Multicellular, primarily holocrine, skin glands are found in reptiles, but are usually small and inconspicuous. Their histogenesis appears often to be closely related to that responsible for generation of keratinizing epidermal cell layers (Quay 1977). Reptilian holocrine skin glands also have many structural similarities with mammalian sebaceous and avian preen (uropygial) glands. Although there are some common features in the structure, composition and histogenesis of these glands, their phylogenetic interrelations are probably most appropriately viewed as an evolutionary radial diversity of epidermal holocrine proliferations and specializations. Direct derivation of either mammalian sebaceous or avian preen glands from particular ones of living reptilian holocrine glands cannot be realistically postulated.

Reptilian skin glands with tubular or tubulo-alveolar structure and mucoid merocrine secretion are usually but not always near mucocutaneous junctions. None of these glands as known in living reptiles has much similarity to mammalian sudoriferous, mammary or related glands. However, a possible pheromonal role for a skin gland in a mammal-like reptile has been suggested to be an evolutionary link in the derivation of mammalian lactation (Duvall et al. 1983; Graves and Duvall 1983).
Olfactory cues are relied upon heavily during courtship and aggression by most reptiles, including many lizards (Gekkonidae, Scincidae, Anguidae), and most snakes, turtles and crocodilians (Carpenter and Ferguson 1977; Simon 1983). Musky odors from some of the more complex skin glands in these reptiles have been known for many years (Favro 1947), but only recently has experimental evidence been presented to support their pheromonal function.

10.2 Survey by Reptilian Group

10.2.1 Chelonians (Testudines)

Chelonians have two kinds of cutaneous scent gland. Both are holocrine and both have been known for over 100 years (Rathke 1848). Mental (chin) glands occur on the throat between the manipular rami of some genera in the closely related families, Emydidae, Testudinidae and Platysternidae (Fig. 1A–G) (Winokur and Legler 1975). Where best studied, in North American *Gopherus* species, mental glands are larger in males than in females. Their secretion contains proteins (with sexual and species differences), phospholipids, triglycerides, cholesterol and free fatty acids. The fatty acids provide olfactory cues during courtship and combative encounters (Rose et al. 1969; Rose 1970; Auffenberg 1977). Paired inguinal and axillary musk glands constitute the second kind of chelonian scent gland. These four glands open lateroventrally near the edge of the carapace in front and behind the plastral bridges. They occur in many marine and freshwater species, and are lacking in the Testudinidae (Müller 1961; Ehrenfeld and Ehrenfeld 1973). Proteins and fatty acids are major ingredients of the secretion, which may function in defense against predators and in intraspecies communication (Eisner et al. 1977, 1978).

10.2.2 Lepidosaurians

Skin glands of living lizards and snakes often have been characterized as consisting of two groups. The smaller and more primitive of these ("generation glands", $\beta$-glands, escutcheon scales of particular taxa) are related to the generation of new epidermal layers in the shedding or sloughing cycle. The "preanal organs" or glands include all of the macroscopically visible secretory structures in the preanal, posterior abdominal and femoral regions (Hulke 1869; Schaefer 1902; Taylor and Leonard 1956; Gabe and Saint-Girons 1965, 1967; Kluge 1967; Maderson 1967, 1968). Evolutionary diversity within both categories is evident, and possible gland homologies and phylogenetic relations can be variously interpreted (Maderson and Chiu 1970; Maderson 1972; Kluge 1983).

10.2.2.1 Lizards (*Lacertilia*)

Larger and more distinctive of the "preanal glands" of lizards are the often sexually dimorphic femoral glands ("femoral pores") (Féliget 1911; Mahendra