ACCOUNTS AND KEYS TO FAMILIES

ORDER MONOTREMATA

This order consists of six living species representing two families. A highly specialized, yet primitive group, it is composed of spiny anteater-like diggers (echidnas) in one family and a duck-billed aquatic form (platypus) in the other. Many characteristics are peculiar to this order. For example, all lay eggs. Hatchlings do not suckle; instead they are nurtured with milk exuded onto the surface of the skin of the female which they lap up. Certain characteristics of the order, such as the structure of the pectoral girdle, splayed limb posture, internal penis, and shell-covered eggs, are reptile-like. The presence of a cloaca is the basis for the name Monotremata, which literally means "single hole". Monotremes are endothermic, but their metabolic rates are low compared to those of most eutherian mammals. All hibernate or are periodically inactive in winter. Monotremes are long-lived—captive 'echidnas have lived 50 years. The fossil record extends back only as far as the Miocene (Woodburne and Tedford, 1975), but because of many primitive characters possessed by the group, monotremes are thought to be archaic, probably dating back to the Mesozoic. Prevailing opinion places then in a separate subclass from other living mammals (marsupials and eutherians).

Recognition Characters:

- **pectoral girdle with large epicoracoids, coracoids, and interclavicle** (these bones are absent in other mammals).
- **females lay eggs.**

1. limbs modified for digging or swimming.
2. ankle in males with a horny spur.

3. no vibrissae.
4. epipubic bone present (also found in marsupials).
5. skull bird-like in shape, sutures usually obliterated by fusion of bones in adults (Figs. 11, 12).
6. **no auditory bulla.**
7. premaxillae separated for at least part of their length (Figs. 11, 12).
8. jugal reduced or absent.
9. **no lacrimal.**
10. palate extending far posteriorly (Figs. 11, 12).
11. **no teeth in adults.**
12. cloaca present (absent in other mammals, with few exceptions).
13. penis within cloaca, used only for passage of sperm.
14. mammae without pendulous teats.

Remark: Summaries of many aspects of monotreme biology are provided by Augee (1978) and Griffiths (1978). Haltenorth (1958) reviewed classification.

KEY TO FAMILIES OF MONOTREMATA

1a. Pelage spiny; snout slender, long; tail very small; skull elongate, slender anteriorly; premaxillae narrow and separated except at anterior ends ..... **TACHYGLOSSIDAE** (p. 32)

1b. Pelage consisting of soft hairs; snout broad, duck-billed; tail well developed, flattened; skull elongate relatively broad; premaxillae laterally expanded and separate anteriorly ..... **ORNITHORHYNCHIDAE** (p. 34)

Family TACHYGLOSSIDAE
(Echidnas or spiny anteaters)

Echidnas are spiny terrestrial mammals equipped for rapid and powerful digging. They construct relatively shallow burrows and dig for termites, other insects, and worms. The tongue is long, sticky, and contractile. A unique food-grinding apparatus is located in the back of the mouth consisting of keratinized ridges at the base of the tongue and on the palate.

Spiny anteaters are usually solitary. They breed once a year, and normally lay one egg. The egg and young are brooded in a temporary brood pouch formed on the abdomen of the female. Offspring mature in one year.

Echidnas apparently have few natural predators, although they are eaten by natives of New Guinea.

Two genera, 5 species; Australia, Tasmania, New Guinea.

Recognition Characters:

1. **hair conspicuously spiny.**
2. **feet not webbed, modified for digging, with large claws.**
3. second digit of hindfoot elongate, modified for preening.
4. **snout slender, long.**
5. **pinna well developed.**
6. **tail very small.**
7. **tongue worm-like.**
8. cranium elongate, slender anteriorly (Fig. 11).
9. **premaxillae separated except at anterior ends** (Fig. 11).
10. lower jaw slender, rod-like (Fig. 11).

Dental formula: no teeth (Fig. 11).

Compare with: Ornithorhynchidae, Myrmecophagidae and Dasypodidae (Edentata), Manidae (Pholidota).

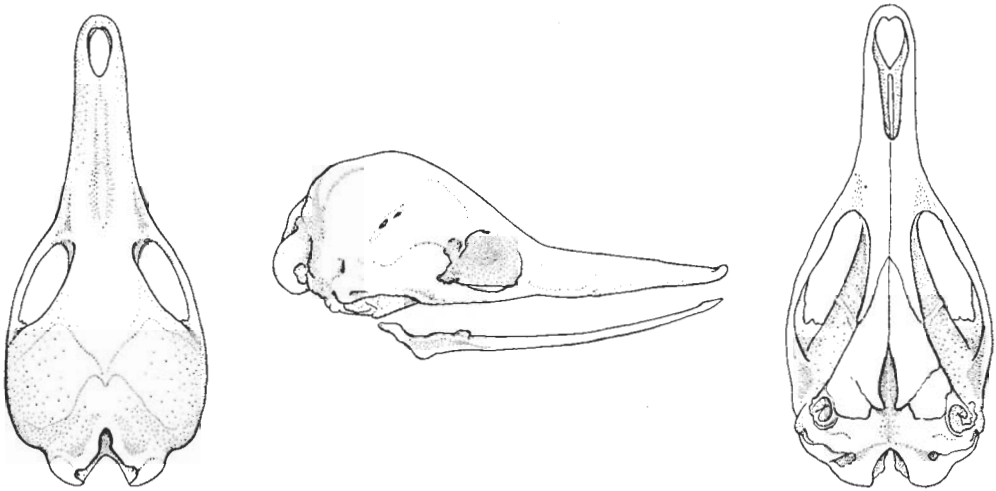


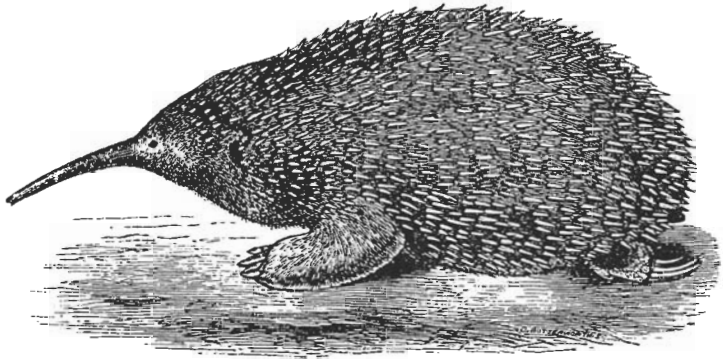
Figure 11. Skull of a tachyglossid (*Tachyglossus*, x ½).

Genera:

Tachyglossus (2) - Australian, Tasmanian echidnas; *T. aculeatus* is the most widespread species of echidna, occurring in both Australia and New Guinea.

Zaglossus (3) - New Guinean long-nosed echidnas.

Remarks: Accounts of habits and characteristics of spiny anteaters were provided by Griffiths (1968, 1978). Various aspects of their biology were also reviewed by Augee (1978).



Echidna.

Family ORNITHORHYNCHIDAE
(Duck-billed platypus)

One of the most bizarre mammals, the duck-billed platypus is the only living representative of this family. Platypuses are semi-aquatic. Their diet consists of freshwater invertebrates and vegetation, which they obtain mainly by probing the bottoms of streams and ponds with a flattened, leathery beak. The feet are webbed and well clawed. They construct burrows in banks.

Platypuses usually occur in pairs except during the breeding season, when, after intricate copulatory behavior, the female retreats to a nesting burrow where she lays two eggs (rarely one or three). She incubates the eggs by curling her body around them—there is no brood pouch. Young emerge from the burrow at four to five months of age and are sexually mature in one year.

Platypuses have few natural enemies. However, until protected by the Australian government they were actively sought for their pelts.

One genus, 1 species; eastern Australia, Tasmania.

Recognition Characters:

1. **pelage of soft hairs; no spines.**
2. **foot webbed, with moderately large claws.**
3. no distinct preening digits.
4. **snout broad, duck-billed.**
5. **no pinna.**
6. **tail well developed, flattened.**
7. **tongue flattened.**
8. cranium elongate, relatively broad (Fig. 12).
9. **premaxillae expanded laterally and separate anteriorly** (Fig. 12).
10. lower jaw of moderate size.

Dental formula: no teeth (horny plates, or "gum plates", present on jaws) (Fig. 12).

Compare with: Tachyglossidae.

Genus:

Ornithorhynchus (1) - *O. anatinus* is the duck-billed platypus.

Remarks: Burrell (1927) and Griffiths (1978) provided comprehensive treatments of the natural history of platypuses. Other aspects of their biology were reviewed by Augee (1978).

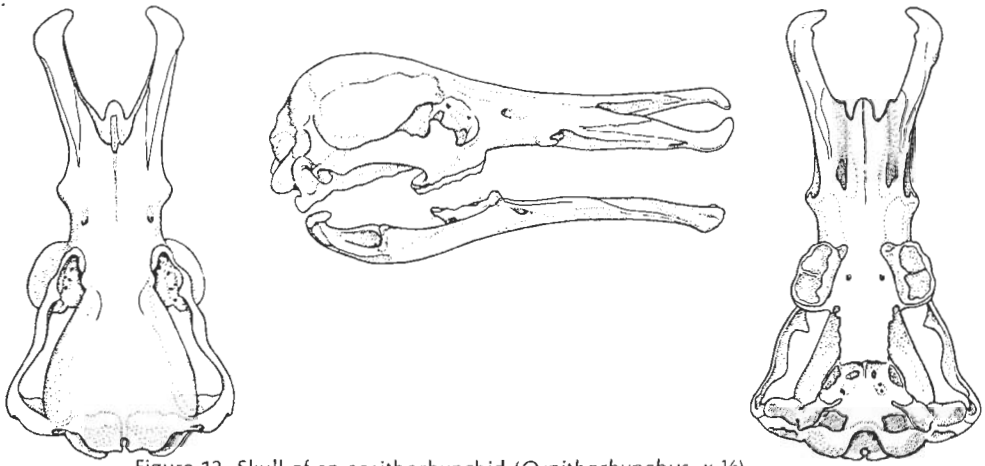


Figure 12. Skull of an ornithorhynchid (*Ornithorhynchus*, x ½).