Order CHARADRIIFORMES

A large, diverse assemblage of small to medium-large (12–75 cm long) limicoline, pratincoline, aquatic or terrestrial birds. Cosmopolitan from Arctic to Antarctic regions; in all sorts of maritime, freshwater and open terrestrial habitats (including deserts) with a few (woodcocks and snipes) even using dense forests. Once known as Limicolae or Laro-limicolae (e.g. Mayr & Amadon 1951); colloquially, the assemblage (excluding alcids, skuas, gulls, terns and skimmers) is often referred to as waders (especially in Britain) or shorebirds (especially in North America).

About 350 species in 19 families, though taxonomic treatments vary. Following families recognized (mostly based on recent reviews of Order [Sibley *et al.* 1988; Sibley & Ahlquist 1990; Sibley & Monroe 1990]):

Thinocoridae	seedsnipes; four species, S. America.
Pedionomidae	Plains-wanderer; monotypic, Aust.
Scolopacidae	sandpipers, snipes and allies; *c.* 85 species, cosmopolitan.
Rostratulidae	painted snipes; two species, s. America and Old World.
Jacanidae	jacanas; seven species, pantropical.
Chionididae	sheathbills; two species, Antarctica and subantarctic islands.
Burhinidae	thick-knees, stone-curlews; nine species, widespread in Old World and two in Neotropics.
Haematopodidae	oystercatchers; *c.* 11 species, worldwide in tropics and temperate regions.
Recurvirostridae	avocets and stilts; about seven species, worldwide in tropical and temperate regions.
Ibidiorhynchidae	Ibisbill; monotypic, central Asia.
Charadriidae	plovers and lapwings; *c.* 60 species, cosmopolitan.
Pluvianellidae	Magellanic Plover; monotypic, S. America.
Dromadidae	Crab Plover; monotypic, Arabian region.
Glareolidae	pratincoles, coursers, and Egyptian Plover; *c.* 15 species, widespread in Old World.
Stercorariidae	skuas and jaegers; about seven species, mostly in Arctic and Antarctic regions.
Rhynchopidae	skimmers; three species, pantropical.
Laridae	gulls; *c.* 47 species, cosmopolitan.
Sternidae	terns; *c.* 42 species, cosmopolitan.
Alcidae	auks; *c.* 20 species, Arctic and temperate regions of n. hemisphere.

Apparently monophyletic. Pteroclididae (sandgrouse) probably sister-group of Charadriiformes (e.g. Fjeldså 1976, 1977; Sibley & Ahlquist 1990; BWP), though whether best placed within Charadriiformes or in separate order is debated. Flamingoes (Phoenicopteridae) and divers (Gaviidae) have also been treated as Charadriiformes (Olson & Feduccia 1981; Fjeldså 1976, 1977) but DNA–DNA hybridization studies (Sibley & Ahlquist 1990) inconsistent with these theories. Affinities to other orders still controversial; DNA–DNA hybridization has suggested closest links are to large waterbirds, such as storks, herons and allies, Pelicaniformes, Procellariformes, penguins, grebes, divers (Gaviidae) and also Falconiformes. All these were combined in huge order Ciconiiformes by Sibley & Ahlquist (1990).

Taxonomy and relationships reviewed in Sibley & Ahlquist (1990), Christian *et al.* (1992) and BWP (and references therein). Recent reviews have included: patterning of downy young (Jehl 1968; Fjeldså 1976, 1977), osteology (Strauch 1978; Mickevitch & Parenti 1980; Olson & Steadman 1981), DNA–DNA hybridization (Sibley *et al.* 1988, Sibley & Ahlquist 1990) and electrophoresis of tissue proteins (Christian *et al.* 1992). The studies of allozymes, DNA–DNA hybridization and the most recent osteological study of the entire order (Strauch 1978) have agreed in finding two or three well-knit, monophyletic assemblages within the Charadriiformes: scolopacids and allies (Thinocoridae, Pedionomidae, Scolopacidae, Rostratulidae, Jacanidae) and charadrids and allies (Chionididae, Burhinidae, Haematopodidae, Recurvirostridae, Ibidorhyncidae, Charadriidae, Pluvianellidae, Dromadidae, Glareolidae, Stercorcariidae, Rhynchopidae, Laridae, Sternidae, Alcidae); Strauch (1978) treated Alcidae as separate lineage, but skeletons may be so highly modified for foot-propelled diving that they do not reflect relations well (Sibley & Ahlquist 1990); gulls and allies have also been regarded as a separate lineage (Christian *et al.* 1992) or as allied to charadrids (e.g. Sibley & Ahlquist 1990). Further relationships within the Order discussed in introductions to families.

Because the Order comprises so many species and adaptations are so diverse, few characters shared by all species; those that are shared are mostly anatomical features of the skull, e.g. most or all have schizorhinal nostrils, schizognathous palates, well-developed vomer, lachrymals fused with ectethemoid and pre-frontal bones, well-developed supra-orbital grooves; see Olson & Steadman (1981) for more information on osteological characters. Wings usually have 11 primaries, with p10 longest and p11 minute; 15–24 secondaries; diastataxic except in *Scolopax minor*, as far as is known. Usually 12 tail-feathers. Necks usually rather long with 15–16 cervical vertebrae. Oil-gland bilobed and tufted. Syrinx, tracheo-bronchial; two carotids (type A-1 of Glenny 1955); caeca present. Legs usually rather long; hind toe small or lacking in most but all toes greatly elongated in Jacanidae. Feathers with small thin afterfeathers. Normally two moults annually: complete post-

breeding and partial pre-breeding; some jacanas and alcids have flightless periods when moulting remiges. Young, downy, usually with intricate cryptic patterns on upperparts of three chief types: pebbly, spotted and striped, matching characters of habitat (Fjeldså 1976, 1977): precocial, nidifugous usually, self-feeding or not depending greatly on parents.

Thirteen families recorded in HANZAB region, with 54 species breeding, 41 occurring as regular non-breeding migrants and *c.* 38 as accidentals or probable accidentals. Scolopacidae, Stercorcariidae, Laridae and Sternidae will be dealt with in Volume 3 of HANZAB.

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Family **LARIDAE** skuas, jaegers, gulls and terns

A large assemblage of small to very large charadriiform seabirds. We recognize four subfamilies within the Laridae following Mayr & Amadon (1951), AOU (1983).[1]

Stercorariinae Skuas and jaegers; about six species; cosmopolitan.
Larinae Gulls; *c.* 47 species; cosmopolitan.
Sterninae Terns; *c.* 42 species; cosmopolitan.
Rynchopinae Skimmers; three extralimital species, pan-tropical.

Taxonomic rank given to above groups varies greatly. Considered four families within suborder Lari (e.g. Campbell & Lack 1985; BWP), or four tribes within subfamily Larinae (e.g. Sibley *et al.* 1988; Sibley & Ahlquist 1990; Sibley & Monroe 1990). Others have divided Lari into three families (Stercorariidae, Laridae and Rynchopidae) with gulls and terns usually considered subfamilies within Laridae (e.g. Wetmore 1960; Judin 1965; Hackett 1989; Peters). Moynihan (1959) divided the group into two subfamilies, Stercorariinae, containing the skuas, and Larinae, containing gulls, terns and skimmers in three tribes. Study of skeletal and external morphology of suborder 'Lari' (our Laridae) was mostly unable to cluster gulls and terns satisfactorily and found group surprisingly uniform (Schnell 1970a,b). Despite lack of agreement on taxonomic ranking of above groups, monophyly of Laridae is not in doubt. Studies of biochemistry (Christian *et al.* 1992), DNA–DNA hybridization (Sibley & Ahlquist 1990), downy young (Fjeldså 1977) and skeletal morphology (Strauch 1978; Mickevich & Parenti 1980; Chu 1995) generally agree in finding close relation with Glareolidae (pratincoles) and Dromadidae (Crab Plover *Dromas ardeola*). DNA–DNA hybridization suggests Alcidae (auks) also closely related (Sibley & Ahlquist 1990), though this contradicted by studies of skeletal morphology (e.g. Strauch 1978; Chu 1995).

Body-form varies greatly, from small and slender in some gulls and terns, to robust and thickset in skuas, jaegers, some gulls and a few terns. Differences in size between sexes slight; males usually larger but females larger than males in Stercorariinae. Wings usually long, narrow and pointed, but broader and more rounded in some; 11 primaries; p10 longest, p11 minute; 17–24 secondaries. Tail has 12 rectrices; shape varies: in Stercorariinae, central rectrices project beyond rest of tail and greatly elongated in adult breeding plumages of *Stercorarius*; in most Sterninae and Rynchopinae, outer rectrices elongated and tail forked; in Larinae, usually square. Bill, varies, though usually rather short and stout, with prominent gonydeal angle; rather fine in some Larinae and Sterninae; tip pointed in Sterninae, decurved in strong hook in Stercorariinae. Bill highly modified for unique foraging methods in Rynchopinae (Zusi 1962). Lack cere, except in Stercorariinae. Nostrils schizorhinal and perforate, with no median septum. Legs, short and stout; attached near centre of body; tibiae partly bare; tarsi, short and typically scutellate in front. Four toes; hindtoe, short, raised, sometimes rudimentary or absent; front toes, fully webbed (webs somewhat incised in some). Claws, moderately long, strong, laterally compressed. Caeca ranges from large (Stercorariinae) to poorly developed (Rynchopinae, Sterninae). Supra-orbital salt-glands well developed.

Plumages mainly browns, black, white and greys. Colours of bare parts often striking and often showing marked variation with both season and age. Adults moult twice annually: (1) a post-breeding (pre-basic) moult to non-breeding plumage, which is complete (with apparent exception of *Larus sabini*); and (2) a pre-breeding (pre-alternate) moult to breeding plumage, which is almost always partial (but see *Larus pipixcan* and *L. sabini*); some terns also undergo one or two pre-supplemental moults of inner primaries. Primaries moult outwards.

Hatch in natal down, which is replaced by juvenile plumage; downy young precocial but more dependent on

[1] This treatment differs from the arrangement presented in the introduction to the Charadriiformes in Volume 2 of *HANZAB* (p. 648), where these four subfamilies were listed as families. Recent major studies in avian classification (particularly by Sibley and co-workers) and the publication of a revised species list of Aust. birds (Christidis & Boles 1994) since the preparation and publication of Volume 2, have brought much rearrangement. In this and subsequent volumes of *HANZAB*, taxonomy, nomenclature and arrangements of species follow Christidis & Boles (1994) (though they do not present subfamilial taxonomy). Their sequence of families of Charadriiformes occurring in HANZAB region is: Pedionomidae, Scolopacidae, Rostratulidae, Jacanidae, Chionididae, Burhinidae, Haematopodidae, Recurvirostridae, Charadriidae, Glareolidae and Laridae. However, work on Volume 2 was too advanced to follow their sequence and taxonomy fully. The Scolopacidae are out of place in the arrangement of subfamilies in Volumes 2 and 3; other families follow the order of Christidis & Boles (1994).

Plate 23

Oriental Pratincole *Glareola maldivarum* (page 366)
1 Adult breeding; **2** Adult non-breeding; **3** Juvenile; **4, 5** Adult

Australian Pratincole *Stiltia isabella* (page 373)
6 Adult; **7** Downy young; **8** Juvenile; **9** First immature non-breeding; **10, 11** Adult

parental feeding than other Charadriiformes. Post-juvenile (first pre-basic) moult complete or partial, varying within and between families; moults of subadults complicated and vary between subfamilies (see subfamily accounts). Generally slow to mature, attaining adult plumage when 2–4 years old and first breeding at 2–4 years (smaller gulls and terns) to 4–9 years (many skuas and larger gulls and terns); some may breed in first year (e.g. *Sterna albifrons*).

Inhabit wide range of marine and freshwater habitats from Tropics to polar regions; many species strongly migratory, especially those breeding at high latitudes, e.g. South Polar Skua *Catharacta maccormicki* and Arctic Tern *Sterna paradisaea*, which migrate between polar regions. Most nest in terrestrial colonies near water (see subfamily accounts); some species highly pelagic in non-breeding season. Use wide range of foraging methods (see subfamilies; for discussion of feeding methods, see General Introduction).

See subfamily accounts for summaries of social organization and breeding.

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Subfamily **LARINAE** gulls

Small to large charadriiform seabirds, ranging in size from Little Gull *Larus minutus* (27 cm) to Great Black-backed Gull *Larus marinus* (76 cm). Cosmopolitan, with greatest number of species in n. hemisphere; diversity lowest in Tropics and no breeding species in central Pacific. About 48 species in five genera, with most species in one genus (*Larus*) and other genera extralimital, with one or two species.

GENUS	NUMBER OF SPECIES
Larus	41–45 species; cosmopolitan
Pagophila	Monotypic; Ivory Gull *P. eburnea*, extralimital in Arctic
Rhodostethia	Monotypic; Ross's Gull *R. rosea*, extralimital in Arctic
Creagrus	Monotypic; Swallow-tailed Gull *C. furcatus*, extralimital in e. tropical Pacific Ocean
Rissa	Two species; kittiwakes, extralimital in n. hemisphere

Taxonomy of subfamily unsettled; number of genera recognized varies from twelve (Wolters 1975) to nine (Dwight 1925), seven (Peters) or one (Moynihan 1959). Our arrangement follows Christidis & Boles (1994) and BWP; Sibley & Monroe (1990) recognize a sixth genus, *Xema* (for Sabine's Gull *L. sabini*). *Larus*, as recognized here, is a large and varied genus and there is little consensus on how it would be best subdivided; species-groups recognized in major reviews by Dwight (1925), Moynihan (1959) and Campbell & Lack (1985) differ substantially. Taxonomy also complex at species level, especially in n. hemisphere, where distributions of some taxa overlap widely (often secondary contact in formerly isolated populations) and they behave as separate species in some areas but hybridize freely in others (Barth 1968; Devillers 1977, 1982; Grant 1986; Mierauskus *et al.* 1991; Nicolau-Guillaumet 1977; Smith 1966; Snell 1989; BWP). Only *Larus* represented in HANZAB region. Four species breed. Pacific Gull *L. pacificus* endemic to s. Aust. and rather distinctive; formerly placed in genus *Gabianus*, sometimes with Dolphin Gull *L. scoresbii*, but shows affinities to typical *Larus*. Black-billed *L. bulleri* endemic to NZ, distinctive member of s. hemisphere *cirrocephalus* species-group, with *L. cirrocephalus*, *L. novaehollandiae* and *L. hartlaubii* (Johnstone 1982). Silver Gull widespread in HANZAB region, and occurs extralimitally only in New Caledonia; Hartlaub's Gull *L. hartlaubii* of Southern Africa, sometimes considered conspecific (e.g. White 1965). Kelp Gull *L. dominicanus* wide-ranging in s. hemisphere, and has affinities with typical large gulls of n. hemisphere, such as Herring *L. argentatus* and Lesser Black-backed *L. fuscus* Gulls (see Kinsky 1963). Another five species have been recorded as vagrants to Aust.; and four species have been doubtfully recorded or recorded as vagrants in subantarctic.

Body-form varies: some slender and compact, others large and robust. Females generally slightly smaller than males (Ingolfsson 1969), useful for sexing birds; sexual dimorphism greater in larger species. Heads rounded; necks slender to thick. Wings, long, moderately broad, pointed; at rest, wings extend beyond tail; 11 primaries (p11 minute); c. 20 secondaries (18–23). Tail, moderately short, with 12 rectrices; square to slightly rounded in most species; slightly forked in a few (*Rissa*, *Creagrus* and *L. sabini*) and wedge-shaped in *Rhodostethia*. Expansor secondarium present. Coracoids in contact; sternum with two notches at each side; pectoral girdle differs from Stercorariinae. Bill, rather short (usually shorter than head) and sturdy, massive in some. Upper mandible hooked at tip, overhanging lower mandible; rhamphotheca simple; no cere; gonydeal angle prominent, highly so in some. Nostrils schizorhinal and perforate, with no median septum; usually narrow slit (narrowest in *L. bulleri*), but round in *L. pacificus*. Legs, moderately long, slender; tarsi scutellate in front, reticulate elsewhere; scales soft and fleshy; claws not hooked. Three front toes fully webbed; hindtoe, small or vestigial, often lacking claw in *Rissa*. Caeca present, small. Oil-gland and supra-orbital salt-glands well-developed, former feathered and with at least three openings on each side.

Sexes alike in plumage. Typically, adults mostly grey above and white below, with distinctive pattern of black and white on wing-tip; a few extralimital species mostly dark. Mantle, back, scapulars and upperwing-coverts, evenly coloured: light to dark grey in most species, black in several, white in *Pagophila*. Tips of outer primaries usually black, with complex white markings of much value in identification and ageing (see General Introduction for definitions of plumages terms specific to gulls). Underparts and tail usually white, with some exceptions: e.g. pink tinge to underparts of several species, black subterminal bands or tips to tails of some. In breeding plumage, head and neck either white or with large dark hood; in non-breeding plumages, hoods much reduced and many species develop brown streaking, especially on neck. Bare parts, brightly coloured. Iris, white to black-brown, surrounded by fleshy orbital ring. Bill, usually red, yellow or black, often with contrasting subterminal markings or tips; many large species have yellow bill with red spot on gonys which is tapped by chicks to elicit feeding from parent. Legs, usually pink, red, yellow or black. Adults moult twice annually: (1) a complete post-breeding (pre-basic) moult, generally beginning during or just after breeding (but before in *Pagophila*); and (2) a partial pre-breeding (pre-alternate)

moult, usually involving feathers of head and body, and, in smaller species, often some inner upperwing-coverts and, rarely, some tertials and central rectrices. *Larus pipixcan* (q.v.) remarkable in usually having two complete moults per cycle. *Larus sabini* (q.v.) apparently aberrant in performing complete pre-breeding and partial post-breeding moults.

Young, precocial, semi-nidifugous. Hatch with soft, loose down; generally buff to light grey, with partly exposed dark-grey bases to down, and with dark cryptic mottling above. Ground-colour varies (though less markedly than in Sterninae) and some species polymorphic; markings of back generally fainter in large marine species of *Larus*; *Rissa*, *Pagophila* and *L. marinus* nearly uniform pale (see Fjeldså 1977 for more information on patterns of downy young). Plumages of juveniles, browner and more cryptic than in adults; mantle, scapulars and upperwing-coverts usually strongly patterned brown and buff, and remiges and rectrices more extensively black than adults; larger species usually have mottled brown upperparts. Post-juvenile (first pre-basic) moult always partial, involving head and body, and occurring soon after fledging. Thereafter, undergo partial pre-breeding (pre-alternate) and complete post-breeding (pre-basic) moults each cycle (annually) (except *L. pipixcan* and *L. sabini*, as noted above). Moults of immatures and failed breeders occur slightly earlier in year than corresponding moults of adults; moults of immatures occur slightly later each year until breeding, when timing as adult. Plumages become progressively less brown, more like adults, with age: largest species take 4 or more years to attain definitive plumage, smaller species 1–3 years. Ageing by plumage can be rather accurate; approach to ageing discussed in Kelp Gull (Ageing). For further information on plumages and moults, especially of subadults, see species texts and reviews in Dwight (1925), Stresemann & Stresemann (1966), Grant (1986) and BWP.

Flight strong and buoyant, with regular, leisurely and often shallow wing-beats; often soar and glide. Swim and walk well. Usually coastal and inshore; some species pelagic when not breeding (notably vagrant Sabine's Gull); some occur in inland waters (sometimes including Silver Gull and vagrant Franklin's Gull); some occasionally frequent riverbeds in mountain regions (notably Black-billed and Kelp Gulls in NZ). Often associate with people and populations increasing locally in response to changes in availability of food, such as refuse and fish offal.

Omnivorous predators, scavengers and kleptoparasites, though steal food less than skuas and jaegers. Take almost anything available of suitable size and texture, including offal and human waste. Over water, feed by surface-plunging, surface-seizing, surface-diving, pattering and aerial pursuit; also steal food. On land, feed by hovering and hawking for insects; sometimes take small birds in flight; also feed by walking slowly and gleaning along coasts, riverbeds and lake shores. Almost completely diurnal; some migrate at night (Campbell & Lack 1985) and some species certainly forage in artificially lit areas at night (e.g. Silver Gull *L. novaehollandiae*, q.v.).

Typically noisy and gregarious, especially when nesting. Roost in large mixed-species roosts, and feed socially. Normally monogamous, defending nesting territory within colony. Colonies often large and densely packed. At breeding colonies, mass-flights or silent dreads recorded for some species (also see comments in Sterninae). Fidelity to colony, nest-site and partner can be high in established breeders. Most first breed when adult plumage attained, when 1–5 years old. Pair-formation may occur at nest-site or in Clubs of non-breeders, which are characteristic of some species. Behaviour of many species well studied, and partial summaries in Tinbergen (1959) and Moynihan (1962). Displays and calls well developed. Based on ritualized displays, breeding species can be split into two types: (1) large white-headed gulls (e.g. Pacific Gull *L. pacificus*, Kelp Gull *L. dominicanus*) and (2) masked gulls (e.g. Silver Gull *L. novaehollandiae*, Black-billed Gull *L. bulleri*). The following are some of the displays of Silver Gull and representative of both types. (References to figures are to those of Silver Gull, which see for full details of displays.) (1) UPRIGHT POSTURES: In aggressive form (Fig. 1) performed with neck swollen, carpals raised and bill depressed. In anxiety form, neck thin, carpals not usually raised, and bill horizontal or raised (usually facing away from opponent). (2) ALARM CALL POSTURES (Fig. 9): Similar to Upright Postures but always accompanied by call. (3) OBLIQUE DISPLAY (Fig. 2): A challenging display, often performed at the end of other displays and not without long loud call. In white-headed gulls, the call is termed Long Call and the display more intense and followed by head being jerked back into THROWBACK position, where head and bill point upwards, often beyond vertical. (4) FORWARD DISPLAY (Fig. 3): Associated with Oblique Display, head and foreparts lowered, neck under-arched and bill pointed anywhere between horizontal and vertical; call with bill almost closed. (5) HEAD TOSS (Fig. 4): After Oblique or Forward Displays, bird may fling foreparts up until bill and head point vertically; silent or with soft call. Moynihan (1962) noted that Head-tossing appeared to be restricted to gulls and was associated with sexual, hostile and food-begging displays, and seemingly related to escape and appeasement. (6) HUNCHED AGGRESSIVE (Fig. 5): Horizontal posture similar in form to forward and hunched positions of begging young. In this posture will chase other adults, often for long periods. (7) CHOKING (Figs 6, 7, 8): Bird calls with body tilted and head and bill facing downwards. Performed during territorial disputes, or as part of nesting ceremonies; can be lengthy and irregular. FACING-AWAY (including HEAD-FLAGGING) only seen in masked gulls but not in Silver Gull; display exaggerates contrast between dark head and pale nape, and is conspicuous during pair-formation, mutual displays at nest and immediately after copulation. Conspicuous PECKING-INTO-GROUND, often with GRASS-PULLING, used to settle territorial disputes (Tinbergen 1953). Young precocial and, if undisturbed, semi-nidifugous. Fed by regurgitation. Dependent on parents for long period (BWP).

Noisy, with large range of loud calls; alarm calls one of most familiar and distinctive features of group (Moynihan 1962).

Breed in loose or dense colonies, occasionally as isolated pairs (HASB). Season annual, usually from late Aug. or Sept. to Jan. in HANZAB region; Kelp Gulls subantarctic usually Nov.–Feb.; Silver Gulls have longer season, from June or July to Mar. in s. Aust., earlier in n. Qld. Nest on offshore islands, islands in estuaries or lakes, on headlands, cliffs, terraced coastal promontories, coastal dunes, edges of lagoons, under or on top of bushes; Silver Gulls will also nest in tree hollows; some species on man-made structures such as jetties, roofs of buildings and moored boats (Fjeldså 1977; HASB; Aust. NRS). Build untidy nests out of plant material or any other material available; usually more substantial than those of Sterninae and Stercorariinae (Fjeldså 1977). Both sexes build. Eggs strongly coloured and marked; in HANZAB region, ground-colour varies from brownish olive to stone-grey or greenish stone, blotched with black or brown or both (HASB). Clutch usually 2–3 eggs, but from one to four recorded; larger clutches usually from dump-nesting or stealing of eggs (Fjeldså 1977; Campbell & Lack 1985; North; Aust. NRS). Usually single brooded; repeat clutches generally only laid after failure (Fjeldså 1977); Silver Gulls can raise more than one brood per season (Nicholls 1974). Both sexes incubate; incubation period, 21–29 days (Campbell & Lack 1985; HASB). Hatching more or less asynchronous (Fjeldså 1977). Young, precocial and, if undisturbed, semi-nidifugous (BWP). Both parents care for young. Young stay in nest for first 2–3 days then begin to wander about; siblings tend to keep together. Parents can recognize young within 4–6 days of hatching. Young beg by pecking at parent's bill; food regurgitated in front of chick (Fjeldså 1977). Fed in or near nest for 2–3 weeks, usually till fledging at 4–6 weeks, and in some species, up to 3 months thereafter (Campbell & Lack 1985; Oliver; HASB). When disturbed by people, young run to shelter and crouch under vegetation or in crevices; adults of large species soar over intruders, some birds swooping down and even striking; small species swoop more regularly and often defecate at intruder; Sabine's Gulls feign injury (Fjeldså 1977). Most breed upon attaining adult plumage, at 1–5 years (Campbell & Lack 1985).

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Larus pipixcan **Franklin's Gull**

COLOUR PLATES FACING PAGES 544 & 545

Larus Pipixcan Wagler, 1831, *Isis von Oken*, col. 515 — Mexico.

The specific name came from Hernandez (1651, *Rerum Medicarum Novae Hispaniae Thesaurus*, p. 32, cap. 84), where *pipixcan* is said to be the indigenous Mexican name for a sort of gull.

The English name honours British Army Major James Franklin (1783–1834), geologist, ornithologist and author.

MONOTYPIC

FIELD IDENTIFICATION Length 32–36 cm; wingspan 91–97 cm; weight 280 g. Small rather compact gull, with short stout bill, rounded head and short neck, slim body, short tail, and horizontal carriage at rest. Slightly smaller than Silver Gull *Larus novaehollandiae* and Laughing Gull *L. atricilla*. All plumages very similar to those of Laughing Gull; much darker above than Silver Gull. Have black hood in adult breeding plumage and diagnostic blackish half-hood in all first-year and non-breeding plumages; in all, relieved by prominent thick white eye-crescents. Adult has diagnostic grey centre to tail (unique among adult gulls but difficult to see in the field) while first immature breeding and all subsequent plumages have distinctive upperwing-pattern. Sexes similar. Some seasonal variation. Juvenile, first immatures and some second immatures separable.

Description Adult breeding Head, slaty black, with thick white crescents or oval patches above and below eye, joining at rear. White hindneck separates hood from dark blue-grey saddle. Rump, uppertail-coverts and tail, white, with diagnostic pale-grey centre to tail (which can be difficult to see in the field). Pattern of upperwing diagnostic: dark blue-grey with: (1) broad white trailing-edge to secondaries and inner primaries; (2) subterminal black bands and large white tips to outer five primaries; and (3) broad white band across primaries, separating black from grey of rest of wing. Extent of black on outer primaries decreases inwards (barely extending to p6 in some) and varies: in some, forms narrow patch broadly surrounded by white, with only thin black line extending up outer web of outermost primary; in others, black more extensive, similar to second immature non-breeding except that black does not extend up outer webs of outer few primaries. When perched, black on wing-tip always surrounded by white. Underbody, white, with pink flush on breast and belly. Underwing-coverts, white, contrasting with light-grey bases of remiges; trailing-edge, band across middle of primaries, and white tips of outer primaries, translucent, highlighting black subterminal patch behind wing-tip. Bill, bright red, with dark subterminal marks or thin band. Iris, brown-black. Orbital

ring, rich pink. Legs and feet, bright red. **Adult non-breeding** As breeding except: head, white, with diagnostic blackish half-hood (and thick white eye-crescents), finely streaked white on crown when fresh. Bill, black or very dark red, with black subterminal band and bright-red or orange tip. Legs and feet, dark red or black. **Juvenile** Unlikely to be seen in HANZAB area. Differs from adult non-breeding by: Half-hood, slightly paler, dark grey-brown, and crown and nape more heavily streaked white; white of forehead and lores, sparsely streaked or spotted grey. Hindneck washed pale grey, merging into slate-brown of saddle; narrow pale-buff fringes of scapulars form indistinct scaling. Rump, uppertail-coverts and underbody, white, faintly washed brown on sides of breast. Tail, pale grey with black subterminal band (broadest in centre) and white outermost feathers. Upperwing: innerwing-coverts, dark blue-grey, with brown carpal bar across lesser and median coverts (pale-buff fringes giving scaly appearance when close); secondaries, grey-brown, with blackish centres (forming dark subterminal secondary bar) and white tips, forming narrow white trailing-edge; outer primaries, their coverts and alula, mainly black, with black on primaries decreasing to subterminal band on p5 or p4 and dark of outerwing merging rapidly into dark blue-grey of inner primaries and their coverts; white trailing-edge to inner primaries continuous with trailing-edge of innerwing; outer primaries have small white tips, increasing in size inwards to p6 or p5. Underwing, white, with large dusky tip (slightly smaller than black area on upperside of primaries); dusky greater primary coverts; and contrasting grey bases to inner primaries and secondaries, bordered by strongly translucent narrow white trailing-edge. Bill, black, faintly paler at base in some. Orbital ring, black. Legs and feet, black. **First immature non-breeding** As juvenile except: pattern of head as adult non-breeding but half-hood generally browner; hindneck, white or washed grey; saddle and varying number of secondary coverts, dark blue-grey (occasionally with fine brown shaft-streaks to scapulars). Brown areas on upperwing become paler with wear and fading; and pale fringes of retained tertials and secondary coverts and white tips of outer primaries reduced or lost. Underbody, white, usually faintly washed grey on sides of neck and breast and sometimes with pink wash. Bill, black, often browner at base. Legs and feet, black to reddish brown. **First immature breeding** Pattern of plumage very different from that of first immature non-breeding, and more like plumages of second immature and adult. Differ from first immature non-breeding by: Pattern of head and neck similar, but hindneck and sides of neck, white, and half-hood often blacker; a few develop larger partial black hood. Saddle and most of upperwing, dark blue-grey, with broad white trailing-edge to secondaries and inner primaries and white tips to outer five or six primaries (decreasing in size outwards). More black on wing-tip than on adult but less and better defined than on juvenile or first immature non-breeding: black on primaries covers outer webs of outer two or three and decreasing distal portions of next few primaries, ending as subterminal mark on p6 or p5; unlike first immature non-breeding, black partly separated from grey rest of outerwing by incomplete narrow white band across middle of primaries; black wing-tip joins brown-black outer greater primary coverts and blackish alula to form dusky leading-edge to outerwing (sometimes difficult to see in field). Varying number of secondaries have dark centres, sometimes forming indistinct partial secondary bar. Tail has white terminal fringe and sides, with grey centre (sometimes becoming darker towards tip and difficult to see in the field); occasionally also with dark subterminal spots forming indistinct partial tail-band. Underbody, white, sometimes with pale-pink flush. Underwing, similar to adult, but with larger black wing-tip. A few retain some or all juvenile remiges and rectrices. Bill, black or black with reddish base. Legs and feet, black. **Second immature non-breeding** Very similar to adult non-breeding; some distinguishable by combination of differences in pattern of wing-tip: more black on outer primaries, extending up outer webs of outer two primaries; incomplete white band separating grey and black areas of primaries; white tips of outer five or six primaries smaller (only when fresh), and outermost primary often has small white mirror on inner web near tip; grey outer greater primary coverts sometimes have indistinct dusky centres or shaft-streaks. Bare parts often duller than adult: bill, black or brown with red or orange tip; orbital ring, dark; legs and feet, black or dull red. **Second immature breeding** As adult breeding.

Similar species Easily confused with **Laughing Gull** (q.v.). At all times, distinguished from **Silver** and **Black-billed** *L. bulleri* **Gulls** by combination of smaller size and more compact shape; partial or complete black hood; darker-grey upperparts; grey centre to tail; very different pattern of wing; and slightly shorter bill, more rounded head and slightly shorter neck, wings, tail and legs. In all plumages, **Black-headed Gull** *L. ridibundus* differs by much paler grey upperparts, very different wing-pattern (with bold white wedge on leading-edge of wing), whiter tail (never with grey centre) and finer build; in adult breeding plumage, hood, dark chocolate-brown (not black). **Sabine's Gull** *L. sabini* differs at all times by diagnostic tri-coloured upperwing. All other gulls in our area much larger.

Gregarious gull, breeding colonially on freshwater marshes of North American prairies, and foraging over surrounding grasslands and croplands. Outside breeding areas, occur inland and on coast during migration; winter in small to large flocks (sometimes 1000s) along arid Pacific coast of Peru and Chile. Vagrants to HANZAB region reported mainly from coastal sites, but also at large inland lakes. Will sometimes join with Silver Gulls to compete for food scraps but, unlike that species, avoid human habitation away from shores. Flight, light and buoyant, with paddling wing-beats, rather rounded wing-tips, short tail and marked agility combining to emphasize compactness. Feed by dipping to surface to snatch food; at times also hawk persistently for insects. When perched, has rather squat, hunched jizz with horizontal posture and short legs. Usual calls away from breeding area are soft *krruk* and louder *weeh-a*, repeated.

HABITAT Breed inland on shores of shallow freshwater lakes and marshes on flat grassy prairies and steppes (Bent 1921; AOU 1983). During non-breeding period, round desert coasts of South America, mainly in sheltered bays, inlets, harbours and estuaries; also inland, on terrestrial wetlands or agricultural land (AOU 1983; Murphy).

In Aust., recorded on sheltered coasts, including bays, harbours and estuaries; also on terrestrial wetlands, occasionally well inland (e.g. L. Cowal, NSW). Seen roosting on sandy beaches and sandspits, on rocks and rocky spits, mudflats and piles of seaweed; also at near-coastal wetland behind beach. Seen feeding on sandy beach and in water up to 100 m offshore (Eades & Debus 1982; Corben & Czechura 1988; Nicholls 1988; Standring 1988).

DISTRIBUTION Breed interior North America, from e. Alberta (S of 60°N) on e. slopes of Rocky Mts, S to Oregon,

and E to sw. Manitoba and nw. Iowa. In non-breeding period, mainly on Pacific coasts of South America S to *c.* 40°S, round Valdivia, Chile, including Galapagos Is. Infrequently, Gulf of Mexico, Caribbean and Central America (Johnson 1967; Blake 1977; AOU 1983; Murphy). Rare in tropical central Pacific Ocean, e.g. Hawaii, Johnson Atoll, Truk, Marshall Is, Kiribati and Marquesas (King 1967; Pratt *et al.* 1987). Accidental, Europe; Gough I. and Tristan da Cunha; Aust. (Swales & Murphy 1965; Watson 1975; BWP).

Aust. (All singles). Few acceptable records (RAC): Geraldton, WA, 7 Mar.–24 Apr. 1976 (Serventy & Whittell 1976; Nicholls 1988); Moreton Bay, Qld, 10 Jan.–13 Mar. 1981 (Corben & Czechura 1988); Sydney Harbour, NSW, 11 May–19 Nov. 1981 (Eades & Debus 1982); L. Monger, WA, 22 Feb.–2 Mar. 1988 (Standring 1988); L. Cowal, NSW, 25 Jan.–17 Feb. 1992. Other unverified claims, either not accepted by RAC or not submitted include: Bunbury, WA, 10 Aug. 1957 (Dixon 1958); Jurien Bay, WA, 27 Mar. 1974 (not accepted by RAC); Scarborough, Qld, 30 Mar.–1 Apr. 1989 (Qld Bird Rep. 1989); Kalbarri, WA, mid-Mar. 1991; Dunsborough, 24–26 Apr. 1991 (Vervest 1991); L. Menindee, NSW, 3 Oct. 1991 (NSW Bird Rep. 1991; not accepted RAC); Greenfields Wetland, Salisbury, SA, 14–24 Sept. 1993; Cairns, Qld, 7 Nov. 1993. Possible records: Kalbarri, WA, 20 June 1988 (Vervest 1988); L. Monger, WA, 8 Jan. 1989 (Jaensch 1989); Albany, WA, 25 Apr. 1991 (Vervest 1991); Bibra L., WA, 1–3 Feb. 1993 (Anon. 1993). Report from Eyre Bird Observatory, WA, 24 Dec. 1988–12 Jan. 1989, subsequently identified as Laughing Gull.

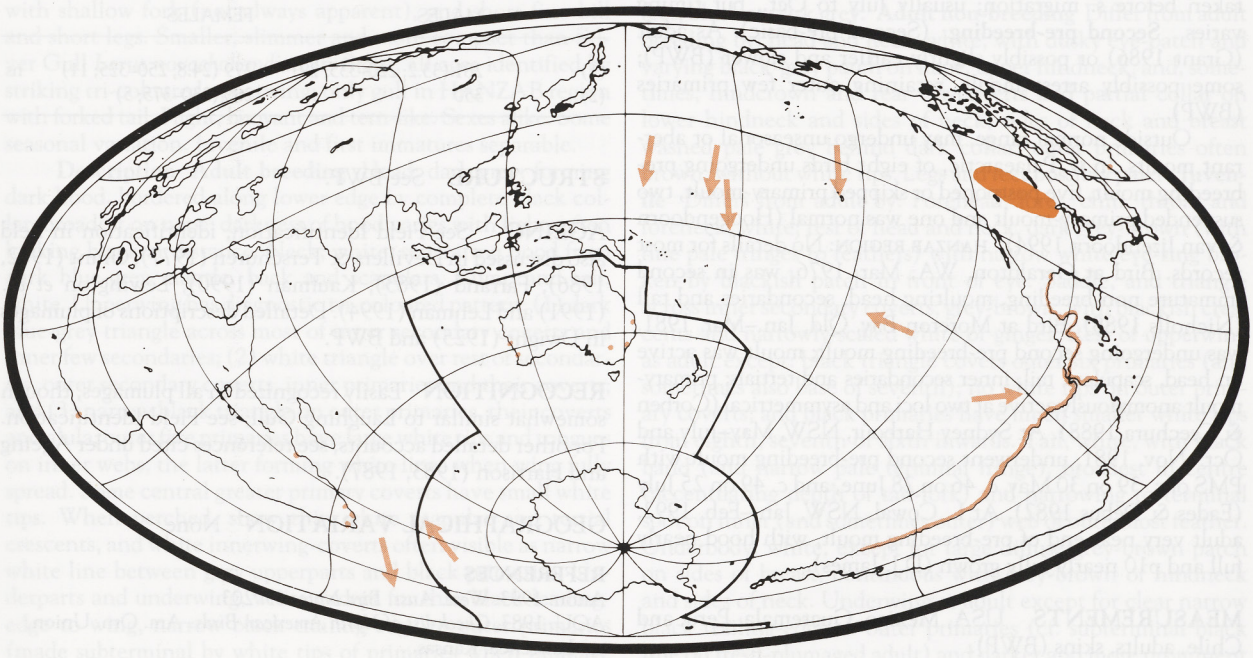
Prince Edward Is Single, Marion I., 10 Feb. 1979 (Sinclair 1981).

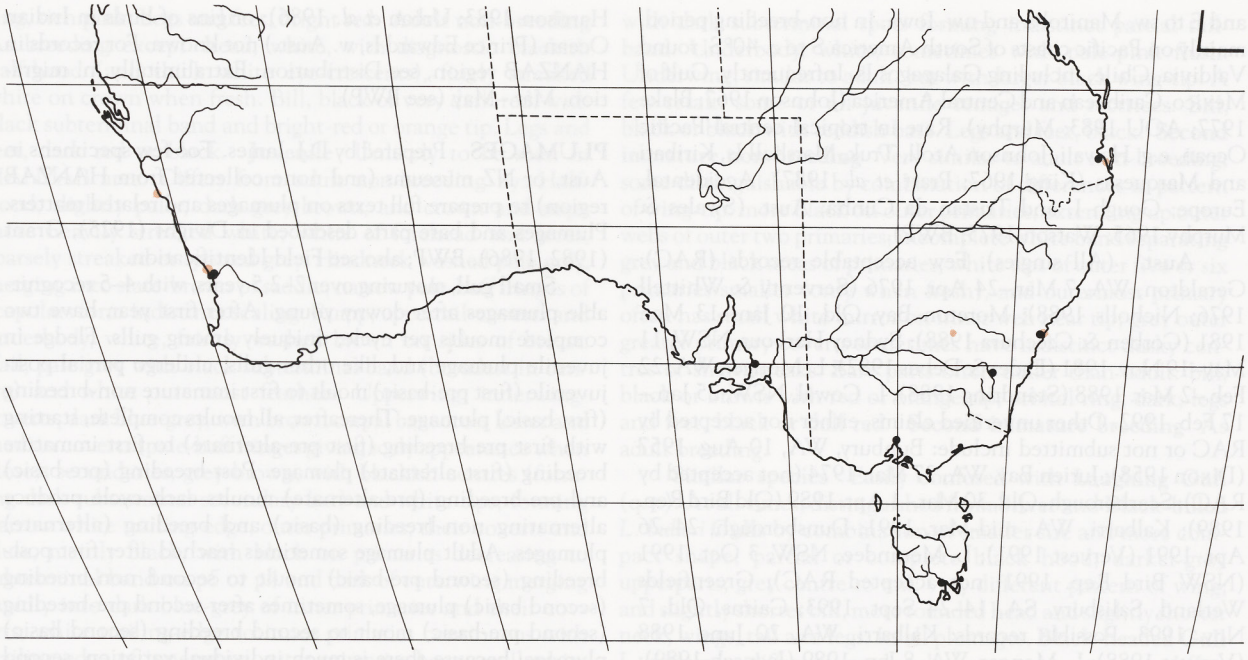
MOVEMENTS Migratory; breed North America and move S through w. North America to non-breeding areas on Pacific coasts of Central and South America. S. migration from first half July to late Nov. (AOU 1983; BWP). Vagrant to Africa, Dec.–Apr., possibly moving E across s. Atlantic, where recorded from Tristan da Cunha (Swales & Murphy 1965; Harrison 1983; Urban *et al.* 1986); origins of birds in Indian Ocean (Prince Edward Is, w. Aust.) not known. For records in HANZAB region, see Distribution. Extralimitally, n. migration, Mar.–May (see BWP).

PLUMAGES Prepared by D.J. James. Too few specimens in Aust. or NZ museums (and none collected from HANZAB region) to prepare full texts on plumages and related matters. Plumages and bare parts described in Dwight (1925), Grant (1982, 1986), BWP; also see Field Identification.

Small gull, maturing over 2–2.5 years, with 4–5 recognizable plumages after downy young. After first year, have two complete moults per cycle, uniquely among gulls. Fledge in juvenile plumage and, like other gulls, undergo partial post-juvenile (first pre-basic) moult to first immature non-breeding (first basic) plumage. Thereafter, all moults complete, starting with first pre-breeding (first pre-alternate) to first immature breeding (first alternate) plumage. Post-breeding (pre-basic) and pre-breeding (pre-alternate) moults each cycle produce alternating non-breeding (basic) and breeding (alternate) plumages. Adult plumage sometimes reached after first post-breeding (second pre-basic) moult to second non-breeding (second basic) plumage, sometimes after second pre-breeding (second pre-basic) moult to second breeding (second basic) plumage; because there is much individual variation, second immature and adult (third and subsequent) non-breeding plumages cannot always be distinguished. Pattern of head of adults in non-breeding and breeding plumages very different. Sexes similar. No geographical variation.

MOULTS Following summary from BWP, Grant (1986) and Dwight (1925). **Adult post-breeding** (Second and subsequent pre-basic). Complete. Normally June or July to Oct., before s. migration. Primaries outwards; p1–p6, July; p5–p7, Aug.; p9–p10, late Sept. to Oct. Non-breeding head-pattern usually attained in Aug. or Oct. **Adult pre-breeding** (Third and subsequent pre-alternate). Complete. Normally Dec. to Apr. or May, before n. migration; some still growing outer one





or two primaries after migration, in Apr. and May. Primaries outwards. Tail, irregularly inwards, Jan.–Feb. Sometimes have complete hood by Feb. (Devillers & Terschuren 1977), but usually by late Mar. or Apr. **Post-juvenile** (First pre-basic). The only partial moult. July–Oct. Moult head, body and, usually, some secondary coverts. **First pre-breeding** (First pre-alternate). Complete or sometimes arrested. Undertaken after migration to wintering areas. Timing varies but generally later and slower than in adult; from Jan. or Feb. to May. Primaries outwards; moult slow, usually one primary at a time; a few arrest moult, retaining varying number of outer primaries. Moult of tail finished by early Feb. to late Mar. Often do not develop hood until May. **First post-breeding** (Second pre-basic). Complete. Similar to adult post-breeding; undertaken before s. migration; usually July to Oct., but timing varies. **Second pre-breeding** (Second pre-basic). As adult (Grant 1986) or possibly slightly earlier and slower (BWP); some possibly arrest moult, retaining outer few primaries (BWP).

Outside normal range, may undergo unseasonal or aberrant moults. In w. Palaearctic, of eight birds undergoing pre-breeding moult, five postponed or skipped primary-moult, two suspended primary-moult and one was normal (Hoogendoorn & van Ijzendoorn 1994). HANZAB REGION: No details for most records. Bird at Geraldton, WA, Mar. 1976, was in second immature non-breeding, moulting head, secondaries and tail (Nicholls 1988). Bird at Moreton Bay, Qld, Jan.–Mar. 1981, was undergoing second pre-breeding moult; moult was active on head, scapulars, tail, inner secondaries and tertials; primary-moult anomalously active at two loci and asymmetrical (Corben & Czechura 1988). At Sydney Harbour, NSW, May–July and Oct.–Nov. 1981, underwent second pre-breeding moult with PMS of *c.* 39 on 30 May, *c.* 46 on 28 June, and *c.* 49 on 25 July (Eades & Debus 1982). At L. Cowal, NSW, Jan.–Feb. 1992, adult very near end of pre-breeding moult, with hood nearly full and p10 nearly fully grown (D.J. James).

MEASUREMENTS USA, Mexico, Guatemala, Peru, and Chile, adults, skins (BWP).

	MALES	FEMALES	
WING	288 (4.99; 280–295; 9)	284 (6.00; 273–298; 12)	ns
TAIL	102 (4.42; 93–109; 9)	102 (4.01; 96–111; 12)	ns
BILL	29.6 (1.16; 27.5–31.9; 9)	29.5 (1.99; 25.8–32.8; 14)	ns
TARSUS	41.0 (0.99; 39.8–43.9; 9)	41.6 (1.57; 39.0–44.3; 14)	ns
TOE C	35.8 (1.57; 34.1–39.2; 9)	36.8 (1.33; 34.9–39.7; 14)	ns

Immatures smaller than adults (BWP). Additional measurements in Dwight (1925).

WEIGHTS Adults (BWP): (1) Minnesota, boreal summer; (2) Chile, boreal winter.

	MALES	FEMALES	
(1)	281 (33.2; 220–335; 29)	279 (24.8; 250–325; 11)	ns
(2)	350	280 (230–375; 5)	

STRUCTURE See BWP.

AGEING See Field Identification; identification in field also discussed in Devillers & Terschuren (1977), Grant (1982, 1986), Farrand (1983), Kaufman (1990), Lewington *et al.* (1991) and Lehman (1994). Detailed descriptions of plumages in Dwight (1925) and BWP.

RECOGNITION Easily recognized in all plumages, though somewhat similar to Laughing Gull; see Field Identification. For other detailed accounts, see references cited under Ageing and Harrison (1983, 1987).

GEOGRAPHICAL VARIATION None.

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Volume 3, Plate 33

Laughing Gull *Larus atricilla* (page 561)
1 Adult breeding; **2** Adult non-breeding; **3** Juvenile; **4** First immature non-breeding; **5** First immature breeding; **6** Second immature non-breeding

Franklin's Gull *Larus pipixcan* (page 565)
7 Adult breeding; **8** Adult non-breeding; **9** Juvenile; **10** First immature non-breeding; **11** Second immature non-breeding

Volume 3, Plate 34

Silver Gull *Larus novaehollandiae* (Nominate race except where stated) (page 517)
1, 2 Adult non-breeding; **3** First immature non-breeding

Black-billed Gull *Larus bulleri* (page 545)
4, 5 Adult non-breeding; **6** First immature non-breeding

Black-headed Gull *Larus ridibundus* (page 558)
7, 8 Adult non-breeding; **9** First immature non-breeding

Laughing Gull *Larus atricilla* (page 561)
10, 11 Adult non-breeding; **12** First immature non-breeding; **13** Second immature non-breeding

Franklin's Gull *Larus pipixcan* (page 565)
14, 15 Adult non-breeding; **16, 17** First immature non-breeding; **18** First immature breeding

Sabine's Gull *Larus sabini* (page 569)
19, 20 Adult non-breeding; **21, 22** First immature non-breeding; **23** First immature breeding