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**Impact of the Curio Trade for
San Diego Horned Lizards
(*Phrynosoma coronatum blainvillii*)
in the Los Angeles Basin, California:
1885-1930**

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Decline of amphibian and reptile populations is a world-wide trend (Honegger, 1975, 1981; Ashton, 1976; Groombridge, 1982). Many reasons for this decline have been suggested, including habitat modification and destruction (Ashton, 1976; Groombridge, 1982), roadway mortality (Prestt et al., 1974; Bury et al., 1977), poisoning by pesticide and pollutants (Hall, 1980), introduction of new diseases and parasites (Carr et al., 1976), and competition and predation from introduced and exotic species (Moyle, 1973; Bury and Luckenbach, 1976; Wilson and Porras, 1983). However, until recently (Groombridge, 1982), human exploitation of these animals was seldom considered, exceptions including land tortoises (Townsend, 1925), sea turtles (Domantay, 1952-1953), crocodilians (Oliver, 1955), and the pet trade (Busack, 1974).

Current research has indicated the tremendous impact of human exploitation on populations of red-legged frogs (*Rana aurora*) in California during the past century (Jennings and Hayes, 1985). I here describe another example of human exploitation for the curio trade in San Diego horned lizards (*Phrynosoma coronatum blainvillii*) from the Los Angeles Basin, California, between 1885 and 1930.

The curio trade for horned lizards in southern California was clearly tied to the fortunes of one individual, William Henry Wakeley (1857-1925) who came to Pasadena, California in 1881. Wakeley studied taxidermy (Farnsworth, 1883; Carew, 1930), and exhibited specimens in his hardware store where they attracted the attention of tourists (Reid, 1895; Page, 1964). He soon realized the commercial appeal of such stuffed and dried curios over hardware, and by 1886 he was advertising for live horned lizards. An advertisement in the "Pasadena and Valley Union" of 27 August 1886 read: "Horned Toads Wanted. Boys now is your chance! W. H. Wakeley wants 1000 Horned Toads to leave at J. W. Wood's drugstore." Collectors were paid five cents for each lizard (Tower, 1902).

By the late 1880's, Wakeley's enterprise had become large enough to establish a factory with 10-20 full-time workers who turned out thousands of stuffed horned lizards and dried specimens of various invertebrates and desert plants (Reid, 1895). Virtually all of these curios were sold through Wakeley's "Natural History Store." Although Wakeley sold many types of curios, stuffed horned lizards remained his

most popular item. In 1887 he sold his store but still employed approximately 10 men full-time to collect natural history specimens throughout the Los Angeles Basin. Wakeley continued as a commercial collector until his retirement in 1917.

The mechanics of the curio trade for horned lizards were relatively simple. Individuals or hires professionals brought in suitable specimens from nearby areas. The best collecting localities were Pasadena, Monte Vista [=Sunland], and Big Tujunga (Tower, 1902). Captured lizards were killed and crudely stuffed. Although stuffed horned lizards comprised the bulk of the trade, hundreds/yr were also shipped alive by mail to eastern U.S. localities until postal officials banned shipments in the late 1890's (Holder, 1901; Tower, 1902).

Eyewitness accounts estimate that the curio trade harvested some 5000-8000 horned lizards/yr around the turn of the century (Reid, 1895; Holder, 1901; Tower, 1902). These estimates match calculations based on Wakeley's 10 man hired force of professional collectors (Reid, 1895) and an average take of 25 to 30 lizards per person per day (Tower, 1902). If collectors were only in the field for approximately 30 days, an estimate of 7500 lizards per season coincides with eyewitness accounts. Given that *P. c. blainvillii* is active primarily in the late spring (April-May) and early summer (June-July) after which most populations estivate, the collectors hired by Wakeley probably could acquire all needed specimens in a short time. Wakeley and others also bought specimens from itinerant collectors (Holder, 1901; Tower, 1902; Grinnell and Grinnell, 1907), whose numbers and take are unknown.

Based on the above information, I estimate that at least 115,000 horned lizards were harvested over a period of 45 years, mostly between 1890 and 1910 (Table 1). After 1910 there are no firsthand accounts, but stuffed horned lizards were sold in Los Angeles until the 1930's (D. L. Jennings, R. F. Jennings, pers. comm.), and there are several articles on live horned lizards purchased by tourists during this time in southern California (Schanafelt, 1927; Scheffer, 1930).

The curio trade rose sharply in the 1890's due to increased winter tourism from the annual Tournament of Roses Parade (Wood, 1917; Carew, 1930). By 1900, the horned lizard curio trade had reached its peak with as many as 8000 lizards sold in one year alone (Tower, 1902).

By 1905, horned lizards began to be noted as being scarce or absent in many areas where they were formerly abundant. Grinnell and Grinnell (1907), Bryant (1911), and Van Denburgh (1922) all noted this decline and explicitly stated that it was due to overcollecting by the curio trade. As large adult horned lizards were worth five cents apiece to collectors (including young boys), it is not surprising that horned lizards soon became scarce in many localities close to urban areas.

Compared with other species of *Phrynosoma*, *P. coronatum* may be particularly sensitive demographically because it produces only a single clutch of 6-17 eggs (average of 11-12) per year and is a late maturing species (typically two full years) (Stebbins, 1954; Howard, 1974; Pianka and Parker, 1975; Goldberg,

TABLE 1. Estimated number of horned lizards collected by the curio trade between 1885 and 1930. See text for further explanation.

Years	Number collected/ year	Totals
1885-1890	1000/year	5000
1890-1910	5000/year	100,000
1910-1930	500/year	10,000
Total for 45 years:		115,000

1983). If *P. coronatum* resembles the closely related *P. platyrhinos* of nearby desert areas (see Medica et al., 1973), then the low annual survivorship of young (26-38%) versus the relatively high annual survivorship of adults (55-75%) would probably result in the drastic depletion of local populations after only a decade of intensive collecting of adult lizards. This result appears to have happened in much of the Los Angeles Basin in the Pasadena area around the turn of the century.

As horned lizard populations declined in the Los Angeles Basin, collectors moved to outlying areas to supply the demand. Tower (1902) reported exploitation of *P. platyrhinos* from the nearby Mojave Desert, and other areas in southern California (such as San Diego) may have also provided specimens for the curio trade as they were the source of hundreds of horned lizards introduced into Hawaii (Anonymous, 1895a, b).

The horned lizard curio trade seems to have declined abruptly after 1910. The reasons for this decline probably include over-exploitation, reduced demand for stuffed curios, the retirement of Wakeley in 1917, and extensive habitat destruction related to agricultural development (Grinnell and Grinnell, 1907) and urbanization (Goldberg, 1983).

There has long been an extensive curio trade in the United States for such diverse items as live and stuffed juvenile spectacled caimans (*Caiman crocodilus*), live "American Chameleons" (*Anolis carolinensis*), and "baby turtles" (*Chrysemys* spp. and *Pseudemys* spp.) (Carr, 1952; Oliver, 1955; Schmidt and Inger, 1957; Busack, 1974; Conant, 1975; Pritchard, 1979; Groombridge, 1982; Jennings, unpubl. data). Unfortunately, little information is available regarding the negative impact of these curio trades on native reptile populations (see Groombridge, 1982). This paper provides evidence that due to their vulnerability, horned lizard populations are particularly susceptible to over-collecting. Significantly, the first law in New Mexico protecting a reptile was passed in 1941 to protect the remaining stocks of horned lizards in the Albuquerque area from the local curio trade (Anonymous, 1941) and other states such as Arizona soon followed suit (Killian, 1954; Parker, 1954). Other undocumented examples of over-collecting probably existed in similar large towns in the southwest in the twentieth century based on the comments of Scheffer (1930).

Phrynosoma c. blainvillii is currently listed as "Indeterminate" by the I.U.C.N. (Honegger, 1975;

I.U.C.N., in press), and as a species of "Special Concern" by the State of California (Jennings, 1983). Although present federal and state laws prevent further commercial exploitation of this lizard (Stewart, 1971; Collette and King, 1973; King, 1974), it is significant to note that its present status was brought about by a combination of over-collecting and habitat destruction over the past 100 years that has almost eliminated this subspecies from the Los Angeles Basin. Since viable populations of this lizard are still present in surrounding areas, it is not in danger of immediate extinction (Bury, 1972). However, continued urbanization in southern California and increased use of more remote areas that include suitable lizard habitat continue to threaten remaining populations.

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