

to the ulnare. The pisiform is free in all the smaller specimens examined.

These data show that the carpus of *G. agassizi* is more variable than that of *G. polyphemus*, particularly in the lateral elements of the subradial and subulnar complexes.

Gopherus berlandieri—The lack of a separate proximal centrale, plus several other anatomical features, suggest that *G. berlandieri* is closer to *G. agassizi* than to the other two extant species. In six specimens under 100 mm in shell length, mediale 2 is not fused to the composite radiale, as it is in all specimens over 100 mm in shell length. In no specimen is the proximal centrale separate from the intermedium. Carpal 1 is separate and in contact with the radius in all specimens and is never fused to the composite radiale. Metacarpals 3 and 4 are always fused to the adjacent phalanges, but metacarpals 1, 2, and 5 are fused to the adjacent phalanges in only the larger specimens. The pisiform is always present. Carpal 5 is fused to the ulnare in 22 of 41 individuals over 100 mm, and carpal 4 separates mediale 3 and the ulnare in all specimens. The radiale is fused to mediale 2 in all individuals, and these are fused to mediale 3 in all adult specimens.

The major difference between the carpus of the *polyphemus* and *berlandieri* groups seems to lie in the position of the centrale. In the former it is in its primitive tortoise position, *i.e.* in contact with the radius. In the *berlandieri* group it is excluded from contact with the radius by the intermedium (Fig. 14). In the *polyphemus* group loss and fusion of carpals and metacarpals occur along the axis of digits II, III, IV and V. When fusion occurs in the *berlandieri* group, it does so along the axis of digits I, IV and V (Table 5).

TARSUS

The tarsus of tortoises is evidently more conservative than the carpus. In *Gopherus* I found no significant interspecific differences in the tarsus. The tibiale, intermedium, and centrale are always completely fused in adults, and the fibulaire is usually separate. In most other tortoises this element is also fused to the large composite element. The tarsals are either four or five in number; if the former, then tarsals 4 and 5 are fused, rather than 3 and 4 as in most turtles (Hoffman 1890). All five metatarsals are distinct, with number 1 being the most robust, as is generally true in all turtles. Metatarsals IV and V articulate with separate tarsals, or with only one if tarsals 4 and 5 are fused. Two phalanges are always found on digits I through IV. The phalanges of digit V are often missing, although one is sometimes present (Fig. 14).

DERMAL ARMOR

Dermal ossicles in *Gopherus* are mainly developed in three areas: