

closer to the epipubic process. The remainder of the girdle is similar in all four recent species.

FEMUR

The femur of testudinid turtles is distinguished from that of emydid turtles by a ridge that runs nearly on the level of the proximal condyle and connects the medial and lateral trochanters. Between this ridge and the condyle there is a pit, the *fossa intertrochanterica*. The proximal condyle is set at an oblique angle, is oval in outline, and is more compressed in *G. agassizi* and *G. berlandieri* than in the two remaining species (Figs. 10-13). The shaft is slightly curved and not compressed. It is proportionately widest in *flavomarginatus*. The distal end is greatly expanded laterally and compressed anteroposteriorly. In adults the distal condyles are well developed, separated by an intertubercular sulcus. They are most clearly differentiated in *flavomarginatus* and *polyphemus* and weakly developed in *agassizi* and *berlandieri*.

CARPUS

Primitively the turtle carpus contained 10 elements (radius, intermedium, ulnare, centrale, pisiform, and five carpals). Apparently the centrale was not in contact with either the radius or the ulna. In presumably primitive tortoises, such as *Geochelone denticulata*, the carpus is composed of 10 elements, at least in the embryonic stage (Hoffman 1890). In this species the centrale has moved distally, so that it contacts the radius; the pisiform is small and in contact with the ulna and carpal 5, instead of only the latter. This pattern is apparently basic in land tortoises. Its modifications include fusion or loss of elements, both of which are individually and ontogenetically variable.

In cleared and stained forelimbs of very young *Gopherus*, I have never found more than nine carpal elements. The pisiform is apparently lost. Furthermore, there is considerably more fusion of the elements in adult *Gopherus* than in any other genus I have studied (Auffenberg 1966a). This is probably associated with the use of front limbs for excavating burrows and shelters.

An examination of many articulated feet of the species of this genus suggests that, although there is considerable variation in the degree of fusion of the component distal elements, two basic patterns are discernible (Auffenberg 1966a). One is found in the *G. polyphemus-flavomarginatus* group, where six carpal elements are in contact with the ulna and radius. In the *G. berlandieri-agassizi* group only four or five elements are in contact with the two brachial elements.

The carpus of *Gopherus* has been shown to represent a primitive type among tortoises (Auffenberg 1966a). It is distinguished by two features: