

Order PASSERIFORMES

The largest and most diverse order of birds, commonly called passerines or perching birds, and comprising some 5712 species in 45 families (based on Sibley & Monroe 1990; Sibley & Ahlquist 1990), and well over half the world's known bird species. In the HANZAB region, Passeriformes represented by some 382 species in 39 families. Tiny to large: smallest passerine is Pygmy Tit *Psaltria exilis* of Java, with a total length c. 8 cm; largest is Greenland Raven *Corvus corax principalis*, with a total length c. 64 cm and weighing up to 1.7 kg. Superb Lyrebird *Menura novaehollandiae* of e. Aust. probably second largest in Order, with a total length (in adult male) of c. 103 cm, including tail of c. 70 cm, and weight up to c. 1.1 kg. Cosmopolitan except Antarctica and some oceanic islands; and occupying all terrestrial habitats.

Overall, Passeriformes are characterized by (based on Raikow 1982; Sibley & Ahlquist 1990; and DAB [=Schodde & Mason 1999]): Palate aegithongnathous (except Conopophagidae [gnateaters]). Intestinal caeca rudimentary. Single left carotid artery (except paired in *Pseudocalyptomena* and possibly other broadbills [Eurylaimidae]). Aftershaft reduced or absent. Neck short, with 14 cervical vertebrae in most, but 15 in Eurylaimidae (broadbills); atlas perforated; metasternum usually two-notched (rarely four-notched). Bicep slip absent. Expansor secundariorum often present (Berger 1956; Raikow 1982; *contra* Beddard 1898; Ridgeway 1901). Pelvic muscles AXY (AX in *Dicrurus* [drongos]). Ambiens absent. Iliofemoralis externus usually absent, but present in some groups as 'developmental anomaly' (Raikow 1982). Tensor propatagialis brevis tendon present. Hypocleideum present (except Menuridae [lyrebirds]). Wings eutaxic. Usually ten primaries, but p10 often reduced or absent; 11 primaries in Menuridae (lyrebirds), most Eurylaimidae (broadbills), most Furnariidae (ovenbirds), and some Passeri (oscines [see below]). Usually nine secondaries (ten in Menuridae [lyrebirds]). Usually 12 rectrices, but from six (*Stipiturus* [Maluridae]) to 16 (Menuridae). Lesser primary and secondary coverts usually reduced or absent (Zeidler 1966; Morlion 1985; Winkler & Jenni 1996), but a few well-developed lesser primary coverts are present in Superb Lyrebird (Morlion 1985). Uropygial preen glands naked. No basipterygoid process. Nasal glands minute. Foot anisodactyl. Hallux incumbent, large and directed backwards; toes 2, 3 and 4 directed forward; digital formula 2-3-4-5. Deep plantar tendons usually of type VII (lacking vinculum), but often type I in Eurylaimidae (broadbills). Spermatozoa bundled with coiled head and large acrosome.

The DNA-DNA hybridization studies of Sibley & Ahlquist (1985a, 1990) revealed much about the relationships within the Passeriformes and resulted in fundamental changes to the higher level taxonomy of passerines, not least to the taxonomy of the Australo-Papuan oscine passerines. Importantly, these studies showed that many elements of the Australo-Papuan avifauna (e.g. the A'asian wrens [Maluridae], robins [Petroicidae], babblers [Pomatostomidae], and so on), represent an endemic radiation of forms that bear an external resemblance to Eurasian families. Many of the findings of DNA-DNA hybridization studies regarding the Australo-Papuan oscines have since been broadly corroborated by studies using protein allozymes (e.g. Christidis 1991; Christidis & Schodde 1991) and microcomplement fixation (e.g. Baverstock *et al.* 1991, 1992), though there are also many points that remain uncertain and many familial relationships within the Passeriformes are unresolved (Christidis & Boles 1994). (For discussion of historical taxonomic arrangements preceding results of DNA-DNA hybridization studies, see BWP, and Sibley & Ahlquist [1985a,b, 1990]).

The Passeriformes divide into two main groups:

SUBORDER TYRANNI (SUBOSCINES): The distribution of the suboscines is centred in the American and Afro-asian Tropics, with a massive radiation in South America (Sibley & Ahlquist 1990; DAB). Suboscines characterized by mesomyodian syrinx, with or without a single pair of intrinsic syringeal muscles (van Tyne & Berger 1976; Campbell & Lack 1985; DAB). Suborder sometimes named Oligomyodi (e.g. Sibley & Ahlquist 1985a,b), Deutero-Oscines (e.g. Morony *et al.* 1975; Voous 1977), or Clamatores (Campbell & Lack 1985). Poorly represented in the HANZAB region: only TYRANNIDAE (tyrant-flycatchers), with two species, both accidental to South Georgia; ACANTHISITTIDAE (NZ wrens), with four species (one extinct) in three genera, endemic to NZ; and PITTIDAE (pittas), with four species in one genus in HANZAB region (three breeding, one accidental). Tyranni formerly included the Menuridae and Atrichornithidae (e.g. Wetmore 1960; Storer 1971), though subsequently shown that these two families should be included in Passeri (e.g. Sibley 1974; Sibley & Ahlquist 1985, 1990).

SUBORDER PASSERI (OSCINES OR SONGBIRDS): Cosmopolitan in distribution. Within the HANZAB region there are 36 families of Passeri. The Australo-Papuan Passeri can be subdivided into several supra-familial groups, but those recognized differ between authors (for further information, see Sibley & Ahlquist 1985, 1990; DAB). Oscines are

characterized by acromyodian syrinx, with three or four pairs of intrinsic syringeal muscles (van Tyne & Berger 1976; Campbell & Lack 1985; Sibley & Ahlquist 1990; DAB).

Suborder Passeri comprises the major element of the Aust. and NZ passerine avifauna. The families recorded in the HANZAB region, and the representatives in the region, are (following Christidis & Boles [1994] for Aust., with additional species for wider region added as appropriate):

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- MENURIDAE (lyrebirds): two species in one genus; endemic to Aust.;
- ATRICHORNITHIDAE (scrub-birds): two species in one genus; endemic to Aust.;
- CLIMACTERIDAE (A'asian treecreepers): six species in two genera breeding in Aust.;
- MALURIDAE (Australopapuan fairy-wrens, emu-wrens and grasswrens): 22 breeding species in three genera in Aust.;
- MELIPHAGIDAE (honeyeaters and Aust. chats): 76 species in 26 genera in Aust. and NZ, all breeding;
- PARDALOTIDAE (pardalotes, scrubwrens, thornbills and allies): 51 species (one extinct) in 15 genera in HANZAB region, all breeding;
- PETROICIDAE (A'asian robins): 23 species in eight genera in HANZAB region, all breeding;
- ORTHONYCHIDAE (logrunners): two breeding species in one genus in Aust.;
- POMATOSTOMIDAE (A'asian babblers): four breeding species in single genus in Aust.;
- CINCLOSOMATIDAE (whipbirds, wedgebills, quail-thrushes and jewel-babblers): eight breeding species in two genera in Aust.;
- NEOSITTIDAE (sitellas): single species breeding in Aust.;
- PACHYCEPHALIDAE (whistlers, shrike-thrushes and allies): 17 species in seven genera in HANZAB region, all breeding;
- DICRURIDAE (monarchs, flycatchers, fantails and drongos): 19 species in seven genera in HANZAB region, all breeding;
- CAMPEPHAGIDAE (cuckoo-shrikes, trillers and minivets): eight species (one extinct) in two genera in HANZAB region, all breeding;
- ORIOIDAE (Old World orioles and figbirds): three species in two genera in Aust., all breeding;
- ARTAMIDAE (woodswallows, butcherbirds and currawongs): 14 species in four genera in HANZAB region, all breeding;
- PARADISAEIDAE (birds of paradise): five breeding species in two genera in Aust.;
- CORVIDAE (crows and jays): six breeding species in single genus in Aust. and NZ, including one introduced to NZ;
- CORCORACIDAE (Aust. mudnesters): two species in two monospecific genera, endemic to Aust.;
- CALLAEIDAE (NZ wattlebirds): three species (one extinct) in three monospecific genera, endemic to NZ;
- LANIIDAE (shrikes): two species in HANZAB region, one accidental to Prince Edward Is, the other accidental to Christmas I.;
- PTILONORHYNCHIDAE (bowerbirds): ten species in seven genera in Aust. (nine species) and NZ (one species), all breeding; Piopio of NZ probably extinct (Heather & Robertson 1997);
- ALAUDIDAE (larks): two breeding species in HANZAB region (including one successfully introduced to Aust. and NZ);
- MOTACILLIDAE (wagtails and pipits): eight species in two genera in HANZAB region, only two breeding (one on South Georgia), the rest non-breeding visitors or accidentals;
- PRUNELLIDAE (accentors): one species successfully introduced to NZ;
- PASSERIDAE (Old World sparrows and A'asian finches): 22 species in nine genera (including four successful introductions) in HANZAB region, all breeding;
- FRINGILLIDAE (Old World finches): seven species in four genera in HANZAB region, all introduced except one naturally occurring vagrant to South Georgia;
- EMBERIZIDAE (buntings, cardinals, tanagers and allies): two successfully introduced species, occurring NZ and Lord Howe I.;
- NECTARINIIDAE (sunbirds and spiderhunters): single breeding species in Aust.;
- DICAEDIDAE (flowerpeckers): single breeding species in Aust.;
- HIRUNDINIDAE (swallows and martins): eight species in four genera in HANZAB region, including four breeding species in Aust. and NZ, one non-breeding visitor and three accidentals;
- PYCNONOTIDAE (bulbuls): one successfully introduced species in Aust.;
- SYLVIIDAE (Old World warblers): 13 species in eight genera in HANZAB region, including ten breeding species (one extinct) in Aust. and NZ, and three accidental to region;
- ZOSTEROPIDAE (white-eyes): seven species (one extinct) in single genus in HANZAB region, all breeding;
- MUSCICAPIDAE (Old World flycatchers, thrushes and chats): eight species in six genera in HANZAB region, including five breeding species (two introduced), and four accidentals (including one on Prince Edward Is);
- STURNIDAE (starlings and mynas): five species in four genera, four breeding in HANZAB region (including two species successfully introduced, and one species now extinct), and one accidental.
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The Aust. oscines fall into two distinct clusters, each with at least three major supra-familial lineages (DAB): One cluster is the Passerida, comprising the Muscicapoida (including true thrushes and allies), Sylvioidea (true warblers and babblers, and swallows, and others), and Passeroidea (including larks, pipits, sunbirds, flowerpeckers and all finches and their allies). The other cluster is the Corvida, which is centred on the Australo-Papuan region (though its origins are not certain) and which also comprises three main lineages: Menuroidea (lyrebirds, scrub-birds, treecreepers and bowerbirds), Meliphagoidea (A'asian wrens, pardalotes, acanthizid warblers, and honeyeaters), and Corvoidea (A'asian robins, logrunners, A'asian babblers, whipbirds and quail-thrushes, sitellas, whistlers, fantails and monarchs, birds of paradise, butcherbirds and woodswallows, cuckoo-shrikes, Old World orioles, crows and mudnesters).

Throughout this volume, arrangement of families follows that of Christidis & Boles (1994) except that the Meliphagidae precedes the Pardalotidae. This change was made to ensure the Meliphagidae were dealt with in a single volume, rather than split between volumes, and because the switch meant no change to the positioning of Meliphagidae relative to the Pardalotidae (including Acanthizidae), one another's closest relatives, and because there is little overriding evidence of the exact taxonomic positioning of all families within the Meliphagoidea; Sibley & Monroe (1990) also placed the Meliphagidae between the Maluridae and Pardalotidae. However, DAB points out that based on structure of humeral fossa, positioning of Meliphagidae between the Maluridae and Pardalotidae is not correct.

DAB, however, varies from the familial arrangement of Christidis & Boles (1994) in several ways. The main differences are: (1) recognition of Pardalotidae and Acanthizidae as separate families (combined in Pardalotidae in Christidis & Boles); (2) minor rearrangement of the sequence of the families Paradisaeidae–Artamidae–Campephagidae–Oriolidae between the Dicuridae and Corvidae (cf. Dicuridae–Campephagidae–Oriolidae–Artamidae–Paradisaeidae–Corvidae in Christidis & Boles); (3) and use of the more traditional muscicapoid (flycatcher) – sylvioid (warbler) – passeroid (finch) sequence of Sibley *et al.* (1988), Sibley & Ahlquist (1990) and Sibley & Monroe (1990) and much contemporary literature of n. hemisphere, with families in the sequence Muscicapidae–Sturnidae–Hirundinidae–Pycnonotidae–Zosteropidae–Sylviidae–Alaudidae–Dicaeidae–Nectariniidae–Passeridae–Motacillidae–Estrildidae–Fringillidae and noting recognition of the Estrildidae as a separate family (cf. the reversed sequence of Christidis & Boles, as given above, and which submerges the Estrildidae within the Passeridae). For discussion of the reasons for these changes, see DAB (and discussion under these families in future volumes of HANZAB).

Arrangement of genera and species within families also follows Christidis & Boles (1994), which was in turn largely based on Schodde (1975) unless there were specific reasons for change. Lastly, with few exceptions, which are discussed in individual species accounts, taxonomy of subspecies follows DAB.

Passerines are extremely diverse in body form and plumage, and vary greatly in rates of maturation. Some attain adult plumage within months or weeks of fledging; others can take up to 9 years to attain adult plumage (e.g. Superb Lyrebird). Degree of sexual dimorphism also varies greatly: some monomorphic, others vary in either size, plumage or both. Common pattern of annual moult is a single complete post-breeding (pre-basic) moult, but some groups (e.g. Maluridae) or species (e.g. Banded Honeyeater *Certhionyx pectoralis*) also undergo a partial pre-breeding (pre-alternate) moult annually. Moult of primaries usually outward. Secondaries moult from innermost and outermost toward s5. Moult of tail usually centrifugal (outward from centre). Young altricial, nidicolous and dependent on adults for food; usually hatch with sparse to very sparse covering of down, mainly on dorsum; Menuridae (lyrebirds) have heavy natal down. Juvenile plumage usually duller than adult, and in many sexually dimorphic species, often similar to that of adult female.

There are few common features of food, feeding behaviour, social organization and behaviour, voice or breeding in such a large and diverse group of birds.

Volant; extinct Stephens Island Wren *Traversia lyalli* probably the only flightless passerine (Millener 1988). Movements vary greatly: some species long-distance migrants (e.g. Barn Swallow *Hirundo rustica*, Nightingale *Luscinia megarhynchos* and many Old World warblers, such as *Acrocephalus* and *Locustella*, breed in temperate Palaearctic and migrate to Africa or Indian subcontinent [BWP]; Acadian Flycatcher *Empidonax virescens* breeds North America and migrates to South America [Ridgely & Tudor 1994]), others sedentary in small territories (e.g. Cactus Wren *Campylorhynchus brunneicapillus* of sw. USA and Mexico [Ricklefs 1975; Ehrlich *et al.* 1988]). In HANZAB region, movements also vary widely: e.g. Yellow-faced Honeyeater *Lichenostomus chrysops* regular annual migrant in parts of e. Aust.; Rifleman *Acanthisitta chloris* of NZ sedentary in small territories. In Aust., movements often poorly known and unstudied; many species often said to be nomadic, with such claims often based on no or very poor knowledge of actual movements and based only on apparently irregular occurrence in an area (see General Introduction [Movements] for fuller discussion of this point).

Arboreal or terrestrial or both; some strictly arboreal (e.g. Hirundinidae), others strictly terrestrial (e.g. Menuridae, Pittidae); most combine both arboreal and terrestrial foraging to varying degrees, but usually with one predominating. Feed on almost all known food, from plant material to vertebrate animals, but most show some specialization for certain food, such as feeding on nectar (Nectariniidae), seeds (Passeridae), fruit (Zosteropidae), small vertebrates (Artamidae) and, commonly, insects (e.g. Maluridae, Pardalotidae, Petroicidae and others). Mostly feed by gleaning

and probing, including probing flowers for nectar; and other substrates for invertebrates; also feed by sallying, including various sallying techniques (sally-hovering, sally-striking and sally-pouncing), each suited for one group of prey, particularly moving animals.

In passerines, parental care in both sexes is well developed. However, a few species are parasitic, e.g. cowbirds *Molothrus* (Campbell & Lack 1985). Young are dependent on parents for food. Young beg by gaping, typically exposing brightly coloured inside of mouth, often with contrasting pale or dark spots; in non-passerines, bright gape present only in hoopoes (Upupidae), mousebirds (Coliiformes) and cuckoos (Cuculiformes) (BWP). See Boles & Longmore (1985) for descriptions of colours and markings inside the mouths of some Aust. passerines.

Anting is a highly specialized behaviour: ants are held in the bill and applied to the plumage, usually to the underside of the wing-tip (direct or active anting, or ant-application), or ants are allowed access to the plumage (indirect or passive anting, or ant-exposure), or both, e.g. anting recorded in Regent Honeyeaters *Xanthomyza phrygia* in HANZAB region, with bird then seen eating ant. Thought to be unique to Passeriformes (e.g. Simmons 1966; Campbell & Lack 1985; BWP). Suggested this may be comfort behaviour related to maintenance of feathers, by perhaps reducing ectoparasite load, removing stale or excess lipids, or adding supplementary essential oils (Campbell & Lack 1985); some secretions of ants are antibiotic, inhibiting growth of both fungi and bacteria, and the secondary acquisition of these antibiotic secretions would be an important advantage of anting (Ehrlick et al. 1986).

Other behavioural characters include head-scratching indirectly (or over the wing) in most families, with the foot brought up above the lowered wing. Head oiled indirectly, as seen in most taxa, but passerines also oil head by head-scratching, in which bird oils the bill directly, then transfers the oil first to one foot by scratching the bill, and then to the head by scratching the head with foot. To oil the undersurface of the wings, use bill or bill and head together, extending one wing at a time sideways and forward, carpus uppermost, and often alternating rapidly from one wing to the other. The stretching of one wing as a comfort movement seems common to all birds, but in passerines it is often accompanied by sideways fanning of tail. After both wings are stretched, passerines often give a two-leg stretch as they straighten the tarsal joints and lift the body. Heat is dissipated by gaping and panting (not by gular-fluttering, so far as known) (Campbell & Lack 1985; BWP). Bathing widespread, mainly by standing in shallow water, but some groups jump into and out of water repeatedly, or flight- or plunge-bathe, while others bathe only or mainly in rain or among wet foliage; for further details of bathing, see Campbell & Lack (1985). Passerines do not flap wings in the manner of non-passerines to dry, but perform various shaking movements, as well as preening (Campbell & Lack 1985). Dusting confined to only a few groups, but sunning, both for gaining heat (sun-basking) and other purposes (sun-exposure), is widespread, and of two distinct types: (1) lateral posture, in which sunning bird squats or sits down, usually on ground, and leans to one side exposing the flank or the 'sun-wing', which has been lowered and partly unfolded, and the fanned tail, which has been brought round to the same side; and (2) spread-eagle posture, in which bird squats or lies flat with both wings open and tail fanned (details in Campbell & Lack 1985; Simmons 1986).

There is a high incidence of co-operative breeding in Aust. and NZ, and it is especially common and well-studied in the Maluridae but is more widely recorded, including within the Acanthisittidae, Meliphagidae, Petroicidae, Pomatostomidae and Corcoracidae (see Dow 1978, 1980; Brown 1987; Ford 1989; Rowley & Russell 1997).

In vocal abilities, species of Passeriformes are more accomplished than those of any other order, but songs may be simple or highly complex, and repertoires small or large. Mimicry of calls of other species is practised by many species; c. 15% of Australian passerine species have been reported to mimic (Marshall 1950). The Superb Lyrebird and the Tui *Prosthemadera novaeseelandiae* have been classed among the best seven of the world's songsters (Hartshorne 1973). Oscines, or songbirds, have specialized forebrain song nuclei, and, through auditory feedback, learn their songs from those of adults, in much the same way as human young learn their spoken language from adults. In contrast, the songs of suboscines are relatively simple (like the non-learned call-notes of songbirds), repertoires are small, geographical variation is minimal, and development of song appears to take place without any imitative or feedback process. Some oscine species use vocal learning to generate large song repertoires and may vary them geographically, even locally. Other oscine species forgo these possibilities and have song repertoires more like those of suboscines; how the learning process maintains stereotypy of song over the range of such species is a mystery (Kroodsma 1996).

Apart from the five families discussed hereunder, syringeal structure of passeriform species of our area is similar, there being four pairs of intrinsic muscles. Pittidae have no intrinsic muscles (Ames 1971); calls are mostly loud strong whistles (Pizzey 1980). Acanthisittidae also have no intrinsic muscles, but the presence of a well-developed drum (fusion of posterior tracheal elements) suggests they may have once been present; vocal repertoire is not great (Ames 1971). Menuridae and Atrichornithidae have similar syringeal structures, with three pairs of intrinsic muscles; songs are highly developed, and there can be much mimicry (Ames 1971). Climacteridae, with four pairs of intrinsic muscles, exhibit gross asymmetry of the extrinsic muscles, unusual directions of muscle fibre in the intrinsic muscles, and an exceptionally robust sternotracheal muscle (Ames 1987); calls are brisk, sharp and piping (Pizzey 1980).

Extended tracheae are found in the genus *Manucodia* (Paradisaeidae), the calls of which are deep, loud or far-carrying (Frith 1994). In the only species occurring in our area, the Trumpet Manucode *M. keraudrenii*, the trachea forms a flat coil between the skin and the pectoral muscles, sometimes extending over the abdominal muscles as well,

and may be up to 828 mm in length, compared with body-length, from bill to pygostyle, of c. 150 mm (Ames 1971; Clench 1978).

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Family SYLVIIDAE Old World warblers, Old World babblers and allies

A very large and morphologically highly diverse family of very small to medium-sized passerines. The family, as defined here (see below), comprises c. 680 species in c. 119 genera, distributed throughout Africa, the Middle East, Eurasia, including the Indian subcontinent, Japan, Indonesia and the Philippines, Papuan Region, A'asia and islands of the w. Pacific Ocean; one species, Arctic Warbler *Phylloscopus borealis*, breeds in far nw. N. America and this and Dusky Warbler *P. fuscatus* occur as non-breeding vagrants to w. N. America (Sibley & Monroe 1990; Monroe & Sibley 1993; AOU 1998; Peters; DAB). The taxonomy of the family is highly complex and unsettled. Taxonomic history is discussed in detail in Sibley & Ahlquist (1990), and there are varying opinions concerning its composition. Sharpe (1879) was among the earliest workers to suggest affinities with true thrushes, and he included Old World warblers as a subfamily Sylviinae within the Turdidae. This was later followed by Hartert (1910), who placed Old World warblers, Old World flycatchers, monarch flycatchers, Old World babblers and true thrushes in one huge family, Muscicapidae. Later authors (Mayr & Amadon 1951; Mayr & Greenway 1956) included Hartert's groups, as well as some species and genera now known to be part of Australo-Papuan centred Meliphagoidea and Corvoidea superfamilies, into the family Muscicapidae. Beecher (1953) treated bulbuls, cisticolas, fairy-wrens, Old World flycatchers and Old World warblers as subfamilies or tribes in Sylviidae. Later, Old World babblers and laughing-thrushes were combined, along with true thrushes, Old World warblers and some Australo-Papuan corvoid genera, in the family Muscicapidae, and the rest of the Old World warblers placed in the family Sylviidae (Peters: see introduction to Vol. 11 for discussion of that treatment). Molecular studies (see below) have now shown these various taxonomic arrangements to be largely incorrect from an evolutionary standpoint (this was pre-empted by Peters). Sibley (1970) found close affinities between Old World warblers and Old World babblers based on electrophoresis of egg-white proteins, but that they were not closely related to true thrushes and Old World flycatchers (see introduction to Family Muscicapidae in this volume for further discussion). Sibley & Monroe (1990) and Monroe & Sibley (1993) used DNA-DNA hybridization data (Sibley *et al.* 1988; Sibley & Ahlquist 1990) to split the Old World warblers (superfamily Sylvioidea) into three families: Regulidae (kinglets and goldcrests *Regulus*), from the Americas and Eurasia; Cisticolidae (cisticolas and African warblers); and Sylviidae, which includes the subfamilies listed below. Some authors include kinglets and goldcrests (*Regulus*) within the Sylviidae (Baker 1997; Peters).

Here, we follow the treatment of Sibley & Monroe (1990) and Monroe & Sibley (1993) except that we include the cisticolas as a subfamily within the Sylviidae (pending further revisions [see below]). The following subfamilies are recognized:

ACROCEPHALINAE: Comprising 223 species, in 36 genera; major genera include *Acrocephalus*, *Cettia*, *Bradypterus*, *Locustella*, *Hippolais*, *Eremomela*, *Phylloscopus*. Four species, in two genera (*Acrocephalus*, *Phylloscopus*), recorded in HANZAB region (see below).

CISTICOLINAE (cisticolas, prinias and allies): Comprising 120 species, in 17 genera. Two species of *Cisticola* recorded in HANZAB region (see below).

MEGALURINAE (grassbirds and allies): Comprising 22 species in ten genera, distributed in Africa, Asia, Papuan Region and A'asia. Seven species, in four genera (*Megalurus*, *Bowdleria*, *Eremiornis*, *Cincloramphus*), in HANZAB region (see below).

GARRULACINAE (laughing-thrushes and allies): Comprising 54 species, in two genera, distributed across s. and se. Asia. Not recorded HANZAB region.

SYLVIINAE (Old World babblers, *Sylvia* warblers and allies): Comprising 261 species, in 54 genera, falling into three distinct tribes: (1) Timaliini (Old World babblers, parrotbills and allies), with 236 species in 51 genera, distributed across Africa, Middle East and Asia, with no species in HANZAB region; (2) Chamaeini (Wrentit *Chamaea fasciata*), consisting of a single monotypic genus, occurring in w. USA and nw. Baja California; and (3) Sylviini (*Sylvia* warblers), with 24 species in one genus, occurring in Europe, Middle East, Africa and Asia, though with only one species in se. Asia (Lesser Whitethroat *S. curruca*, which vagrant in Thailand [Robson 2000]). No species recorded naturally in HANZAB region (but three species introduced unsuccessfully; see below).

Recent studies of mitochondrial DNA-sequences (Leisler *et al.* 1997; Helbig & Seibold 1999) and a combination of nuclear and mitochondrial DNA-sequences (Alström *et al.* In press) have shed further light on the evolutionary relationships between many of the taxa mentioned above. These studies all confirm the close relationship between *Acrocephalus*, *Chloropeta* and *Hippolais*; and Leisler *et al.* (1997) indicate that cisticolas lie between reed-warblers and *Phylloscopus* warblers (cf. Sibley & Ahlquist [1990] who place them outside the Old World warblers). The work of Alström *et al.* (In press) provides further insight into the phylogeny of the superfamily Sylvioidea and their data indicate the following: (1) a number of subfamilies, such as Acrocephalinae, Cisticolinae and Megalurinae, may be elevated to family status; (2) *Phylloscopus* is not monophyletic, and, along with *Seicercus*,

form the family Phylloscopidae; and (3) confirm the close relationship between Old World babblers, *Sylvia* warblers and laughing-thrushes, as well as white-eyes *Zosterops*, which together they place in the family Timaliidae. However, in this work we follow Christidis & Boles (1994) and DAB in maintaining *Acrocephalus*, *Cisticola*, *Megalurus* and *Phylloscopus* in Sylviidae, and white-eyes in Zosteropidae, but recognizing that this will almost certainly change.

Overall, 13 species, in seven genera, acceptably recorded within HANZAB region: two species of grassbirds *Megalurus* (Tawny *M. timoriensis* and Little *M. gramineus* Grassbirds); two species of fernbirds *Bowdleria* (Fernbird *B. punctata* and extinct Chatham Island Fernbird *B. rufescens*); monotypic *Eremiornis* (Spinifexbird *E. carteri*); two species of songlarks *Cincloramphus* (Rufous *C. mathewsi* and Brown *C. cruralis* Songlarks); two species of cisticolas *Cisticola* (Zitting *C. juncidis* and Golden-headed *C. exilis* Cisticolas); two species of reed-warblers *Acrocephalus* (Australian *A. australis* and Oriental *A. orientalis* Reed-Warblers, latter non-breeding migrant to Aust.); and two species of *Phylloscopus* (Arctic Warbler accidental to Aust., and Willow Warbler *P. trochilus* accidental to Prince Edward Is; see species accounts). In addition, Gray's Grasshopper Warbler *Locustella fasciolata* unacceptably reported for Aust. (see species account); and a further three species of Sylviinae (Sylvini) unsuccessfully introduced to Aust. and NZ: (1) RED-BILLED LEIOTHRIX *Leiothrix lutea*: Probably released in WA before 1912 but did not become established; (2) WHITETHROAT *Sylvia communis*: Two birds released Auckland, NI, in 1868 but not seen after release; attempted import in 1874 failed when birds died on passage to NZ; and (3) BLACKCAP *S. atricapilla*: Five birds released Auckland, NI, in 1872, but no further information (Thomson 1922; Long 1981).

The following discusses species in the subfamilies Acrocephalinae and Megalurinae, the tribe Sylviini within the subfamily Sylviinae and the Cisticolinae (see above). We do not discuss further laughing-thrushes and allies (subfamily Garrulacinae), and Old World babblers (tribe Timaliini) or Wrenit (tribe Chamaeini) in the Sylviinae; nor do we discuss further Regulidae, which some authors include in Sylviidae (see above). See Fry *et al.* (2000) for general discussion on Old World babblers, and Sibley & Ahlquist (1982) for discussion of Wrenit.

The family (excluding Garrulacinae, Old World Babblers, Wrenit and Regulidae) has the following characteristics (summarized largely from Baker [1997], Urban *et al.* [1997], BWP and DAB). Size varies from tiny (e.g. Tiny *Cisticola* *Cisticola nanus*: total length c. 9 cm, weight c. 5 g) or very small (e.g. Pallas's Leaf-Warbler *Phylloscopus proregulus*: total length 9 cm, weight c. 6 g), to medium-sized (e.g. Brown Songlark: total length 23 cm, weight 70 g [males]). Wings vary from short and rounded at tips in some (e.g. *Megalurus*, *Cisticola*) to rather long and pointed at tips (e.g. some *Phylloscopus*, *Sylvia*). Ten primaries; p10 usually rather short or very short. Nine secondaries, including three tertials. Tail varies from very short and slightly rounded at tip (e.g. *Tesia*, *Sylvietta*) to long with rather square tip (e.g. *Sylvia*, *Hippolais*) or very long and graduated at tip (e.g. *Megalurus*, *Locustella*, *Prinia*); most species have 12 rectrices, but some (e.g. *Tesia*, *Seicercus*, *Malcorus*, *Prinia*, *Abroscopus*) have only ten; number of rectrices can vary within genus and even species (e.g. Cinnamon Bracken-Warbler *Bradypterus cinnamomeus* which have 10 or 12). Some species (e.g. *Sylvietta*, Spinifexbird) have elongated tail-coverts. Bill usually rather short, straight and slender, but fairly long and more robust in some (e.g. *Acrocephalus*, *Hippolais*), rather long and more decurved in others (e.g. *Orthotomus*) or occasionally rather broad and slightly flattened (e.g. *Seicercus*); some even have small hook at tip of bill (e.g. longbills *Macrosphenus*). Bill said to lack tomial notch near tip of maxilla, but this present in some species (e.g. Brown Songlark). Nostrils rounded and operculate. Rictal and nasal bristles present; usually very short or vestigial, but more prominent in some species (e.g. *Acrocephalus*). Tongue slender with blade-like tip in some species (Beecher 1953); in some species (e.g. *Sylvia*, *Phylloscopus*) adapted for taking nectar or insects from flowers. Legs and feet usually rather short and weak, but longer and stronger in some (e.g. *Tesia*, *Locustella*, *Acrocephalus*). Some (e.g. *Acrocephalus*) have rather long hindtoe and hindclaw. Tarsal scaling laminiplantar in most species but said to be holothecal in some (BWP). Skull rather narrow. Ectethmoid plate usually truncate, but winged in cisticolas; species in the grassbird assemblage (Megalurinae) have thin ectethmoid plate. Ectethmoid foramen usually a single slit. Lachrymal fused. Tips to maxillo-palatine processes usually thickened and furrowed, but often differ in shape (e.g. clavate and flattened in grassbirds; subulate in cisticolas). Tip of vomer usually shortly acute (flat-tipped in cisticolas). Temporal fossae narrow and flanked by well-developed post-orbital and zygomatic processes. Humerus has two pneumatic fossae, but second fossa only weakly developed (Bock 1962).

Following plumage and moult characteristics shared by the family (summarized from Baker [1997], Urban *et al.* [1997], BWP and DAB). Colour and markings of plumage vary greatly; most species have rather dull and sombre plumage comprising brown, grey, olive, dull-green or yellow tones, but others, especially African and Asian genera (e.g. *Seicercus*, *Apalis*, *Abroscopus*, *Orthotomus*, *Sylvietta*), have brighter plumage, with rich yellows, greens and rufous; *Hyltiota* have dark-bluish or purplish upperparts. Markings also vary considerably; many (e.g. *Acrocephalus*, *Prinia*, *Cettia*, *Phylloscopus*, *Bradypterus*, *Megalurus*) have white or yellow supercilia; some also have other facial markings such as crown-stripes and dark eye-stripes (e.g. *Phylloscopus*, some *Acrocephalus*), blackish or rufous caps, facial masks or hoods (some *Apalis*, *Orthotomus*, *Eremomela*, *Bathmocercus*) or moustachial stripes (some *Sylvia*, *Phylloscopus*, *Apalis*). Some have distinct white tips or outer edges to tail (e.g. *Sylvia*, *Acrocephalus*, *Prinia*, *Cisticola*). Some species (e.g. *Megalurus*, *Cisticola*) have blackish streaking on head and body. Sexes usually similar, but some

(e.g. *Cisticola*, *Apalis*, *Sylvia*, *Hyltiota*) show obvious plumage-dimorphism. In adults, males tend to be slightly larger than females. Juveniles usually duller than adult, and unspotted. Nestlings usually naked, but some (e.g. *cisticolas*) develop fine, sparse down. Nestlings usually have 2–3 black spots on tongue; nestlings of songlarks also have black markings on tip of one or both mandibles, and nestling Brown Songlark also has much black on palate (Maclean & Vernon 1976). Fledge in juvenile plumage. Moulting strategies vary considerably, even within species. Most species undergo a partial post-juvenile (first pre-basic) moult to adult-like first immature (first basic) plumage, usually starting when 1–2 months old; this usually does not involve remiges, greater primary coverts or rectrices. Some (e.g. some *Acrocephalus*, *Sylvia* and *cisticolas*) undergo a complete or nearly complete post-juvenile moult; in some species (e.g. Zitting Cisticola in n. hemisphere), birds that hatch early undergo a complete post-juvenile moult to adult plumage, but late-hatched birds undergo a partial post-juvenile moult to first immature plumage. Moulting strategies often complex and vary considerably between species, and often related to migratory movements and date of hatching. Most species undergo a complete adult post-breeding (pre-basic) moult on or near breeding grounds each year, but some species, particularly long-distance migrants (e.g. some *Phylloscopus* and *Acrocephalus*), start complete post-breeding (pre-basic) moult on or near breeding grounds, then suspend moult for s. migration and finish moult on wintering grounds. Many species also undergo a partial pre-breeding (pre-alternate) moult, usually not involving remiges, greater primary coverts, alula and rectrices. A few species (e.g. Aquatic Warbler *Acrocephalus paludicola*) undergo only a partial post-breeding (pre-basic) moult, suspending moult of remiges during s. migration, and not finishing moult of remiges till complete pre-breeding (pre-alternate) moult on wintering grounds. Some species (e.g. some *Acrocephalus*, *Hippolais* and *Locustella*) undergo a partial post-breeding moult that includes outer primaries on breeding grounds, suspend moult for s. migration, then perform a complete pre-breeding (pre-alternate) moult in wintering grounds; these birds therefore moult outer primaries twice each year. Primaries moult outward, usually starting at p1, but sometimes starting with outer primaries in those species undergoing partial post-breeding moult; a few species (e.g. Savi's Warbler *Locustella luscinioides*) undergo outward and inward moult of primaries, starting at about p4. Secondaries usually moult inward, but sequence can vary individually; usually starting when moult of primaries about halfway through. Moult of tail centrifugal. Moult of tail and body usually start about same time as primaries.

Found in wide variety of habitats, but often in dense low vegetation, and many species closely associated with water in both aquatic and riparian associations, including swamps, marshlands, freshwater meadows and the like. Commonly in grasslands, sedgeland or rushlands, including pasture or cropland; also often in dense understorey of woodlands and forests, including riparian or gallery associations; and in more open habitats, such as sparse or arid shrublands. Some species strongly associated with open woodlands or forests, particularly where bordering open country or clearings (e.g. Rufous Songlark in Aust.) (de Schauensee 1984; Urban *et al.* 1997; Grimmett *et al.* 1999; Robson 2000; Shirihai *et al.* 2001; see species accounts).

Range from sedentary or resident to migratory, with proportion of migratory species increasing with increasing latitude. Most n. Eurasian breeding species migratory (e.g. *Hippolais* warblers), while African and s. Asian breeding species tend to be sedentary or resident with minor local or altitudinal movements (e.g. *Bradypterus* warblers, prinias). Reed-warblers *Acrocephalus* and grasshopper-warblers *Locustella* highly migratory, though some African breeding reed-warblers are resident (e.g. Lesser Swamp-Warbler *A. gracilirostris*), and Clamorous Reed-Warbler *A. stentoreus* is resident in e. Mediterranean, Indonesia and New Guinea, but partly migratory in central Asia and the Middle East; *Phylloscopus* and *Sylvia* warblers tend to be migratory (e.g. Pallas's Leaf-Warbler, Garden Warbler *S. borin*), or partly migratory (e.g. Chinese Leaf-Warbler *P. sichuanensis*, Sardinian Warbler *S. melanocephala*), with some altitudinal migrants (e.g. Smoky Warbler *P. fulgiventis*), and breeding residents in Africa (e.g. Laura's Woodland-Warbler *P. laurae*); tesian *Tesia* are local altitudinal migrants (e.g. Chestnut-headed Tesia *T. castaneocoronata*); and grassbirds *Megalurus* and *Graminicola*, *cisticolas* *Cisticola*, prinias *Prinia* and tailorbirds *Orthotomus* largely sedentary or resident (e.g. Golden-headed Cisticola, Graceful Warbler *P. gracilis*, Common Tailorbird *O. sutorius*), with a few species known to undertake local movements; Zitting Cisticola, especially juveniles, dispersive and occasionally irruptive in parts of range, and cross Mediterranean from Europe to n. Morocco. Interpretation of movement patterns of some species complicated by marked seasonal changes in conspicuousness (e.g. Little and Tawny Grassbirds) (de Schauensee 1984; Urban *et al.* 1997; Grimmett *et al.* 1999; Robson 2000; Shirihai *et al.* 2001; BWP; see species accounts).

Primarily insectivorous. Mainly take invertebrates, predominantly insects, though many species also eat small fruits and seeds, and some take nectar or other vegetable matter; some occasionally eat small vertebrates (e.g. small frogs, lizards, fish fry). Mainly arboreal, foraging in trees and shrubs, though many species also feed to varying degree on ground, and some also take food from surface of water or just below surface. Most prey gleaned from vegetation (usually foliage but also twigs and branches), usually while perching, or occasionally while hanging upside-down or hovering. Some species also take flying prey from air, usually by sally-striking, sometimes by leaping between branches or, rarely, by snatching prey while perched. Some probe flowers for nectar, insects or parts of flowers; and morphology of bill, tongue and oral cavity of some species adapted for this purpose. Usually search through vegetation by hopping or making short flights between branches, sometimes inspecting substrates slowly or

meticulously. When foraging on ground, walk, hop or run, and pause to glean or probe from ground or to glean from low vegetation, or sometimes leap to pounce on active prey. Usually forage solitarily during non-breeding season, though some may join mixed-species foraging flocks (Urban *et al.* 1997; BWP).

Most species typically seen singly or in pairs throughout year, but some more usually in small groups (e.g. eremomelas *Eremomela*). Some join mixed-species flocks in non-breeding season. Most species monogamous, but some polygynous. Co-operative breeding occurs in eremomelas *Eremomela*. In most species, incubation by female only. In many species, both parents feed nestlings and fledgelings, and helpers also feed young in co-operatively breeding species; in some species, only female feeds young. Most species nest solitarily and are territorial. Usually roost solitarily when not breeding. Social behaviour of most species not well known. Many species skulk within vegetation, making observation difficult, and vocalizations often the only indication of their presence (e.g. reed-warblers *Acrocephalus*, bush-warblers *Cettia* and *Bradypterus* and tailorbirds *Orthotomus*). Some species of open habitats more conspicuous (e.g. eremomelas *Eremomela* and crombecs *Sylvietta*). Most scratch head indirectly, but Eurasian Reed-Warbler *Acrocephalus scirpaceus* uses direct method. Usually bathe by standing in shallow water, but also bathe in wet foliage. Apparent dust-bathing reported in a few species. In many species, males perform aerial flight-displays, often accompanied by songs or noise of wings (Smythies 1981; Skutch 1987; Coates 1990; Urban *et al.* 1997; BWP).

Vocalizations vary greatly; for example, some produce insect-like buzzing (e.g. Zitting Cisticola), some almost mechanical sounds (e.g. River Warbler *Locustella fluviatilis*), and others produce sweet liquid notes (e.g. Marsh Warbler *Acrocephalus palustris*). Many species have well-developed songs that are often loud and far-carrying. Usually sing most often in breeding season, and song thought to be used both in mate attraction and territorial defence. Some species rather quiet in non-breeding season (Smythies 1981; Urban *et al.* 1997; BWP; see species accounts).

Most species solitary and monogamous, but some polygynous; most *Eremomela* breed co-operatively (see above). Most species nest close to ground (or surface of water) in dense, low vegetation (e.g. in tussocks of grass, clumps of reeds or sedges, or among brambles), or low down in shrubs or trees; *Phylloscopus* habitually nest on ground, or in holes or crevices. Structure of nests varies greatly; generally either cup-shaped or domed with side entrance, but sometimes partly domed (e.g. Moustached Warbler *Acrocephalus melanopogon*, Cricket Warbler *Spiloptila clamans*, Yellow-breasted *Apalis flavida*), purse or bag-shaped (e.g. *Schistolais*, *Sylvietta*, *Phyllolais*, some *Apalis* species), or occasionally pear or bottle-shaped (e.g. some cisticolas, White-tailed Warbler *Poliolais lopesi*). Nests typically made of grass, leaves and plant stems, and sometimes other material, such as plant down, moss, lichen, roots, bark or twigs; material sometimes bound together with spider web; and nests usually lined with fine grass, hair, feathers, plant down, rootlets or other fine fibres. Nests built by both sexes, or sometimes by female only; helpers may assist in *Eremomela*. Eggs varyingly oval to sub-elliptical; smooth; usually glossy, sometimes slightly glossy or lustreless. Ground-colour often pale, varying from white or shades of white (e.g. dull white, or pinkish, greenish, bluish or greyish white) to shades of buff, pink, green, blue or grey, or occasionally red, brown or olive. Eggs usually spotted or blotched with shades of brown, grey, red, black, green, mauve or purple; markings sometimes more concentrated at, or form ring or cap round large end. Eggs also occasionally unmarked. Clutch-size usually 2–4 in tropics and 3–4 to 5–6 in more temperate regions, but some variation. Eggs laid on consecutive days. Incubation by both sexes, though often mainly by female, or by female only; helpers may assist in *Eremomela*. Incubation period usually between 11–12 and 16–17 days in most species, but varies from <10 to >20 days. Nestlings usually fed and brooded by both sexes, though brooding often mainly by female and, in some species, brooding and occasionally feeding by female only; helpers may assist parents with feeding, and possibly brooding, in some species (e.g. eremomelas, Banded Prinia *Prinia bairdii*). Fledging period between 10–11 and 16–17 days in most species. In some species, young fledge before capable of flight. Fledgelings usually fed by both parents; brood-division can occur in some species, and fledgelings may also be fed by helpers in *Eremomela*. Young usually dependent on adults for 1–3 weeks after fledging, occasionally longer (up to 1 month or more). Many species rear 2–3 broods per season (Urban *et al.* 1997; BWP).

Within the components of this large family we discuss here, many species globally threatened. Two species extinct in wild, including Chatham Island Fernbird of HANZAB region (see species account); the other, Aldabra Warbler *Nesillas aldabrana*, was confined to the Seychelles and only discovered in 1967 (and last recorded in 1983). Three species considered critically endangered: Taita *Apalis fuscigularis* of Kenya, Long-billed Tailorbird *A. moreaui* of Tanzania and Mozambique, and Millerbird *Acrocephalus familiaris* of Hawaii. A further eleven species are endangered, and 26 considered vulnerable (Stattersfield & Capper 2000; BirdLife International Species Factsheets, available at <http://www.birdlife.org/datazone/species/index.html> [accessed Sept. 2005]).

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Bowdleria rufescens Chatham Island Fernbird

Sphenoaecus rufescens Buller, 1869, *Ibis* 1869: 38 — Chatham Islands, New Zealand.

This fernbird is distinguished from its congener by its dark chestnut-brown plumage and plain underparts, from Latin *rufescens*, reddish (from *rufescere*, to become reddish).

OTHER ENGLISH NAMES None.

MONOTYPIC

EXTINCT Formerly endemic to Chatham Is, occurring on Chatham, Pitt and Mangere Is (Stattersfield & Capper 2000; NZCL). First recorded on Mangere in 1868, and considered 'not uncommon' there in 1871 (Hutton & Drummond 1904; Oliver) but extinct by c. 1892 (Tennyson & Millener 1994; Oliver). Thought to have become extinct on other islands by c. 1900 (NZCL), though doubtful unconfirmed report from Pitt I. in c. 1950–51 (Lindsay *et al.* 1959). Thought to have become extinct after habitat modified by fires and overgrazing by goats and rabbits, introduction of Cats to Mangere and Pitt Is, and excessive collection of specimens on Mangere (McLean 1906; Fleming 1939; Veitch 1985; Stattersfield & Capper 2000; Oliver; see below).

Biology very poorly known. Thought to have inhabited dense vegetation at edges of swamps and tidal inlets, as Fernbird (Gill & Martinson 1991); McLean (1906) stated that burning of fern and swamp and draining of marshes implicated in decline, and that many swamps and lagoons remained as refuge for the bird, implying these were suitable habitat. Last specimen taken was from an isolated scrubby slope of Mangere I. (Fleming 1939). Assumed to be sedentary. Only known to eat insects (Hutton & Drummond 1904; Oliver).

Birds were usually seen singly, and said to be difficult to observe, birds hopping rapidly from one place of concealment to another (Oliver). Voice a peculiar whistle, similar to that used by person to attract the attention of another at some distance; also had a call similar to that of Fernbird (Oliver). Breeding unknown, though one egg from Pitt I. described as broadly oval-conical, creamy white, speckled or marbled all over with reddish brown, and measuring 20.3 × 16.5 mm (McLean 1906).

PLUMAGES AND RELATED MATTERS Prepared by J.S. Matthew. No information on nestlings, juveniles or moult-patterns. Description based on examination of one adult skin (NMNZ 16685). Plumage very different from extant Fernbird *Bowdleria punctata*.

Adult HEAD AND NECK: Most of forehead, and entire crown, nape and hindneck, dark red-brown (dark 223A) with very faint and narrow blackish (c89) shaft-streaks. Sides of neck, warm brown (c37). Prominent whitish (ne) supercilium extends from sides of lower forehead to above ear-coverts.

Lores and malar area, off-white (ne) with blackish-brown (119) flecking or mottling formed by tips of feathers. Ear-coverts, black-brown (119) with partly visible off-white (ne) bases forming faint pale flecking. Chin and throat, cream (c92). **UPPERPARTS:** Mantle, dark reddish-brown (dark 223A), grading to warm brown (121C, c37) on rest of upperparts, with broad black-brown (119) streaking on lower mantle, scapulars and back. **UNDERPARTS:** Most of underparts, cream (92) with warm-brown (121C) flanks, vent and undertail-coverts, and with broad black-brown (119) streaking on flanks. **UPPERTAIL:** Rectrices, dark reddish-brown (dark 223A). **UNDERTAIL:** Brown (121B). **UPPERWING:** All coverts, tertials and alula, black-brown (119) with rich-brown (223b) fringes. Primaries and secondaries, dark brown (121) with brown (223B) outer edges. **UNDERWING:** No information; skin too delicate for examination of this area.

MEASUREMENTS Unsexed adult skin (NMNZ 16685) has following measurements: Wing 67; Tail 96; Bill S 15.6; Tarsus 26.9; Hindclaw 8.3.

GEOGRAPHICAL VARIATION Some authors consider Chatham Island Fernbird *B. rufescens* as a subspecies of Fernbird *B. punctata* (e.g. Falla *et al.* 1981; NZRD; Peters) but here we follow more recent work (Olson 1990; NZCL) and consider *rufescens* as a full species.

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