

Misidentifications of Sea Turtles in the East Pacific: *Caretta caretta* and *Lepidochelys olivacea*

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ABSTRACT.—A reinvestigation of several records and specimens of marine turtles in the East Pacific, and subsequent publications referring to these, revealed a series of long-standing errors, that are still being perpetrated, and stem mainly from an old confusion between *Caretta caretta* and *Lepidochelys olivacea*. The reidentifications proposed herein result in reduced distributional, breeding and historic records of *C. caretta* and invalidate taxonomic combinations formerly used for this species. Distributional and historic records for *L. olivacea* must also be modified.

"*Thalassochelys*" was proposed by Fitzinger (1835:128) as the second "Sectio" of the genus *Chelonia*, but the list of species in the synonymy under *Thalassochelys* is large and seems to include most of today's genera of extant sea turtles. Subsequent use of *Thalassochelys* has thus resulted in taxonomic confusion, although it was used mainly for species which today are referred to the genera *Caretta* Rafinesque 1814 or to *Lepidochelys* Fitzinger 1843, respectively the Loggerhead and Ridley turtles. Not only has the nomenclature been confused, but the perception of distinct genera and their identifications has been inconsistent: see, for example, Van Denburgh's (1922:998) description of "*Caretta olivacea*" and Pope's (1935:24) description of "*Caretta caretta olivacea*," each of which include characteristics of both *Caretta caretta* (L.) and *Lepidochelys olivacea* (Eschscholtz). Deraniyagala championed the recognition of distinct genera, first proposing three forms, *Caretta*, *Lepidochelys* and *Colopchelys* (1934) and then settling on two, *Caretta* and *Lepidochelys* (1939:Errata et Addenda, 1943, 1952), as is now accepted. Although several authors have described the past taxonomic confusion (e.g., Loveridge and Williams, 1957:470; Brongersma, 1961:2 ff.; Donoso-Barros, 1966:81; Pritchard, 1969:4 ff.), problems persist and bedevil nomenclature, synonymies,

historic records, and breeding records. Brongersma (1982:410) has described how this problem has confused information from west African waters. Four cases of misidentification relevant to the East Pacific are discussed in detail below in an effort to describe the history of these problems and illustrate the critical characters needed to correctly identify the specimens involved. Museum abbreviations are as in Leviton et al. (1980); collection numbers are indicated where available.

DISCUSSION

1. *Thalassiochelys tarapacona* sp. nov. Philippi (1887a:85) [MNHNS 100225] and *Thalassochelys controversa* sp. nov. Philippi (1899:732) [MNHNS 100226].

Philippi (March 1887a) named a new species of sea turtle, *Thalassiochelys tarapacona*, giving a description so brief that the name is little more than a nomen nudum; possibly for this reason some taxonomists have not included this name in synonymies (see below). Three months after this first publication Philippi (June 1887b) mentioned a specimen of *Thalassochelys* from Iquique, correcting the generic spelling but not giving a species name. Boulenger (1888:25) listed "*Thalassochelys tarapacona* n. sp. Philippi . . . p. 85," combining the corrected genus spelling with the previ-

ously mentioned species. Even further "editorial liberty" was taken by Boettger (1888:221) who listed *Thalassochelys tarapacana* Philippi, "correcting" the spelling of the species name to match that of the province of Tarapaca, where the town of Iquique is found. This spelling of the species name is consistent with that used later by Philippi (1899:731, 1901:111), and the first spelling evidently had a typographical error.

The first useful description of this specimen was given by Philippi (1899:731) who had added (pg. 732) an additional new species *Thalassochelys controversa* (named because it had given rise to controversy!). His descriptions of his specimens include features characteristic of *Lepidochelys olivacea*, but rare in *Caretta caretta*. *T. tarapacana* had six vertebrals, very thin dorsal scutes, an olivaceous carapace, and large hallux claws. *T. controversa* had a curved carapace width equal to curved carapace length, six (pairs) of pleurals, and dark coloration. Philippi (1899:734) stated that the museum had a carapace and two complete specimens of *T. controversa* although he described only one in detail, and apparently only one still exists (Núñez, pers. comm.). Philippi maintained that the specimen of *T. tarapacana* was different at a species level from the examples of *T. controversa*, and that both species were distinct from *T. caretta* and *T. olivacea*.

Philippi (1901) again published descriptions of these new species in German. His orthography was nothing if not inconsistent: the generic spellings changed from "*Thalassiochelys*" (1887a:84) to "*Thalassochelys*" (1887b:212, 1899:731) to "*Thalassochelis*" (1901:111).

Later, Boulenger (1889, 1900) listed Philippi's species in the synonymy of *Thalassochelys caretta*. Siebenrock (1909) listed them under *Caretta caretta*.

Deraniyagala (1943:82, footnote) stated that T. Barbour, of Harvard, had informed him that "several sea turtles described by Philippi from Chili are [s]ynonymous with this species [*Lepi-*

dochelys olivacea olivacea]." This comment seems to have been generally overlooked.

Yáñez (1951:14) argued that all of Philippi's specimens of *Thalassachelys* [sic] were *Lepidochelys olivacea*, and showed a photo and line drawing which clearly illustrate his point. Donoso-Barros (1966) agreed with Yáñez, and there seems to be general acceptance that at least *T. controversa* is synonymous with *L. olivacea* (Carr, 1952; Loveridge and Williams, 1957; Loveridge, 1957; Smith and Smith, 1979). Exceptions are Mertens and Wermuth (1955) and Wermuth and Mertens (1961, 1977) who listed both *Thalassiochelys tarapacana* and *Thalassochelys controversa* in the synonymy of *Caretta caretta* and *Caretta caretta gigas*, respectively; however, they preceded the Philippi names with question marks.

Unfortunately, Yáñez' (1951) reidentification of *T. tarapacana* has been ignored, although it is unclear why since it was proposed together with that for *T. controversa*. (Many colleagues are unfamiliar with Yáñez' 1951 work, which was, however, cited frequently in Donoso-Barros, 1966.) Carr (1952) hinted that *tarapacana* might be a race of *C. caretta* from the East Pacific; Loveridge and Williams (1957) listed both *Thalassiochelys tarapacana* and *Thalassochelys tarapacana* as synonyms for *C. caretta*; Loveridge (1957:168) listed "*Thalassochelys tarapacana* (sic) Philippi" under *C. caretta*, using the spelling of Boulenger (1888), and Caldwell (1962:24) offered the name "*Caretta caretta tarapacana* (Philippi, 1899:731)."

Smith and Smith (1976:T-B-2, T-C-3, T-E-2) listed *C. c. tarapacana* as a junior synonym for *C. c. gigas*, formerly using the name in a synonymy, but misspelling it. Later (1979:307) they corrected the spelling and proposed that "*Caretta caretta tarapacana* (Philippi) Caldwell" had seniority over the more commonly used *C. c. gigas* of Deraniyagala (1933) (one might question if *tarapacana* is not Philippi's senior name). Recently, Ernst



FIG. 1. Dorsal view of the left side of the holotype of *Thalassochelys tarapacana* Philippi [MNHNS 100225], showing wide shell, elongated vertebral scutes, and lack of a prepygeal knob; H. Núñez has chalked in most inter-scute sutures; photo by H. Núñez.

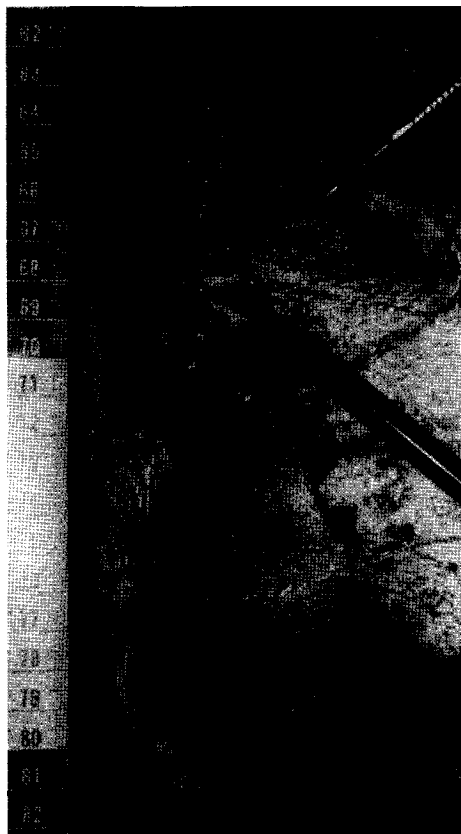


FIG. 2. Ventral view of the holotype of *Thalassochelys tarapacana* Philippi [MNHNS 100225], showing left inframarginal scutes, the posterior two with conspicuous pores (indicated by pencil tips).

(1982) commented that Smith and Smith's trinomial is unfamiliar, but he implied that it is a valid name.

Philippi's specimens show clear characteristics of *L. olivacea*. Both *T. tarapacana* and *T. controversa* have rectangular (not polygonal) 2nd and 3rd vertebrals; at least six (not five) pleurals on each side; platter-shaped carapaces that are wider than long and highly domed anteriorly but without prepygeal knobs; four pairs of inframarginals, some with a conspicuous pore; a large inframandibular scale on each side of the lower jaw; and a hooked upper beak (Figs. 1 to 3). Therefore, the use of either "*tarapacana*" (or variant spellings) or "*controversa*" in combination with *C. caretta* is incorrect, and all of Philippi's (1887a,

1887b, 1899, 1901) specimens of *Thalassochelys* are *L. olivacea*. This is in agreement with Yáñez (1951) and Donoso-Barros (1966) who also examined these specimens. Frazier and Salas (1984) discuss these, and other Chilean, specimens.

A partial synonymy for these specimens is as follows:

- Thalassiochelys tarapacona* Philippi, 1887a:
85;
Thalassochelys [sp.], Philippi, 1887b:
212;
Thalassochelys tarapacona, Boulenger,
1888:25;

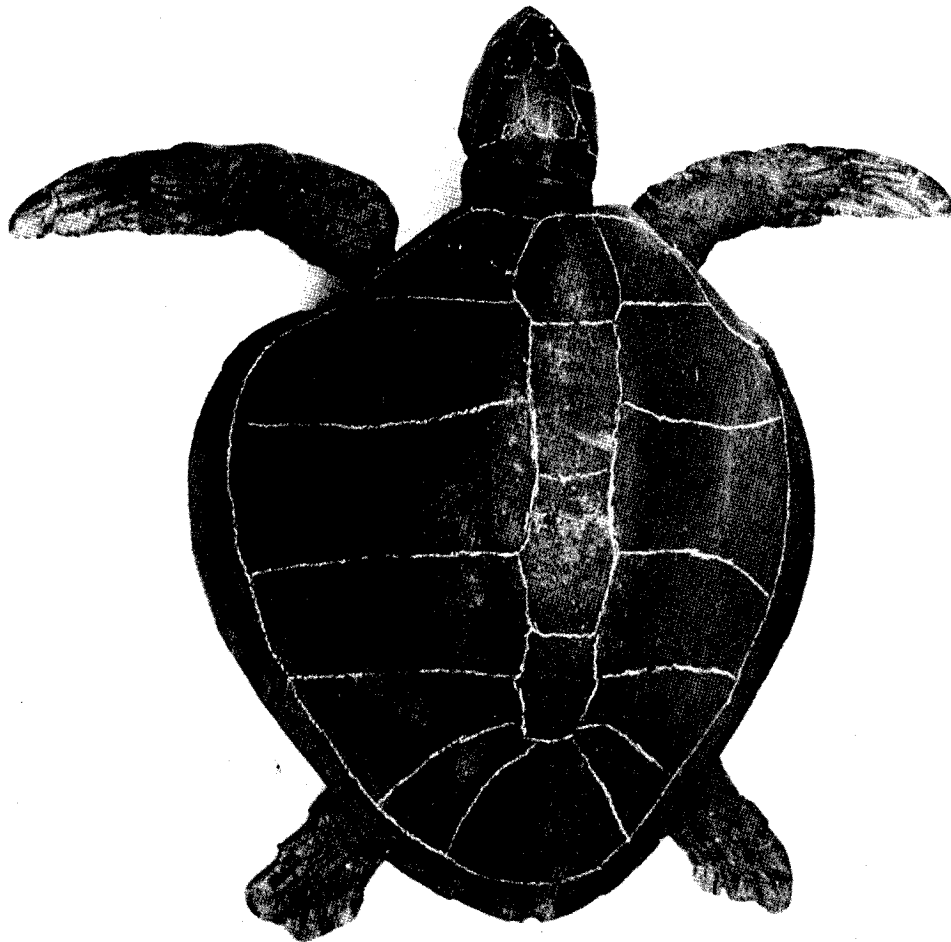


FIG. 3. Oblique dorsal view of the syntype of *Thalassochelys controversa* Philippi [MNHNS 100226], showing wide shell, six pairs of pleural scutes, and the lack of a prepygeal knob; H. Núñez has chalked in most of the inter-scute sutures; photo by H. Núñez.

Thalassochelys tarapacana, Boettger, 1888:221; Philippi, 1899:731;

Thalassochelys caretta, Boulenger, 1889:185; 1900:25;

Thalassochelis tarapacana, Philippi, 1901:111;

Caretta caretta, Siebenrock, 1909:550; Loveridge & Williams, 1957:491; Loveridge, 1957:167;

Lepidochelys olivacea, Yáñez, 1951:13; Donoso-Barros, 1966:81;

Caretta caretta gigas, Carr, 1952:394 (1973:394);

? *Caretta caretta gigas*, Mertens & Wermuth, 1955:383; Wermuth & Mertens, 1961:233;

Caretta caretta tarapacana, Caldwell, 1962:24; Smith & Smith, 1979:307;

Caretta caretta tarapacana, Smith & Smith, 1976: T-B-2, T-C-3, T-E-2;

? *Caretta caretta*, Wermuth & Mertens, 1977:94.

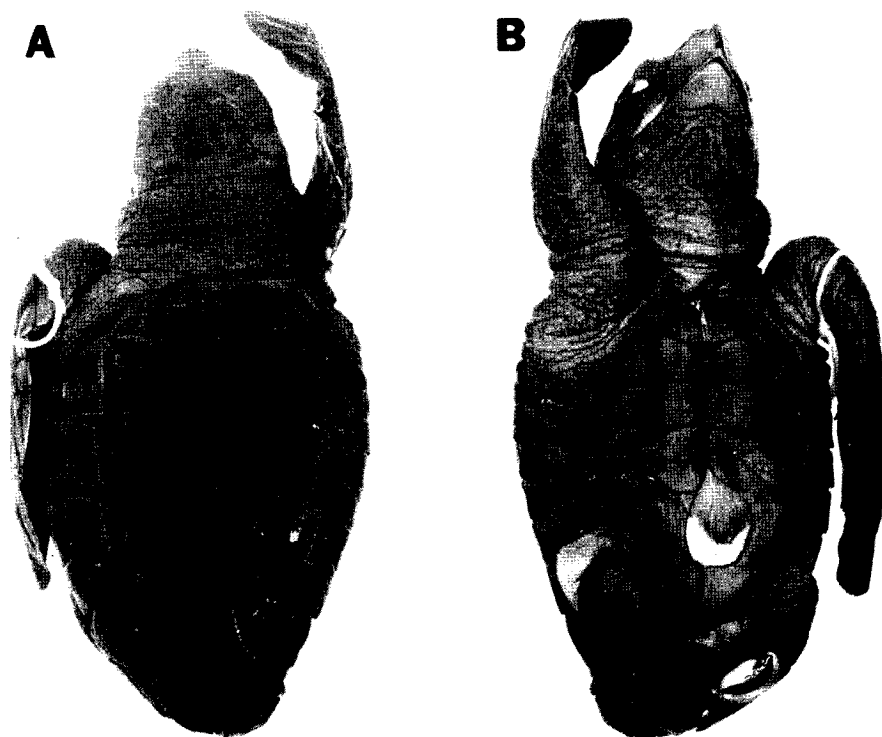


FIG. 4. *Lepidochelys olivacea* [BM 1881.10.1.12]: A. Dorsal view showing six pairs of pleural scutes and a dark dorsal color; B. Ventral view showing a large inframandibular scale on either side, four right inframarginal scutes and dark ventral color.

Thalassochelys controversa Philippi, 1899: 732;

Thalassochelys caretta, Boulenger, 1900: 25;

Thalassochelis controversa, Philippi, 1901:112;

Caretta caretta, Siebenrock, 1909:550;

Lepidochelys olivacea, Carr, 1952:404 (1973:404) [as "*Thalassochelis controversa*" (sic)]; Yáñez, 1951:13; Donoso-Barros, 1966:81; Smith & Smith, 1979:326;

? *Caretta caretta gigas*, Mertens & Wermuth, 1955:384; Wermuth & Mertens, 1961:235;

Lepidochelys olivacea olivacea, Lovelidge & Williams, 1957:495; Lovelidge, 1957:168;

? *Caretta caretta*, Wermuth & Mertens, 1977:94.

It is notable that Stejneger (1907:485, 506) had doubts about the validity of Philippi's (1899) new species and, thus, did not include them in any of his synonymies.

2. *Caretta caretta* fide Boulenger (1889) [BM 1881.10.1.11 & 1881.10.1.12].

Boulenger (1889:186) listed the following under *Thalassochelys caretta*: "γ-δ. Yg., spir. Mazatlan. Mr. A. Forrer [C.]." According to Smith and Smith (1979: 311) this is the earliest record of *Caretta caretta* from Mexico (hence also the first record for the East Pacific). Both of these

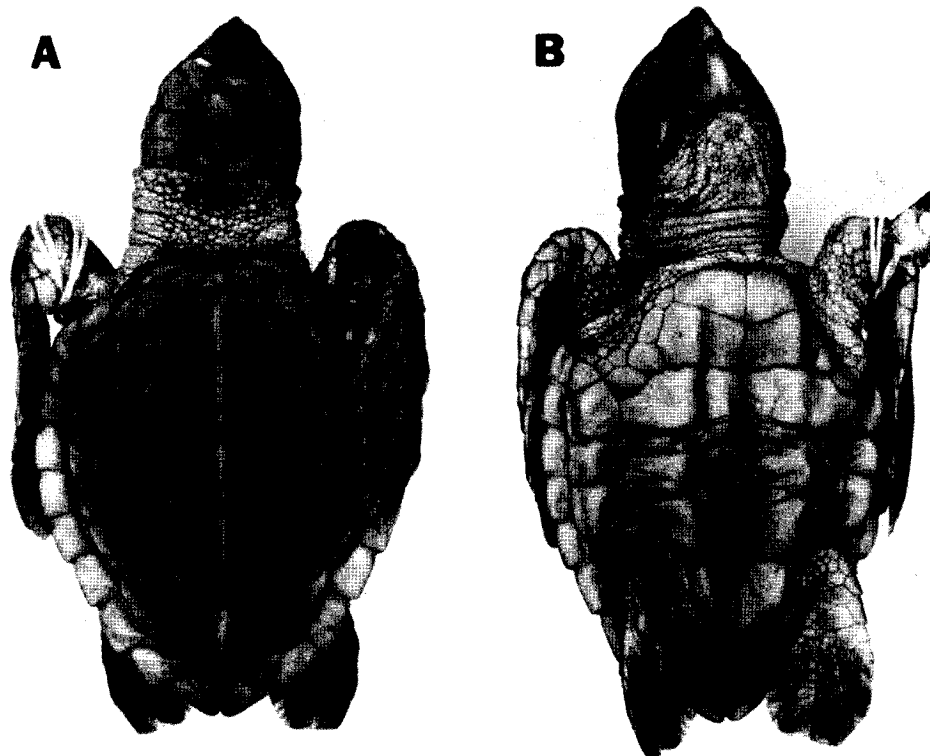


FIG. 5. *Caretta caretta* [USNM 55728]: A. Dorsal view showing five pairs of pleural scutes and light dorsal color; B. Ventral view showing three right inframandibular scales of similar size, three pairs of inframarginal scutes and light ventral color.

specimens (Fig. 4) have six pairs of pleural scales, four pairs of inframarginal scales, a pair of large inframandibular scales, and dark color dorsally and ventrally, characters typical of *Lepidochelys olivacea* and extremely rare in *Caretta caretta*. For comparison, a typical hatchling of *C. caretta* is illustrated herein (Fig. 5), showing five pairs of pleurals, three pairs of inframarginals, three circular inframandibulars on each side, and relatively light color dorsally and ventrally.

The locality data are also consistent with the reidentification. Deraniyagala (1938:66-67) described a newly hatched *L. olivacea* from Mazatlan, and the species is known to nest in large numbers in this locality (Márquez et al., 1976:

15). On the other hand, *C. caretta* is not known to nest anywhere in the East Pacific (Frazier, MS).

Therefore, Boulenger's (1889) identification was in error (possibly because he assumed that *L. olivacea* was a synonym of *Thalassochelys caretta*) and so were subsequent listings of these specimens as *C. caretta* (e.g., Hardy and McDiarmid, 1969:108; Smith and Smith, 1979). It is noteworthy that these two turtles had been reidentified as *L. olivacea* at the British Museum previous to this study; this may have been done by Deraniyagala who mentioned (1939:163) "newly hatched young from West Mexico . . . in the British Museum."

Smith and Smith (1979:332) listed two records of *L. olivacea* in Mexico earlier

than Boulenger (1889), but they state that the locality data are imprecise for both of these. Gray (1873b:408) described the new species, *Cephalochelys oceanicus* "from the west coast of America, probably Mexico." Brongersma (1961) identified this specimen as *L. olivacea*, and if a subspecific name is needed for *Lepidochelys olivacea* in the East Pacific, as Smith and Smith (1979:328) argue, *oceanicus* is available. Sumichrast (1880:169) reported, with some uncertainty, "*C. olivacea* Esch." from the Gulf of Tehuantepec. Although there is no evidence of this specimen in Paris (Bour, pers. comm.), his identification is substantiated by the type for *Caretta remivaga* [USNM 243,393; formerly 09973] which is labeled as collected by Sumichrast in Ventosa Bay (Gulf of Tehuantepec), Mexico (Hay 1908:194). Deraniyagala correctly reidentified this specimen as *L. olivacea* (1938, 1939).

It is worth reviewing the nomenclatural history of these two specimens of *L. olivacea* from the East Pacific which have also caused taxonomic problems in the past.

- Cephalochelys oceanica* Gray, 1873a:91 [nomen nudum]; 1873b:408;
Thalassochelys caouana, Garman, 1884:301;
Thalassochelys caretta, Boulenger, 1889:185;
 ? *Caretta caretta gigas*, Mertens & Wermuth, 1955:383; Wermuth & Mertens, 1961:233;
Caretta caretta, Loveridge & Williams, 1957:491; Loveridge, 1957:167; Wermuth & Mertens, 1977:93 (in the synonymy of the genus *Caretta*);
Lepidochelys olivacea, Brongersma, 1961:28, 30, 31, fig. 8c; Wermuth & Mertens, 1977:98; Smith & Smith, 1979:326;
Caretta caretta gigas, Smith & Smith, 1976:T-B-3, T-C-3.

Note: *Cephalochelys* is mentioned by Deraniyagala (1939:405) referring to his

page 163, but on that page the name is not mentioned.

- Caretta remivaga* Hay, 1908:194, pl. 10 figs. 1-3, pl. 11 fig. 5;
Caretta olivacea, Deraniyagala, 1933:63, 66;
Lepidochelys olivacea, Deraniyagala, 1938:67, 1939:124, 163; Smith & Taylor, 1950:15; Carr, 1952:404 (1973:404); Wermuth & Mertens, 1977:98; Smith & Smith, 1976:T-B-3, T-C-12, T-E-2, 1979:326;
Lepidochelys olivacea remivaga, Schmidt, 1953:107; Mertens & Wermuth, 1955:386; Taylor, 1970:143;
Lepidochelys olivacea olivacea, Wermuth & Mertens, 1961:242; Loveridge & Williams, 1957:495; Loveridge, 1957:168.

In conclusion, the first definite locality record of *Lepidochelys olivacea* in the East Pacific is based on hatchlings reported by Boulenger (1889) under the name *Thalassochelys caretta*.

3. *Lepidochelys olivacea* fide Shaw (1946) [SDNHM 56552].

Shaw (1946) reported an immature turtle from the northwest coast of Baja California. He concluded that it was an abnormal *Lepidochelys olivacea*, describing characters that can be grouped as either normal to *C. caretta*, or normal to *L. olivacea*, or common to both of these two species:

- C. caretta*—pleurals: 5 pairs; inframarginals: poreless, except 4th left; color: red-brown; inframandibulars: 2 equal-sized;
L. olivacea—inframarginals: 4 pairs; both species—ventral color: yellow; alveolar ridge: prominent; limbs: two clawed; postanal: present.

Carr (1952:395) questioned Shaw's (1946) identification of this specimen and Caldwell (1962:23, 24) later argued that it was *C. caretta*. Márquez (1969) and others (e.g., Fritts and Stinson, MS) have concurred with this reidentification, and

Brongersma (1961:3) discussed the number of inframarginals in *C. caretta* showing that it is variable. Yet Shaw's record continues to becloud the literature. Smith and Smith (1979:310) listed this specimen (via Caldwell, 1962) as a locality record for *C. caretta* in Baja California Norte, but they also (pg. 330) listed the original citation (Shaw, 1946) as a record for *Lepidochelys olivacea* from Baja California Norte. Although the confusion is understandable, one specimen cannot validate two records (a similar problem arises in Smith and Smith [1979:310], where a record of *C. caretta* from San Felipe, is attributed to Caldwell [1962:23] and the next entry is Shaw's [1947] record from between Bahía Ometepe and the Colorado River—in fact, Caldwell was citing Shaw's 1947 record).

Shaw's (1946) photographs are identifiable as *C. caretta*, and the skull of this animal (SDNHM 56552) clearly shows the maxillaries in contact, not separated by the vomer (Fig. 6). Carr (1952) and Caldwell (1962) were correct in contesting Shaw's (1946) identification, for the specimen is *C. caretta*.

Hence, Shaw's 1947 note is not the earliest record of *C. caretta*, but was predated by his 1946 account. The latter is both the first specimen from Mexico, and the first record of *C. caretta* from the East Pacific.

4. *Caretta caretta gigas* fide Brattstrom (1955).

Brattstrom (1955:220), while studying in the Revillagigedo Islands of Mexico, reported a "young, and apparently just hatched, *Caretta c. gigas*" from the stomach of a Clarion Island Racer, *Masticophis thompsoni* (Stejneger). This record is unique for two reasons: it is the first indication of *C. caretta* breeding anywhere in the East Pacific; it is the first record of predation on sea turtles by snakes. The latter phenomenon has since been confirmed numerous times and forms an intriguing facet in the

feeding ecology of these island dwelling snakes (Brattstrom, pers. comm.). The identity of the turtle is, however, inconsistent with other information. In almost 30 years of observations, Brattstrom (1982) has seen only evidence of *Chelonia mydas agassizii* Bocourt nesting in the Revillagigedos; in 1905 Slevin found only *Chelonia mydas* at Socorro Island, some of which were reproductively active (Fritts, 1981; Fritts and Fritts, 1982:5). Suggestions that *L. olivacea* nests on the Revillagigedos (Márquez et al., 1976:15) were based on hearsay from fishermen and have never been substantiated (Márquez, pers. comm.), but there are enormous nesting aggregations of *L. olivacea* on mainland Mexico (Márquez et al., 1976:15). This species is also suspected to nest near the southern end of Baja California (Fritts et al., 1982), but there is no known breeding of *C. caretta* anywhere in the region (Frazier and Salas, 1983; Frazier, MS).

The specimen in question is not in the California Academy of Sciences (Simmons, pers. comm.) nor the Los Angeles County Museum, and it seems to have been lost (Brattstrom, pers. comm.).

Given the lack of corroborative data over a period of nearly three decades, Brattstrom's (1955) record must be questioned. If nesting by a turtle other than *C. mydas* does occur in the Revillagigedo Islands, it is much more likely to be *L. olivacea* than *C. caretta*, although there is no information to support the contention that more than one species nests. Hatchlings of other species may appear from elsewhere: there are literally millions of *L. olivacea* hatching on mainland beaches of Pacific Mexico every year, and it is probable that occasionally one is swept out to sea and stranded on Clarion, 1000 km away. Hughes (1974: Table 1) reported that hatchlings of *C. caretta* could be swept 1650 km in 48 to 102 days down the coast of South Africa, and some washed ashore alive. Brattstrom's hatchling may have been a mis-



FIG. 6. Ventral view of cranium of *Caretta caretta* [SDNHM 56552] showing maxillaries in contact, not separated by vomer.

identified *Lepidochelys olivacea* or *Chelonia mydas*. If the former, it was probably not from a nest on Clarion.

CONCLUSIONS

Neither of Philippi's (1899) names used with *Thalassochelys* (or variant generic spellings) is available for *Caretta* as has been claimed, because his specimens are *Lepidochelys*. Boulenger (1889) is not the first record of *C. caretta* from Mexico, but instead the first unquestionable record of *L. olivacea* in the East

Pacific with precise locality data. The confusion around Shaw's (1946) specimen should have been cleared up in 1962 by Caldwell's reidentification. It is in fact the first specimen of *C. caretta* from Mexico, or the East Pacific, despite the claims of Shaw's paper a year later (1947). Most significant of all are queries regarding Brattstrom's (1955) report, the only record of *Caretta* from an East Pacific island, and the only breeding record for this species from the East Pacific. Because of the lack of a voucher

specimen and the inconsistency of other evidence, this record must be questioned. Apparent locality records of *Caretta* in Chile (Philippi, 1887a, b, 1889, 1901); Mazatlan, Mexico (Boulenger, 1889); and Revillagigedo Islands, Mexico (Brattstrom, 1955) have to be rejected, as they refer to *Lepidochelys* or an equivocal record.

While seemingly esoteric, these reidentifications affect synonymies, historical records, breeding records and range records. In any discussion of the distribution and status of these turtles in the East Pacific (Frazier and Salas, 1983; Frazier, MS) it is essential that the identifications of the animals under discussion be correct and unequivocal.

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LITERATURE CITED

- BOETTGER, O. 1888. Bericht über die Leistungen in der Herpetologie während des Jahres 1887. Arch. Natg. 54, vol. 2:157-256.
- BOULENGER, G. A. 1888. Reptilia and Batrachia. Zoological Record (1887). Vol. 24:1-24.
- . 1889. Catalogue of the Chelonians, Rhynchocephalians, and Crocodiles in the British Museum (Natural History). Taylor and Francis, London. 311 pp.
- . 1900. IV. Reptilia and Batrachia. Zoological Record (1899). Vol. 36:1-31.
- BRATTSTROM, B. H. 1955. Notes on the herpetology of the Revillagigedo Islands, Mexico. Amer. Midl. Natur. 54:219-229.
- . 1982. Breeding of the green sea turtle, *Chelonia mydas*, on the Islas Revillagigedo, Mexico. Herp. Review 13:71.
- BRONGERSMA, L. D. 1961. Notes upon some sea turtles. Zool. Verh., Leiden 51:1-46.
- . 1982. Marine turtles of the eastern Atlantic Ocean. In K. A. Bjorndal (ed.), Biology and Conservation of Sea Turtles. Pp. 407-416. Smithsonian Institution Press, Washington, D.C.
- CALDWELL, D. K. 1962. Sea turtles in Baja Californian waters (with special reference to those of the Gulf of California), and the description of a new subspecies of northeastern Pacific green turtle. Contr. Sci., Los Angeles Co. Mus. 61:1-31.
- CARR, A. 1952. Handbook of Turtles. The Turtles of the United States, Canada and Baja California. Cornell University Press, Ithaca. 542 pp. [Reprinted 1973.]
- DERANIYAGALA, P. E. P. 1933. The loggerhead turtles (Carettidae) of Ceylon. Ceylon J. Sci. (B) 18:61-72.
- . 1934. Relationships among loggerhead Turtles (Carettidae). Ceylon J. Sci. (B) 18:207-209.
- . 1938. The loggerhead turtles in the National Museum of Ireland, with special reference to those taken in Irish waters. Irish Natural. J. 7:66-70.
- . 1939. The tetrapod reptiles of Ceylon. Dulau & Co. Ltd., London. Errata et Addenda, xxxiii + 412 pp.
- . 1943. Subspecies formation in loggerhead turtles (Carittidae). Spol. Zey. 23:79-92.
- . 1952. The loggerhead turtles (Caretinae) of Europe. Herpetologica 8:57-58.
- DONOSO-BARROS, R. 1966. Reptiles de Chile. Universidad de Chile, Santiago. 458 pp.
- ERNST, C. H. 1982. Book review: Synopsis of the herpetofauna of Mexico, Volume VI. Guide to Mexican turtles and bibliographic addendum III. Herp. Review 13:98-99.
- FITZINGER, L. 1835. Entwurf einer systematischen Anordnung der Schildkröten nach den Grundsätzen der natürlichen Methode. Ann. Wiener Mus. 1:103-128.
- . 1843. Systema Reptilium: Fasciculus Primus: Amblyglossae Vindobonae. 106 pp.
- FRAZIER, J., AND S. SALAS. 1983. The marine turtle situation in the East Pacific. Chelonian Documentation Center Newsletter 2:7-10.
- , AND ———. 1984. Tortugas marinas en Chile. Boletín Museo Nacional Historia Natural, Santiago 39(1982):63-73.
- FRITTS, T. H. 1981. Marine turtles of the Galapagos Islands and adjacent areas of the eastern Pacific on the basis of observations made by J. R. Slevin 1905-1906. J. Herpetol. 15:293-301.
- , AND P. R. FRITTS. 1982. Race with extinction: herpetological notes of J. R. Slevin's journey to the Galapagos, 1905-1906. Herpetological Monographs No. 1:98 pp.
- , M. S. STINSON, AND R. MÁRQUEZ M. 1982. The status of sea turtle nesting in southern Baja California, Mexico. Bull. Southern Calif. Acad. Sci. 81:51-60.

- GARMAN, S. 1884. The reptiles of Bermuda. Bull. U.S. Nat. Mus. 25:285-303.
- GRAY, J. E. 1873a. Hand List of the Specimens of Shield Reptiles in the British Museum. London. E. Newman. 124 pp.
- . 1873b. Notes on the genera of turtles (*Otiacopodes*), and especially on their skeletons and skulls. Proc. Zool. Soc. Pp. 395-411.
- HARDY, L. M., AND R. W. MCDIARMID. 1969. The amphibians and reptiles of Sinaloa, Mexico. Univ. Kansas Publs. Mus. Nat. Hist. 18:39-252.
- HAY, O. P. 1908. On three existing species of sea-turtle, one of them (*Caretta remivaga*) new. Proc. U.S. Nat. Mus. 34:183-198.
- HUGHES, G. R. 1974. The sea turtles of south-east Africa. II. The biology of the Tongaland loggerhead turtle *Caretta caretta* L. with comments on the leatherback turtle *Dermochelys coriacea* L. and the green turtle *Chelonia mydas* L. in the study region. Investigational Report, Oceanographic Research Institute-Durban. N° 36. 96 pp.
- LEVITON, A. E., R. W. MCDIARMID, S. MOODY, M. NICKERSON, J. ROSADO, O. SOKOL, AND H. VORIS. 1980. Museum acronyms—second edition. Herp. Review 11:93-102.
- LOVERIDGE, A. 1957. Check List of the Reptiles and Amphibians of East Africa (Uganda; Kenya; Tanganyika; Zanzibar). Bull. Mus. Comp. Zool. 117:151-362.
- , AND E. E. WILLIAMS. 1957. Revision of the African tortoises and turtles of the suborder Cryptodira. Bull. Mus. Comp. Zool. 115:163-557.
- MÁRQUEZ M., R. 1969. Additional records of the Pacific loggerhead turtle, *Caretta caretta gigas*, from the north Mexican Pacific coast. J. Herpetol. 3:108-110.
- , A. VILLANUEVA O., AND C. PEÑAFLORES S. 1976. Sinopsis de datos biológicos sobre la tortuga golfinia *Lepidochelys olivacea* (Eschscholtz, 1829). Instituto Nacional de Pesca, Sinopsis sobre la Pesca N° 2. 61 pp.
- MERTENS, R., AND H. WERMUTH. 1955. Die rezenten Schildkröten, Krokodile und Brückenechsen. Zool. Jahrb. Syst. 83:323-440.
- PHILIPPI, R. A. 1887a. Vorläufige Nachricht über die chilenischen Seeschildkröten und einige Fische der chilenischen Küste. Zoologische Garten 28:84-88.
- . 1887b. Vorläufige Nachricht über einige Schildkröten und Fische der chilenischen Küste. Verhandl. deutsch. Wissensch. Ver., Santiago 1:210-213.
- . 1899. Las tortugas chilenas. Anales de la Universidad, Chile 104:727-736.
- . 1901. Die Seeschildkröten Chile's. Archiv für Naturgeschichte. Jahrgang 67, 1:109-114.
- POPE, C. H. 1935. The Reptiles of China. The American Museum of Natural History, New York. 604 pp.
- PRITCHARD, P. C. H. 1969. Studies of the systematics and reproductive cycles of the genus *Lepidochelys*. Unpublished Ph.D. Thesis, University of Florida, Gainesville. 197 pp.
- RAFINESQUE, C. S. 1814. Specchio delle Scienze (Palermo), 2, N° 9, p. 66.
- SCHMIDT, K. P. 1953. A Check list of North American Amphibians and Reptiles. 6th ed. American Society of Ichthyologists and Herpetologists/The University of Chicago Press, Chicago. 280 pp.
- SHAW, C. E. 1946. An anomalous Pacific loggerhead turtle from the northwestern coast of Baja California. Herpetologica 3:123-124.
- . 1947. First records of the red-brown loggerhead turtle from the eastern Pacific. Herpetologica 4:55-56.
- SIEBENROCK, F. 1909. Synopsis der rezenten Schildkröten, mit Berücksichtigung der in historischer Zeit ausgestorbenen Arten. Zool. Jahrb., Suppl. 10, 3:427-618.
- SMITH, H. M., AND R. B. SMITH. 1976. Synopsis of the Herpetofauna of Mexico: Volume III. Source Analysis and Index for Mexican Reptiles. John Johnson, Vermont. Pag. var.
- , AND R. B. SMITH. 1979 (released 1980). Synopsis of the Herpetofauna of Mexico: Volume VI. Guide to the Mexican Turtles, Bibliographic Addendum III. John Johnson, Vermont. 1044 pp.
- , AND E. H. TAYLOR. 1950. An Annotated Checklist and Key to the Reptiles of Mexico Exclusive of the Snakes. U.S. Nat. Mus. 199:253 pp.
- STEJNEGER, L. 1907. Herpetology of Japan and Adjacent Territory. Bull. U.S. Nat. Mus. No. 58. 577 pp.
- SUMICHRIST, F. 1880. Contribution à l'histoire naturelle du Mexique. 1. Notes sur une collection de reptiles et de batraciens de la partie occidentale de l'Isthme de Tehuantepec. Bull. Soc. Zool. France 5:162-190.
- TAYLOR, E. H. 1970. The turtles and crocodiles of Thailand and adjacent waters with a synoptic herpetological bibliography. Univ. Kansas Sci. Bull. 49:87-179.
- VAN DENBURGH, J. 1922. The reptiles of western North America. Part II. Snakes and turtles. Occ. Pap. California Acad. Sci. 10:615-1028.
- WERMUTH, H., AND R. MERTENS. 1961. Schildkröten. Krokodile. Brückenechsen. Gustav Fischer, Jena. 422 pp.
- , AND R. MERTENS. 1977. Liste der rezenten Amphibien und Reptilien. Testudines, Crocodilia, Rhynchocephalia. Tierreich Lieferung 100. 174 pp.
- YÁÑEZ A., P. 1951. Vertebrados marinos chilenos. Revista Biología Marina (Valparaíso) 3:1-18.

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