostly 45-53, ♀♀ 41-52. Bill, 10½-12½ (mostly 11-12). Tarsus, 19-21. See Tables on pp. 77 *seq.* Tail 75-85 per cent of wing-length (all races except *canariensis*).

Weight. Browne and Browne (1956) give for 101 adults at Skokholm Bird Observatory, range 5.7 to 9.2, average 7.5 gm. Doubtless these figures include some *abietinus*. P. Davis gives for 22 *collybita* at Fair Isle, range 5.7 to 8.8, average 7.5 gm.

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 4-8 (10) + p.c.

Wing-point usually 3rd = 4th = 5th, but occasionally 3rd ½-1 and 5th ½ shorter. 6th, 1-3; 7th, 3½-6; 8th, 6-8; 10th, 9-12.

2nd, 5½-8, is usually between 7th-8th, seldom as long as 7th or as short as 9th.

Moult (pp. descendant). Complete post-nuptial moult on or near the breeding area in late July and August. One at Ile d'Ouessant, Finistère, France, 19.viii., had pp. 3-4 growing and p. 5 in pin, but no moult of ss. or tail; two others, 21 and 25.viii., had pp. 5-6 growing and pp. 7 (8) in pin, and moult of ss. and all tail feathers had recently begun (C. Clapham). There is a pre-nuptial body moult, sometimes including middle rectrices and tertials, in January.

Distribution. Ireland and Great Britain (except N. Scotland and Outer Hebrides), Holland, Belgium, S. and W. Germany, Denmark, France, Switzerland, Czechoslovakia and S. Poland (to 4,800 feet in Carpathian Mts), Austria, Hungary, Rumania and mountains of Italy, Bulgaria and Yugoslavia. Intergrades with *abietinus* in N. Germany and N. and E. Poland. Winters in the southern part of the breeding range, including S. Eng and, and Mediterranean Basin south to about 13° N. in W. Africa and to Egypt, Syria and Iraq in the east.

Ph. collybita ibericus Ticehurst

The CHIFFCHAFF of N.W. Africa and the Iberian Peninsula is brighter, more greenish-olive above and deeper yellow on the under parts, including the under tail-coverts. The differences are slight but are constant enough in series, in both spring adults and juveniles. Measurements and wing-formula are as in the typical race, though a greater percentage have the wing-formula $2nd = 6th/7th$. The legs are said to be paler brown in this race, and the song is very different, judging from recordings: it has been fully described by G. Thielcke and K. E. Linsenmair (1963).

Ph. collybita abietinus (Nilsson)

Paler and greyer above, less deep olive-brown, than the typical race; buff and yellow on breast reduced so that under parts, including under tail-coverts, appear whiter. Call-note said to differ from *collybita*, resembling the 'cheep' of a chicken in distress.

Measurements. Wing, ♂♂ mostly 56-67, ♀♀ 53-65. Tail ♂♀ 41-53 (56). Bill and tarsus as in *collybita*. See Tables on pp. 77 seq.

Weight. P. Davis gives for 22 autumn birds at Fair Isle, range 5.9 to 9.1, average 7.6 gm. At Dungeness, seven autumn birds average 7.9 and eight spring 7.2 gm. (R. E. Scott).

Wing-formula (pp. ascendant). As in *collybita* except that 2nd p. is generally a little longer, often between 6th-7th and only rarely shorter than 8th. The emargination on 6th is sometimes less noticeable.

Moult (pp. descendant). As in *collybita*. A non-breeder (probably this race) trapped in very worn plumage at Fair Isle, Shetland, 21.vii., had reached the stage of replacing pp. 4-5 and the tail feathers, but not ss., when recaptured on 8.ix. (P. Davis).

Distribution. Norway, Sweden, Finland, N. and W. Russia, former Baltic States and E. Prussia, N. Poland, Caucasus Mts and N. Iran, intergrading with *tristis* in the east of its range. Winters S. Caspian region, W. Iran, Iraq, S. Arabia, Egypt, Sudan, Abyssinia, Eritrea, Somalia and Kenya (rare).

NOTE. The form '*fulvescens*' Severtzov has a curiously disjunct range, from the Pechora Riv. to the Yenesei Riv. in Siberia, south to Semipalatinsk, Minusinsk, W. Sayan Mts and N.W. Mongolia, occurring again from N.E. Iran to S.W. Transcaspia (Vaurie, 1954: 5). It seems likely that these are areas of secondary intergradation between *abietinus* and the eastern *tristis*. Vaurie (1959: 275) describes it as 'much greyer above than *abietinus*, olive pigments reduced to a greenish-yellow tinge on the lower back, rump and upper tail-coverts and wings, under parts lighter, whitish or buff'. Birds of this description, comparable with freshly moulted autumn birds from the areas mentioned above, can be found at the type-locality of *tristis*, which is Calcutta. Late spring migrants in N.W. Iran and April birds from S.W. Iran and the Persian Gulf vary from brownish-olive to greyish-olive above, and some have the under parts entirely devoid of yellow streaking; they can be matched by the equally variable 'Northern Chiffchaffs' which occur regularly in autumn in Shetland (especially Fair Isle) and elsewhere in Britain, and which can have little connection with the population just mentioned (see Williamson, 1954 and 1955). There is no doubt that over the wide geographical ranges of '*fulvescens*' the species is unstable as regards the tone of the upper parts and the amount of buff suffusion and yellow streaking beneath, and the name is best synonymized with *tristis* as recommended by Ticehurst (1939: 56).

NOTE. Watson (*Ibis*, 1962) has resuscitated *Ph. c. brevirostris* (Strickland) for the breeding population of N. and W. Turkey, on the grounds that four breeding ♂♂ show intermediate characters between *abietinus* and *lorenzii*.

Ph. collybita tristis Blyth

Upper parts brownish to greyish-brown without olive except on the edges to wing and tail feathers, wing-coverts, and usually the rump. No yellow in the supercilium, eye-ring and cheeks, this being replaced by buff. Sides of breast and flanks 'mackintosh' buff, the only yellow being at the bend of the wing and under the wing.

Measurements. Wing, ♂♂ mostly 57-66, ♀♀ 54-65, Tail, ♂♀, 43-55. Bill and tarsus as in *collybita*. See Tables on pp. 77 *seq.*

Weight. P. Davis gives for 7 birds at Fair Isle, x.-xi., range 6.2 to 8.2, average 7.2 gm. R. E. Scott gives 5.9 and 8.5 (autumn) and 9.3 gm. (spring) for birds at Dungeness.

Wing-formula (pp. ascendant). As in *collybita*, very few having the formula 2nd=6th/7th or 8th/9th.

Distribution. From Pechora Riv. and Ural Mts across Siberia to Kolyma Riv., north to tree limit; south to central and S. Russian Altai, W. Sayan Mts, upper reaches of Lena Riv., Tannu Ola Mts and N.W. Mongolia. Winters in the Himalayas (Kashmir, Bhutan etc.) southward through Pakistan and the plains of India to Central Provinces. Also recorded in Baluchistan, Afghanistan, E. and S. Iran, Iraq and Israel. Regular autumn drift-migrant to W. Europe including Italy, Holland, Norway, Faeroe Is, Shetland Is (especially Fair Isle), Orkney Is, Forth area (Isle of May) and N.E. England (Holy Island). Ticehurst (1939: 54) worked out its movements in some detail.

Ph. collybita canariensis (Hartwig)

A very distinct form, the upper parts browner-olive and noticeably darker than in *collybita*, the under parts with a deeper tawny-buff wash on sides of breast and flanks. Under tail-coverts buffish-yellow. The tail is longer relative to the wing than in other forms (85-96 per cent), and is slightly rounded (outermost feathers 4-7 shorter than longest).

Universally distributed from sea-level to limit of vegetation in wooded and cultivated country; commonest in gardens and orchards overgrown with creepers and shrubs. In pine forests above 4,000 feet. Song harsher, briefer and lower-pitched than *collybita* with less or no alternation between high and low notes (Bannerman, 1963).

Colours of soft parts. Bill: dark horn. Legs: greenish-brown to yellowish-brown, but never dark brown.

Measurements. Wing, ♂♀ 47-57. Tail, ♂♀ (42) 44-52 (54). Bill, 11-13½, but mostly 12½-13. Tarsus, 19-22, mostly 20-21½. See Tables on pp. 77 seq. A total of 24 trapped by Dr. E. A. R. Ennion, 10.i.-23.ii., had wing-length ♂♀ 47-56 (58).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 8½-11½ + p.c.

Wing-point 4th=5th, occasionally=6th. 3rd, 1-2½; 6th, ½-1; 7th, 2-4; 8th, 4-6; 10th, 6½-10.

2nd, 7-10, is almost invariably shorter than 10th and often=ss.

Moult (pp. descendant). One, Gran Canaria, 28.viii., had pp. 8-10 nearly full-grown, s.3 half grown and ss. 4-6 in pin, so probably the moult is over in most by the end of August.

Distribution. Resident in W. Canary Is.

Ph. collybita exsul Hartert.

Said to be somewhat smaller, rather lighter and less olive above, and less rufous, more fawn-yellow, below. (Only one specimen seen.) Legs 'almost black' (Bannerman 1963).

Cultivated areas in Haria Valley, Lanzarote. Apparently scarce.

Measurements. Hartert gives ♂♂ 50-52, ♀♀ 47-48.5.

Distribution. Lanzarote and (doubtfully) Fuerteventura, E. Canary Is.

NOTE. The Canary Is appear to be visited regularly in winter and on passage by *ibericus* and *collybita*.

PHYLLOSCOPUS SINDIANUS Brooks

*Mountain Chiffchaff**Ph. sindianus sindianus* Brooks

Brownish to greyish-brown above, like *tristis*, but without any olive on the rump, wing-coverts and fringes of wing and tail-feathers, except for a trace in spring dress, when it is a distinctly greyer bird than *tristis* in comparable plumage. Under parts off-white infuscated with buff on breast and flanks, and entirely without yellow; pale yellow or cream-coloured bend of wing, axillaries and under wing-coverts. December birds from Sind are a warm brown above similar to *lorenzii* and the only greenish is a trace on lesser wing-coverts.

In bushes, willow-groves etc. at elevations of 8,000-14,000 feet; in winter, in Sind and the Indus Valley, inhabits acacia and tamarisk in company with *tristis* and *neglectus*. Song resembles that of *collybita* but is less vigorous and not so rhythmic. Call-note distinct, a loud *tiss-yip* (W. E. Brooks).

Colours of soft parts. Bill: blackish-brown, base of lower mandible brown to yellowish-brown. Legs: black or blackish-brown, soles yellowish-horn. Mouth: yellow.

Measurements. Wing, ♂♀ 51-62 (64). Tail, ♂♀ 41-52 (55). Bill shorter than in *Ph. collybita*, 10-12, usually 11. Tarsus, 19½-20. See Tables on pp. 77 *seq.* Tail 80-89 per cent of wing-length (cf. *neglectus*).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. $7\frac{1}{2}$ -10+p.c.

Wing-point 4th=5th, rarely=6th; otherwise, 3rd and 6th, $\frac{1}{2}$ -1; 7th, $2\frac{1}{2}$ -4; 8th, 4-6; 10th 7-9 $\frac{1}{2}$.

2nd, 6-9, is usually between 6th-10th or shorter, occasionally less than 10th.

Moult (pp. descendant). Complete post-nuptial moult in September and October, though some are apparently later. One from Rondu Dist., Kashmir, 20.ix., is growing pp. 6-7 with pp. 8-9 in pin, s. 1 nearly full-grown and the tail and tertials new. Another Kashmir bird, 5.x., has the outer part of the wing, pp. 6-10, also ss. 2-4, growing; and one on 16.x. has pp. 7-10 and ss. 1-3 growing and the outermost tail feather just short of completion. A ♀ from Sind, 5.xii., is only just finishing with pp. 9-10 and s. 6 short of full length.

Distribution. W. Kun Lun and Astin Tagh Mts in Sinkiang, west to Pamirs and Alai Ranges; Karakoram and N.W. Himalayas in Kashmir east to Ladakh range. In winter at lower elevations, some moving as far as E. Afghanistan and W. Pakistan.

Ph. sindianus lorenzii (Lorenz)

Upper parts warm brown without any greenish tinge on rump, wing-coverts or edges to wing and tail feathers. Under parts whitish suffused with buff, the only pale yellow (in some, cream-colour) being on the bend of wing, axillaries and under wing-coverts.

Ticehurst (1938: 50) gives the following measurements: wing, ♂ 59-64, ♀ 54.5-59; tail, ♂ 51.5-55, ♀ 46-49. In the wing-formula, 2nd falls between 7th-9th or=9th.

The bird breeds in the subalpine zone and upper belt of the forest zone in the Caucasus Mts: its distribution is given in detail by Ticehurst (1938: 50-51). It descends to the foothills in winter and some may move south, as two of the three specimens in the British Museum are from Iraq—♀, Amara, Riv. Tigris, 26.x., and ♂ Basra, 21.xi.

PHYLLOSCOPUS NEGLECTUS Hume

Plain Leaf-warbler

No bigger than a GOLDCREST (*Regulus regulus*), greyish olive-brown above and whitish below with a buffy tinge, especially on flanks. Supercilium creamy-white, not very conspicuous; lores and eye-streak dusky; cheeks and ear-coverts pale brown.

Wings and tail brown, with outer edges to tertials and wing-coverts brighter. No trace of green or yellow in the plumage.

In Sind a bird of acacias and tamarisks, associating with CHIFFCHAFFS, from which its small size and comparatively short tail distinguish it. In the breeding season inhabits juniper and oak between 6,000 and 9,000 feet. Call-note is then said to resemble a GOLDCREST'S (Witherby), but in winter a harsh *churr* has been recorded.

Colours of soft parts. Bill: dark brown, base of lower mandible horn-colour. Legs: blackish-brown, soles dull olive. Mouth: yellow.

Measurements. Wing, ♂♂ 49-54, ♀♀ (45) 47-50. Tail, ♂♀ 33-41. Bill, 9-11. Tarsus, 17-19. See Tables on pp. 77 *seq.* Tail 71-81 per cent of wing-length (cf. *sindianus*).

Weight. 4.2 to less than 7.0 gm. (winter).

Wing-formula (pp. ascendant). Emarginated 6th. 1st p. 7-10+p.c.

Wing-point 4th=5th, occasionally=3rd or=6th; otherwise 3rd, $\frac{1}{2}$ -2; 6th, $\frac{1}{2}$ -1; 7th, 2-3; 8th, 4-5; 10th, $6\frac{1}{2}$ -8.

2nd, $5\frac{1}{2}$ - $8\frac{1}{2}$, falls between 8th-10th, occasionally as short as ss.

Moult (pp. descendant). The complete post-nuptial moult takes place during August; the pre-nuptial moult involves body feathers, lesser wing-coverts and central rectrices during March, according to Ticehurst. He examined five juveniles which were moulting the whole tail in August, but the remiges and greater coverts are not changed. A ♂ from Quetta, Baluchistan, 19.viii., has pp. 8-10 and ss. 1-2 growing and one old tail feather remaining.

Distribution. Iran from Gurgan at the southeast corner of the Caspian Sea east through the Kopet Dagh range to Tadzhikistan; Badakhshan, N.E. Afghanistan and N. Baluchistan (Safed Koh). Winters at lower elevations, some penetrating to the shores of the Persian Gulf and the plains of W. India.

THE WILLOW WARBLER

This species, *Phylloscopus trochilus*, is dimorphic over the greater part of its range: in addition to an 'olive-and-yellow' morph with a largely southwestern distribution, there is a 'brown-and-white' morph with a largely northeastern range. This latter type (the '*eversmanni*' of some authors—but see the discussion in Ticehurst, 1938: 27-30) is apparently exclusive in N.E. Siberia, and this terminal population was named *yakutensis*

by Ticehurst (type-locality Verkhoyansk Dist., E. Siberia). As pointed out by him, however, many birds verging on this type—and, indeed, some indistinguishable from it—occur within the range of *acredula*, at least as far west as Perm, the Kola Peninsula and N. Lapland.

The eastern races, however, have no monopoly of the 'brown-and-white' type, and in fact many Scottish breeding-birds are of this kind, as first pointed out by Clancey (1950). I have seen many such in the field in May and June in western Scotland and the Inner Hebrides, and a number of observers have been struck by the marked contrast between these and English breeders. (R. E. F. Peal, *in litt.*, reports them from Skye; see also A. Hazelwood and E. Gorton, *Bull. B.O.C.* 76: 11-13). The late Alfred Hazelwood showed me a good series of breeding birds from Perthshire in the Bolton Museum; another, collected at Bolton (Lancs.) when in heavy wing moult, may well have bred nearby, since 'brown-and-white' individuals are not uncommon in the large Willow Warbler population of the Pennine uplands. Similar birds are to be found as far west in the wintering range of *trochilus* in W. Africa as Bintumane Peak, Sierra Leone, and R. F. Rutledge has shown that there is a regular passage of such birds through Great Saltee (Co. Wexford) in late April (reports in *Fair Is. Bird Obs. Bull.*), and this is reflected at Skokholm (Pemb.). That this passage has a wider extent is suggested by the considerable number of 'brown-and-white' birds in the British Museum collected during spring migration, 24.iv. to 27.v., at St Catherine's Lighthouse, Isle of Wight, and in Southern Counties of England, 20.iv. to 11.v.

Attention should be drawn to a Willow Warbler "identified as belonging to the Northern race (*Phylloscopus t. acredula*)" when ringed at Monks' House Bird Observatory, Northumberland, on 30.iv.1958, and later recovered at Muir of Ord, Ross-shire, on 20.viii.1958. A series of ten birds from the Yenesei Riv., Siberia, 15.v. to 2.vi., can be matched by some Scottish breeding birds. Both are very close to Ticehurst's *yakutensis*, and while this race may be stable in N.E. Siberia, as he claims, birds inclining strongly towards the 'olive-and-yellow' morph are found not far away, and I have seen specimens from Krasnoyarsk and Baikit on the Tunguska Riv. which were not separable from Swedish *acredula*.

One can sum up by saying that the racial names *trochilus* and *yakutensis* describe the extreme types of a dimorphic population, the former dominant in the southwest and the latter in the northeast of the species range. Between these extremes, as shown by Salomonsen (1945), there is every kind of intergradation, but no simple cline, so that the confines of these two races and of the intermediate aggregation called *acredula* are impossible to fix with any degree of precision.

PHYLLOSCOPUS TROCHILUS (Linnaeus)

Willow Warbler

Ph. trochilus trochilus (Linnaeus)

Upper parts and edges of wing and tail feathers olive-brown with a yellowish-green tinge. Supercilium yellow, not very distinct; lores and indistinct eye-streak dusky brown; cheeks and ear-coverts brownish tinged yellow. Under parts dull whitish, streaked with a varying amount of yellow, this colour being most in evidence on throat and breast; under tail-coverts yellowish-white. Bend of wing, axillaries and under wing-coverts brighter yellow. Wings and tail brown.

As described above, there is a plumage-type in which the green and yellow pigments are suppressed.

Ageing. 1st-winter birds have almost uniform canary-yellow under parts, tinged buffish across the breast. They lack the contrast found in adults between the yellow throat and breast and whitish belly, on which the yellow is reduced to sparse streaks. Young usually have a more whitish chin and under tail-coverts, and brighter yellow cheeks and supercilium.

Colours of soft parts. Bill: brown, base of lower mandible paler. Legs: usually pale brown, but not infrequently dark brown, in some almost as dark as CHIFFCHAFF (Conder and Keighley, 1950).

Measurements. Wing, ♂♂ 64-70, ♀♀ 60-66. Tail, ♂♂ 47-55, ♀♀ 42-50. Bill, 10-15, mostly 11-12. Tarsus, 19-22, mostly 20-21. See Tables on pp. 77 seq.

Weight. Browne and Browne (1956) give for 723 adults at Skokholm Bird Observatory, range 6.5 to 11.8, average 8.7 gm.;

and 729 juveniles and 1st w. birds, range 6.3 to 11.9, average 9.1 gm. These figures may include some *acredula*.

Wing-formula (pp. ascendant). NOT emarginated 6th. 1st p. $3\frac{1}{2}$ -8+p.c.

Wing-point, 3rd=4th, rarely 4th $\frac{1}{2}$ shorter; 5th, 1-3 $\frac{1}{2}$, usually 1-2; 6th, 5-8; 7th, 8-12; 8th, 10-14; 10th, 13 $\frac{1}{2}$ -18.

2nd, 4 $\frac{1}{2}$ -7, falls between 5th-6th or=6th, very rarely shorter.

Moult (pp. descendant). This species appears to be unique among *Phylloscopi* in having two complete moults in the year. The post-nuptial moult on the breeding-ground begins in England about the third week of June: one from Westhoughton (Lancs.), 24.vi., has pp. 1-4 growing and the tertials in pin; another from Wickham (Hants.), 30.vi., has pp. 1-2 nearly complete and p. 5 in pin, but both show very little body moult. Another, Westhoughton, 12.vii., has the body more advanced and pp. 1-4 and several tail feathers nearly full grown. A ♀ from Llangwen (N. Wales), 28.vii., has the outer part of the wing, pp. 6-10, and practically all the ss. in active moult with the tail and tertials new and the body almost finished. A ♀ from Wickham, 29.vii., has nearly finished, as also have two from Stretton (Herefords.), 5 and 9.viii.; others, almost complete, are from Darnley (Renfrews.), 13.viii., and Aberdovey (N. Wales), 17.viii. Some have finished by 11 and 12.viii., but a 'brown-and-white' ♀ from Bolton (Lancs.), 4.ix., is still growing pp. 6-10 and most of ss. The first moulting examples from W. Africa are 1st w. birds, from Nigeria, 25.xi., and the Cameroons, 5.xii. By mid-December wing moult is fairly general in both adults and 1st w., though some have still not begun, but all January specimens are in moult and by mid-February many are finishing, though a few late birds continue into the first week of March.

Distribution. Ireland and Great Britain, Denmark, Holland, Belgium, France except S.W. and Mediterranean coast, Switzerland, Germany, Austria, W. Hungary, N. Rumania, Czechoslovakia (to 4,500 feet in Carpathian Mts), N. Italy, Yugoslavia, S. Poland. Winters in tropical W. Africa south of about 10° N. including Nigeria, Cameroons, Congo, Angola; and in E. Africa from S. Sudan south to the Cape. Specimens indistinguishable from *trochilus* have been taken on passage in Egypt, Eritrea, Arabia and Iraq, and a juvenile of this race from Myggbukta, E. Greenland, 18.ix.1937 (labelled *acredula*) is in the British Museum. It is of very rare occurrence in Britain in winter (e.g. Banbury, Oxon. 18.xii.1961). The migration of this species has been discussed by H. N. Southern, *Brit. Birds* 32: 202-6, and by R. Moreau, *Ibis* 103a: 503-4.

Ph. trochilus acredula (Linnaeus)

Paler on the upper parts, more yellowish and brighter olive than *trochilus*; yellow on the breast reduced. There is a greater incidence of the 'brown-and-white' type, in the northern populations particularly. Owing to the general reduction of yellow on

the under parts discrimination between adult and 1st w. is much less easy than in *trochilus*, and many juveniles have no yellow on the breast at all.

In birches and conifers, also willow scrub beyond tree limit, in the breeding season.

Weight. For E. African wintering birds (probably this race) R. E. Moreau gives, range 7.3 to 9.5, average 8.8 gm. (*Ibis*, 86:21). Average weight of thirty spring birds at Dungeness (Kent), 8.5 (7.1-10.5) gm.

Measurements. Wing, ♂♂ 64-72, ♀♀ (60) 62-66. Tail, ♂♂ 48-56, ♀♀ (42) 44-51. Bill and tarsus as in *trochilus*, and wing-formula same.

Moult (pp. descendant). The complete post-nuptial moult begins nearly a month later than *trochilus*: a ♂ from W. Siberia, 16.vii., has pp. 1-4 growing but this is the only moult, and two from the Lower Pechora Riv., 21.vii., have not started. A ♂ from Riv. Ob, W. Siberia, 15.viii., has renewed p. 1, and has pp. 2-5, tertials and all tail feathers growing, with the body plumage mostly old. A ♀ from Tunniemi, Swedish Lapland, 14.viii., has renewed pp. 1-4 and has the tertials and tail partly extended, while a ♂ from Sundet, Telemarken, Norway, 25.viii., is finishing with pp. 7-10 and ss. 5-6 short of full length. The complete winter moult takes place in E. Africa and is again about three weeks behind that of *trochilus* wintering in W. Africa: the earliest, just begun, are a 1st w. ♂ from N. Rhodesia and an adult ♂ from Zululand, both 16.xii., but other adults which have only just commenced are Uganda, 30.xii., S. Rhodesia, 10.i. (pp. 1-5 all missing or in pin), Damaraland and Tanganyika, 22.i. A number are well advanced by that time, however, and all birds are actively in moult during February. By 8-9.iii. several from Tanganyika have finished or virtually so, and the last seen in moult is a ♂ from Uganda, 30.iii., with pp. 8-10 and ss. 3-6 incomplete.

Distribution. Norway and Sweden (except S.), former Baltic States and E. Prussia, whole of Russia south to N. Ukraine, W. Siberia east to Yenesei Riv. and south to Tomsk and Minusinsk Dists. and foothills of W. Sayan Mts. Winters over the whole of E. Africa from S. Sudan south to Natal and Transvaal, also Angola and E. Congo. Spring and autumn passage migrant on E. coast of Britain, especially at Fair Isle (Shetland); vagrant in Faeroe Is and Iceland.

Ph. trochilus yakutensis Ticehurst

Upper parts grey-brown with only a trace of olive-green on the rump and edges to wing and tail feathers. Under parts dull white, clouded grey on breast, and without any yellow except at the bend of wing and on the 'thighs'.

Measurements. Ticehurst (1939: 37) gives: wing, ♂ 69-74, ♀ 65-68; tail, ♂ 54-56.5, ♀ 51-53. Bill and tarsus as in other races, and wing-formula same.

Moult. No doubt two complete moults as in the other races. A ♂ from the Nyiki Plateau on the Nyasaland—N. Rhodesia border, 22.i., has replaced pp. 1-5 and ss. 1-3 and has the remainder of the remiges growing, with body plumage mostly new.

Distribution. Ticehurst gives: Siberia from Taimyr Peninsula and Angara Riv. east to Kolyma, Yana and Andayr Rivs, south to about 60° N. on lower Tunguska and Viliui Rivs. It is quite impossible to define its range precisely, however. This bird has a prodigious migration of some 6,000-7,000 miles skirting the deserts of central Asia on the north and west to reach its wintering-grounds in E. Africa. It is unrecorded in the Indian sub-continent except at Naga Hills, Assam, i.1952.

PHYLLOSCOPUS SIBILATRIX (Bechstein)

Wood Warbler

Upper parts yellowish-green with a slight brownish or greyish cast. Well-marked yellow supercilium; lores and eye-streak dark olive; cheeks and ear-coverts yellow. Under parts silky white sharply demarcated from yellow throat and upper breast. Axillaries and under wing-coverts a brighter yellow admixed with white. Wings and tail dark brown with bright yellowish-green fringes.

Habitat in breeding season chiefly well-grown woods and wooded parkland, especially beech and oak, but also stunted oak and birch in hilly districts; in continental Europe often in coniferous and mixed woodland. Seems to prefer woods with little or no undergrowth. In winter arboreal in forest and open country. Distinctive song, a high-pitched *pee-pee-pee* intensified to a shivering trill. Call-note a plaintive, piping *peu*, sometimes repeated a number of times. *Plate III.*

Ageing. 1st w. birds have fresh remiges and rectrices with bright yellowish-green edges; in adults these feathers are worn and faded in autumn.

Colours of soft parts. Bill: blackish-brown above, yellowish-flesh below. Legs: pale yellowish-brown (once noted as greenish-horn).

Measurements. Wing, ♂♂ 71-80, mostly 73-78; ♀♀ 69-78. Tail, ♂♂ 46-55; ♀♀ 42-52. Such relative shortness of the tail, about 62-69 per cent of the wing-length, is unique in the *Phylloscopi*. Bill, 12-14. Tarsus, 18-20. See Tables on pp. 77 *seq.*

Weight. Eighteen caught at British bird observatories, viii. and ix., range from 8.2 to 11.8, average 9.4 gm. A spring bird at Isle of May (Scotland), 5.v., weighed 10.3 gm.

Wing-formula (pp. ascendant). NOT emarginated 6th, and emargination on 5th not always well-marked and occasionally absent. 1st p. very short, from 4-6—p.c., but in young birds often a little longer, once 1+p.c.

Wing-point 3rd. 4th, $\frac{1}{2}$ -2; 5th, 4-6; 6th, 8-11 $\frac{1}{2}$; 7th, 12-15; 8th, 15-18; 10th, 20-22.

2nd, 1 $\frac{1}{2}$ -5, falls between 3rd-5th.

Moult (pp. descendant). A body moult after breeding may or may not be accompanied by replacement of the tertials and lesser coverts, and occasional birds appear to moult one or more of the tail feathers. The complete moult takes place in Africa from mid-December to the end of February. A ♂ from Kumba, Cameroons, 12.xii., and one from Isoba, S. Nigeria, 26.xii., are growing p. 1 and have p. 2 in sheath; another from Kumba, 27.xii., has pp. 1-2 new and p. 3 half grown. Birds from Oweri, S. Nigeria, 1.i., and Riv. Ja, Cameroons, 14.i., have pp. 1-3 new and 4-5 growing and are replacing the tertials. Birds from Lagos, S. Nigeria, 14.i., and Kumba, 19.i., have progressed as far as pp. 6-7, have started ss. and have their tails half grown. Specimens from Imatong Mts, Sudan, 17.ii., and Upper Congo, 19.ii., have reached the stage of finishing pp. 8-10 and ss. 5-6, with the tail finished except for the outermost pair, and two birds from Abouri, Ghana, 23.ii., are similarly advanced. A ♂ from Mpumu, Uganda, 26.ii., has finished the tail and tertials but has pp. 7-10 still growing and ss. 5-6 old. The earliest in active body moult is dated 12.xii. and the latest, finishing with chin and throat, comes from the Riv. Ja on 21.iii.

Distribution. Most of Europe west to Britain and Ireland (scarce), north to 61° 30' N. in Norway and 64° N. in Finland and Russia, east to Ural Mts and south to Crimea, Caucasus, Yugoslavia, Italy and central France, with outposts in the high forests of the Pyrenees. On passage through E. Mediterranean countries and N. Africa (rare Egypt in autumn), wintering on the equator or north of it from N.E. Kenya and N. Uganda through N. Congo and S. Cameroons to Ivory Coast and Guinea.

There are vagrant records for Madeira and the Canary Is (spring), Fair Isle (Shetland) (mainly autumn), Heligoland (Germany), Alexandrovsk (Murman coast of Russia) and Omsk (W. Siberia). Autumn recoveries of birds ringed in Wales, England, Sweden and Germany show a migration route through Italy. (A Landsborough Thomson, *Brit. Birds* 46: 447-8; R. Drost and M. Stanislaus, *Alauda* 10: 275-8). Its migration has also been dealt with by H. N. Southern, *Brit. Birds* 34: 74-9, G. Svårdson, *Vår Fågelvärld* 6: 1-28 and R. Moreau, *Ibis* 103a: 594-6.

PHYLLOSCOPUS BONELLI (Vieillot)

Bonelli's Warbler

Ph. bonelli bonelli (Vieillot)

Upper parts brown, often with close greenish-yellow streaking; rump, coverts and edges of wing and tail feathers bright greenish-yellow to golden-brown, contrasting with mantle. Supercilium whitish, but yellowish above eye, poorly-defined in front of eye; lores dusky; cheeks and ear-coverts pale brown. Under parts silky white, suffused greyish on sides of breast and flanks. Wings and tail dark brown, tertials with whitish edges in fresh plumage, outer and penultimate tail feathers with very narrow white border and tip to inner web. Axillaries pale yellow, under wing-coverts and bend of wing brighter yellow.

Nasal hairs more marked than in WILLOW WARBLER and the three rictal bristles overhang the base of the nostrils.

The greyish tone of the plumage, especially the head, contrasting with silvery-white under parts, and offset by yellowish wing-patches where the fringes of inner pp. and ss. overlap, make this one of the most distinctive leaf-warblers. For an excellent description of field-characters, habitat etc. see I. J. Ferguson-Lees and M. D. England (1961).

A bird of hills and mountains, 2,000 to 6,000 feet, over most of its range, in oaks and pines, but likes areas where the ground vegetation is sparse. Song a monotonous trilling rattle of half a dozen notes, recalling a slow version of the first part of WOOD WARBLER'S song, yet with a certain resemblance to CIRC BUNTING *Emberiza cirulus* and LESSER WHITETHROAT *Sylvia curruca* (I. J. Ferguson-Lees). 'A short trill on one note of five to seven syllables, lower pitched and slower than trill of WOOD WARBLER and without the acceleration' (D. J. Pearson, S. Boddy and M. Smart, *Brit. Birds* 55: 277). Call-note variously reported as *wheet*, *cloo-ee*, *clweet*—a rather harsh single or double metallic note.

Ageing. Ist w. birds are greyer on mantle than autumn adults, which have worn and faded remiges and rectrices. The contrast between mantle and rump is not nearly so pronounced and often difficult to appreciate in the field, but the combination of greyish upper parts, silky white under parts and bright green wing and tail edges makes this one of the most distinctive leaf-warblers (P. Hope Jones).

Colours of soft parts. Bill: upper mandible horn with pinkish cutting-edge and base, lower mandible pinkish. Legs: brown, with slaty tinge in front and pinkish tinge behind (P. Davis); also stated as dark bluish-flesh, dark pinkish-brown. Mouth: yellow.

Measurements. Wing, ♂♀ (56) 58-66. Tail, ♂♀ (42) 44-52. The ♂ is probably the bigger sex, but too few ♀♀ are available to be sure. Bill, 11-13½, mostly 12-13. Tarsus, 17½-20. See Tables on pp. 77 seq.

Weight. A 1st w. bird at Bardsey (Caerns.) increased its weight from 6.8 gm. (18.viii.) to 8.9 gm. (29.viii.) and was 9.0 gm. on 5.ix. Another increased from 6.4 gm. (15.ix) to 8.9 gm. (20.ix.). Others were 6.8 and 8.2 gm; one at Portland Bill (Dorset), 29.viii. was 7.4 gm.; one at Fair Isle (Shetland), 22.ix., was only 6.4 gm.; one at Great Saltee Is. (Co. Wexford) gained from 7.3 gm. on 1.ix. to 10.6 gm. on 14.ix. Average of seven August weights, Zaragoza (Spain), 7.0 (6.6-8.2) gm. (P. Wilkinson).

Wing-formula (pp. ascendant). Emarginated 6th in many specimens, though more usually 3rd-5th only. 1st p. 3-6 (7½)+p.c.

Wing-point 3rd=4th (once=5th); otherwise 5th, ½-2½; 6th, 3-5½; 7th, 6-8½ (9½); 8th, 8-12; 10th, 11½-15.

2nd, 5-7, =6th or falls between 6th-7th. In one bird, N. Portugal, 2nd was between 5th-6th, but this is most unusual—see *orientalis*. Of the 35 examined only seven others had 2nd as long as 6th. In some there is a slight notch on inner web of 2nd, 16-19 from tip

Moult. (pp. descendant). Adults moult the body feathers, and some the tertials, while still on the breeding-ground, and complete the wings and tail after arrival in Africa. A ♂, French Sudan, 20.ix., has not started; another ♂, Timbuktu, 18.x., is just finishing; and one dated 21.x. has finished. Farther south the moult may be later, as a ♂ from Mora, N. Cameroons, 9.xii., has p.9 half-grown and p. 8 incomplete.

Distribution. Morocco, Algeria, Tunisia, Spain, N. Portugal, both slopes of the Pyrenees, France (except Brittany and N.W.), S. Belgium, Germany (north to about 47° N.), Czechoslovakia (rare), Austria (east to Vienna), Switzerland, Italy, Sicily. A migrant in Malta. Winters in N. Cameroons, N. Nigeria, S. French West Africa—generally between the parallels of 10° N. and 17° N. and west of 15° E. Vagrant on several occasions, spring and autumn, at Heligoland (Germany); irregular autumn drift-migrant at Ile d'Ouessant (Finistère), N.W. France; and in S.W. England and Wales, 10.viii. to 5.x. (Portland, Marazion Marsh, Lundy, Lavernock Point, St Agnes, Skokholm, Bardsey). It has reached Ireland thrice (Cape Clear Is. 2-3.ix.1961; Great Saltee Is. 1-16.x.1962, 1-14.ix. 1963) and Scotland once (Fair Isle, 22.ix.1961). Singing males have appeared at

Walberswick (Suffolk) 29-30.iv.1961 and in the Delamere Forest (Cheshire), 19.v. to 9.vi.1963, while it has also reached Holland in spring. The only autumn occurrences in S.E. England are Dungeness (Kent) 2.ix.1963, and Epping Forest (Essex) 11.ix.1964; and in N.E. England, St Mary's Isle (Northumberland) 10.x.1966.

Ph. bonelli orientalis (Brehm)

Upper parts a decidedly greyer brown than in the typical race, and with a paler under-wing. Somewhat larger.

Measurements. Wing, ♂♂ 65-72, ♀♀ 62-65. Tail, ♂♀ 44-54, mostly 45-50. Bill, 11-13. Tarsus, 17-19. See Tables on pp. 77 seq.

Wing-formula (pp. ascendant). NOT emarginated 6th. 1st p. $3\frac{1}{2}$ - $6\frac{1}{2}$ + p.c.

Wing-point 3rd, usually = 4th, otherwise 4th $\frac{1}{2}$ shorter; 5th, $\frac{1}{2}$ -2; 6th, 5- $6\frac{1}{2}$; 7th, 8-10; 8th, 10-13; 10th, 13-17.

2nd, $3\frac{1}{2}$ -5, = 6th or falls between 5th-6th.

Moult (pp. descendant). Probably similar to *bonelli*. A ♀, Nazareth, 14.vii., had a new middle tertial in the right wing and most of the tail feathers half grown.

Distribution. Yugoslavia (S. Serbia, Macedonia), Greece, Turkey (Cicilian Taurus, mountains near Ankara), probably S. Syria, Israel (Mts Carmel and Tabor). On passage in Crete, Cyprus, Lower Egypt, Cyrenaica. Winters in Sudan south to 9° 30' N. Vagrant (twice) in the Crimea. The migration and range are incompletely known. See R. E. Moreau, *Ibis* 103a: 596.

TABLE I
MEASUREMENTS—WING AND TAIL

SPECIES/RACE	WING				TAIL			
	n.	mean	s.d.	theoretical range	n.	mean	s.d.	theoretical range
<i>pulcher pulcher</i>	123	56.92	2.81	48—65	120	40.45	2.65	33—48
<i>maculipennis maculipennis</i>	99	48.35	2.27	42—55	101	33.48	2.04	27—40
<i>proregulus proregulus</i> ..	93	50.73	2.59	43—58	97	37.78	2.51	30—45
<i>proregulus chloronotus</i> ..	81	51.41	2.78	43—60	80	37.88	3.11	29—47
<i>subviridis</i>	63	54.79	2.83	46—63	63	41.24	2.29	34—48
<i>inornatus inornatus</i>	81	55.36	1.93	50—61	85	39.49	2.26	33—46
<i>inornatus humei</i>	103	56.50	2.35	49—64	104	41.16	2.28	34—48
<i>occipitalis</i>	105	64.70	3.09	55—73	104	48.93	2.81	41—57
<i>coronatus</i>	96	61.38	2.17	55—68	104	46.31	2.23	40—53
<i>reguloides reguloides</i> ..	82	57.22	2.51	50—65	81	42.86	2.45	36—50
<i>reguloides claudiae</i>	42	61.52	2.85	52—70	43	45.49	2.30	39—52
<i>reguloides fokienis</i>	44	58.73	2.13	52—65	44	43.32	2.33	36—50
<i>reguloides 'assamensis'</i>	32	56.19	2.36	49—63	34	41.44	2.29	35—48
<i>davisoni</i> races	76	52.66	2.36	46—60	76	39.47	1.96	34—45
<i>borealis borealis</i>	239	65.42	2.73	57—74	239	46.33	2.81	38—55
<i>borealis xanthodryas</i> ..	30	70.17	2.36	63—77	30	49.87	2.60	42—58
<i>trochiloides trochiloides</i> ..	67	61.45	3.47	51—72	69	50.03	3.29	40—60
<i>trochiloides viridanus</i> ..	94	60.34	2.43	53—68	96	46.41	2.59	39—54
<i>nitidus</i>	105	61.94	2.40	55—69	109	46.16	2.20	40—53
<i>plumbeitarsus</i>	40	58.60	2.27	52—65	43	44.49	2.29	38—51

TABLE I—continued
MEASUREMENTS—WING AND TAIL

SPECIES/RACE	WING				TAIL			
	n.	mean	s.d.	theoretical range	n.	mean	s.d.	theoretical range
<i>tenellipes tenellipes</i>	45	61.20	2.92	52—70	43	45.98	2.26	39—53
<i>magnirostris</i>	83	67.78	2.83	59—76	83	51.31	2.82	43—60
<i>ryleri</i>	42	57.60	2.47	50—65	41	40.81	2.05	35—47
<i>fuscatus fuscatus</i>	140	60.10	3.21	50—70	143	50.18	3.65	39—61
<i>fuligiventer/tibetanus</i>	52	55.52	2.62	48—63	50	44.78	2.62	37—53
<i>schwarzi</i>	41	62.00	3.07	53—71	42	53.52	3.78	42—65
<i>griseolus</i>	108	62.57	3.26	53—72	107	48.79	3.27	39—59
<i>armandii</i>	31	61.94	3.55	51—73	29	54.93	3.51	44—65
<i>affinis affinis</i>	124	57.52	2.65	50—65	121	44.55	2.31	38—51
<i>affinis subaffinis</i>	50	51.60	2.29	45—58	51	44.35	2.57	37—52
<i>collybita collybita</i>	116	58.54	2.99	50—68	116	47.36	2.82	39—56
<i>collybita abietinus</i>	87	60.63	3.71	50—72	88	48.14	3.20	39—58
<i>collybita tristis</i>	106	60.37	3.31	50—70	105	49.04	3.22	39—59
<i>collybita canariensis</i>	58	53.00	2.66	45—61	58	48.00	2.75	40—56
<i>sindianus sindianus</i>	55	56.51	3.20	47—66	54	47.11	3.14	38—57
<i>neglectus</i>	57	50.12	1.85	44—56	58	38.35	1.93	33—44
<i>trochilus trochilus</i>	111	65.22	2.84	57—74	112	49.18	2.79	41—58
<i>trochilus acredula</i>	117	67.38	2.72	59—76	121	50.98	3.02	42—60
<i>sibilatrix</i>	225	74.74	2.36	68—82	218	48.89	2.40	42—56
<i>bonelli bonelli</i>	71	62.44	2.23	56—69	73	47.95	2.08	42—54
<i>bonelli orientalis</i>	57	65.53	2.59	58—73	64	48.08	2.25	41—55

TABLE 2
MEASUREMENTS—BILL AND TARSUS

SPECIES/RACE	BILL				TARSUS			
	n.	mean	s.d.	theoretical range	n.	mean	s.d.	theoretical range
<i>pulcher</i>	85	11.89	0.47	10½—13½	34	19.29	0.82	17 —21½
<i>maculipennis</i>	86	9.41	0.50	8 —11	26	17.37	0.58	15½—19
<i>proregulus</i>	91	10.12	0.45	9 —11½	20	16.83	0.69	15 —19
<i>subviridis</i>	50	10.88	0.56	9 —12½	18	17.58	0.67	15½—19½
<i>inornatus</i>	99	10.73	0.48	9½—12	44	18.61	0.81	16 —21
<i>occipitalis</i>	90	13.78	0.57	12 —15½	43	18.13	0.63	16 —20
<i>coronatus</i>	97	13.73	0.65	12 —15½	30	18.13	0.60	16½—20
<i>reguloides</i>	153	12.12	0.54	10½—13½	53	17.76	0.66	16 —19½
<i>davisoni</i>	78	11.17	0.55	9½—13	49	17.93	0.37	17— 19
<i>borealis borealis</i>	195	13.82	0.66	12 —16	17	19.74	0.83	17½—22
<i>borealis xanthodryas</i>	23	14.15	0.65	12 —16	17	20.15	0.79	18 —22½
<i>trochiloides trochiloides</i>	56	12.54	0.45	11 —14	} 31	19.21	0.68	17 —21
<i>trochiloides viridanus</i>	46	12.21	0.44	11 —13½				
<i>plumbeitarsus</i>	31	12.26	0.44	11 —13½				
<i>nitidus</i>	60	12.87	0.66	11 —15	28	18.84	0.71	16½—21
<i>tenellipes</i>	43	12.84	0.48	11½—14	} 16	19.59	0.69	17½—21½
<i>magnirostris</i>	84	13.95	0.56	12 —15½				
<i>tyleri</i>	39	12.76	0.57	11 —14½				

TABLE 2—continued
MEASUREMENTS—BILL AND TARSUS

SPECIES/RACE	BILL				TARSUS			
	n.	mean	s.d.	theoretical range	n.	mean	s.d.	theoretical range
<i>fuscatus</i>	56	12.43	0.26	11½—13	} 39	21.28	0.71	19 —23½
<i>fuligiventer</i>	50	12.83	0.51	11½—14½				
<i>schwarzi</i>	41	12.84	0.61	11 —14½	32	22.53	0.76	20 —25
<i>griseolus</i>	91	13.40	0.59	11½—15	18	20.19	0.55	18½—22
<i>armandii</i>	26	12.60	0.37	11½—13½				
<i>affinis</i>	46	11.70	0.52	10 —13	17	19.38	0.60	17½—21
<i>collybita</i> races	120	11.58	0.50	10 —13	48	19.97	0.56	18½—21½
<i>collybita canariensis</i>	52	12.79	0.49	11½—14½	25	20.78	0.72	18½—23
<i>sindianus</i>	21	11.12	0.63	9 —13	(as <i>collybita</i>)			
<i>neglectus</i>	49	10.09	0.44	9 —11½				
<i>trochilus</i>	137	11.73	0.68	9½—14	22	17.93	0.62	16 —20
<i>sibilatrix</i>	110	12.98	0.58	11½—15	32	20.55	0.69	18½—22½
<i>bonelli bonelli</i>	71	12.55	0.56	11 —14	48	18.67	0.64	17 —20½
<i>bonelli orientalis</i>	57	12.20	0.62	10½—14	46	18.96	0.74	16½—21
					24	18.08	0.68	16 —20

TABLE 3
SEX DIFFERENCES IN MEASUREMENTS OF SOMB LEAF-WARBLERS

	WING				TAIL											
	n.	♂♂ mean	s.d.	theoretical range	n.	♀♀ mean	s.d.	theoretical range	n.	♂♂ mean	s.d.	theoretical range	n.	♀♀ mean	s.d.	theoretical range
<i>pulcher</i>	23	57.78	2.02	52—64	24	55.75	2.77	47—64	24	40.67	2.06	34—47	24	39.63	2.36	33—47
<i>occipitalis</i>	63	65.76	2.53	58—73	24	62.25	3.04	53—71	66	50.00	2.21	43—57	25	46.76	2.88	38—55
<i>coronatus</i>	58	61.78	2.00	56—68	24	59.92	2.08	54—66	61	46.82	1.84	41—52	27	45.22	2.06	39—52
<i>borealis</i>	107	66.33	2.58	59—74	38	64.21	2.69	56—72	106	47.12	3.00	38—56	38	45.29	2.41	38—53
<i>magnirostris</i>	40	68.48	2.55	61—76	23	66.61	2.98	58—76	39	51.72	2.42	44—59	24	50.21	3.12	41—60
<i>tenellipes</i>	27	61.63	2.39	54—69	12	60.00	3.33	51—70	27	46.19	1.84	41—52	10	45.20	2.35	38—52
<i>fuscatus</i>	65	61.63	2.49	54—69	32	56.97	2.21	50—64	66	51.91	3.05	43—61	33	47.46	2.88	39—56
<i>schwarzi</i>	24	63.58	2.10	57—70	11	59.91	3.02	51—69	26	54.92	2.74	47—63	10	51.00	2.83	43—59
<i>griseolus</i>	60	63.92	2.79	56—72	32	60.44	2.91	52—69	60	50.20	2.74	42—58	33	46.73	3.14	37—56
<i>affinis</i>	66	58.15	2.25	51—65	26	55.50	3.00	47—65	65	44.80	2.26	38—52	24	43.21	1.89	38—49
<i>subaffinis</i>	19	51.90	2.00	46—58	17	50.94	2.05	45—57	19	44.95	2.41	38—52	17	43.59	2.15	37—50
<i>collybita collybita</i>	51	59.69	2.44	52—67	42	57.19	2.92	48—66	52	48.12	2.49	41—56	42	46.36	2.93	38—55
<i>collybita abietinus</i>	46	61.91	2.94	53—71	32	59.25	3.66	48—70	47	48.91	3.08	40—58	32	47.38	2.95	39—56
<i>collybita tristis</i>	54	61.70	2.55	54—69	29	58.21	3.53	48—69	54	50.11	2.95	41—59	28	47.32	3.40	37—58
<i>trochilus trochilus</i>	72	66.76	1.85	61—72	37	62.46	1.99	56—68	72	50.47	2.31	44—57	40	46.90	2.45	40—54
<i>trochilus acredula</i>	100	68.48	1.90	63—74	45	64.44	2.33	57—71	100	52.16	2.17	46—59	46	48.00	2.70	40—56
<i>sibilatrix</i>	122	75.57	1.76	70—81	53	72.81	2.33	66—80	122	49.75	1.97	44—56	54	47.11	2.34	40—54
<i>bonelli bonelli</i>	43	62.88	1.62	58—68	12	60.83	2.25	54—68	45	48.31	1.74	43—54	13	46.92	1.89	41—53
<i>bonelli orientalis</i>	26	66.92	2.30	60—74	24	64.08	2.17	58—71	30	49.20	1.92	43—55	25	47.00	2.06	41—53

KEY TO THE GENUS PHYLLOSCOPUS

- A. No wing-bars. Not emarginated 6th p.:
- Rump much yellower than mantle *bonelli* (some),
orientalis
- Rump nearly uniform with mantle:
- Greyish above, whitish below, bright green edges
to wing *bonelli* (1st w.)
- Olive above, some yellow below:
- Supercilium broad, reaching to nape .. *borealis* (worm adults)
- Supercilium narrow, not reaching to nape:
- Tail short, 62-69% of wing; 1st p.—p.c. *sibilatrix*
- Tail long, 72-80% of wing; 1st p.+p.c. *trochilus, acredula*
- Brownish above, whitish suffused buff below *acredula, yakutensis*
- B. No wing-bars. Emarginated 6th p.:
- Upper parts brown without olive, under parts without yellow:
- Brown mantle contrasting with yellow rump *bonelli* (adults)
- No trace of green or yellow in plumage:
- Goldcrest-like, flanks creamy *neglectus*
- Chiffchaff-like, flanks fulvous *fuscatus, weigoldi*
(adults)
- Trace of greenish on lesser coverts:
- Rump more greenish than mantle *tristis*
- Rump uniform with mantle:
- 2nd p.=7th/9th pp. *lorenzii*
- 2nd p.=9th/10th pp. *sindianus*
- Upper parts brown without olive, under parts with yellow:
- Yellow confined to streaks on throat .. *armandii*
- Yellow not in streaks:
- Supercilium orange before, yellow behind
eye; axillaries rusty-buff *griseolus*
- Supercilium whitish before, rusty behind
eye; axillaries fulvous-white *fuscatus, weigoldi*
(1st w.)
- Supercilium uniformly bright yellowish-
buff; axillaries same *subaffinis*
- Supercilium ill-defined, dusky yellowish;
axillaries deep olive tinged yellowish .. *fulgiventor, tibetanus*
(1st w.)
- Upper parts with olive, under parts with yellow or buff:
- Supercilium long, reaching to nape:
- Bill stout; 1st p. 9-14+p.c. *schwarzi*
- Bill long and thin; 1st p. 5-9+p.c. .. *tyleri*

- Supercilium of moderate length:
 Tail over 85% of wing; 2nd p. shorter than
 10th *canariensis, exsul*
 Tail under 85% of wing; 2nd p. = 7th/9th *collybita* (western
 races)
- Tail narrowly bordered white on inner webs
 of 3 outer feathers *affinis*
- C. Single or double wing-bars. Not emarginated 6th p.:
- Upper parts brown, under parts whitish .. *tenellipes* (some)
- Upper parts with olive, under parts with yellow:
- Head-pattern of dark coronal bands with pale
 crown-stripe *coronatus* (some)
- Head darker than mantle but no definite pattern:
- Under parts with a little pale yellow .. *borealis, kennicotti*
 Under parts fairly uniformly bright yellow *xanthodryas*
- D. Single or double wing-bars. Emarginated 6th p.
- Pale yellow edges and tips to tertiaries:
- Head-pattern of dark coronal bands and pale crown-stripe:
- Rump yellower than mantle but not a pronounced band
- Supercilium and face bright yellow .. *subviridis*
 Supercilium and face whitish *mandellii*
- Rump with a pronounced yellow band:
- White in 3 outer tail feathers:
- Wing-bars orange, throat yellow .. *pulcher*
 Wing-bars pale yellow, throat grey .. *maculipennis*
- No white in tail:
- Bright greenish above; golden face; base
 of bill yellow; 2nd p. = 7th/9th pp. .. *proregulus*
- Yellowish-green above; yellowish face;
 2nd p. = 9th/ss. *simlaensis*
- Greyish-green above; pale yellow face;
 base of bill dark *chloronotus*
- No definite head-pattern but sometimes a pale crown-stripe:
- Wing-bars and supercilium yellow .. *inornatus*
 Wing-bars and supercilium buffish-white *humei*
- No pale edges and tips to tertiaries:
- Coronal bands blackish or sooty, crown-stripe and supercilium bright
 yellow:
- Breast and belly uniformly bright yellow *ricketti*
 Breast yellow contrasting with white belly *cantator*

Coronal bands dusky olive, crown-stripe and supercilium pale yellow or whitish:

Single pale yellow wing-bar *coronatus* (some)

Double pale yellow wing-bars:

Outer 2 tail feathers largely white .. *davisoni*

Outer 3 tail feathers edged white on inner webs *reguloides*

Outer 2 tail feathers edged white and a white apical spot on 3rd *occipitalis*

Head darker than mantle but no definite coronal bands etc.:

Upper parts brown, under parts white .. *tenellipes* (some)

Upper parts greenish, under parts with yellow:

2nd p. = 6th/7th *ijimae*

2nd p. = 8th/ss. *trochiloides*

Head uniform with mantle:

Double yellowish wing-bar, 2nd p. = 7th/9th pp. *plumbeitarsus*

Single yellowish wing-bar (perhaps with indication of upper bar in fresh dress):

Bill long and robust, hooked tip; rictal bristles strongly developed *magnirostris*

Bill long and thin, rictal bristles weak .. *tyleri* (rarely)

Bill of moderate size, not hooked:

Bright green above, yellow beneath; 2nd p. = 6th/7th pp. *nitidus*

Greyish-green above, little yellow beneath; 2nd p. = 7th/9th pp. *viridanus*

NOTE: Forms of *Ph. trivirgatus* and *Ph. olivaceus* (islands of S.E. Asia) are not included in this key.

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