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On the Availability of the Name *Dermochelys coriacea schlegelii* (Garman, 1884) as a Species or Subspecies of Leatherback Turtle

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ABSTRACT. – **The nomenclatural history of the name *Dermochelys coriacea schlegelii* (Garman, 1884) (originally *Sphargis schlegelii*) is presented along with an analysis of its potential type material. The previous restriction of the type locality to "Guaymas, Mexico" by Smith and Taylor (1950) is erroneous; the actual source of the type material is more likely to be Japan. Thus, even if the eastern Pacific populations of *D. coriacea* are distinctive, the name *schlegelii* is not available for them.**

KEY WORDS. – **Reptilia; Testudines; Dermochelyidae; *Dermochelys coriacea schlegelii*; sea turtle; nomenclature; type locality; type restriction; Mexico; Japan**

Editorial Preface. — In this journal in 1995 (*Chelonian Conservation and Biology* 1(3):244–247) I alluded to a manuscript on nomenclature of leatherback turtles prepared by the late Professor Leo Brongersma and sent to me as a personal communication nearly a decade ago. At that time, I recommended that this manuscript should be published eventually. It is presented below. Editorial changes are minimal — no more than the addition of a title, correction of minor typographic errors, and, in a few places, occasional rewording of Brongersma's always correct but occasionally slightly stilted or formal English. It stands as an invaluable contribution to chelonian taxonomy as well as a demonstration of meticulous antiquarian research.

Brongersma's arguments are based on the general assumption that leatherback turtles, if subspecifically divisable at all, break down along Atlantic and Indo-Pacific lines. On the other hand, what minor morphological (and size) data exist would, in fact, lean towards recognition of an eastern Pacific nesting population as distinct from other nesting populations in all three tropical oceans. Yet, if this is the case, Brongersma demonstrates that neither Garman (the describer of *schlegelii*), nor any of the authors cited by Garman, have used type material, nor named type localities, from the eastern Pacific. Smith and Taylor's (1950) subsequent designation of the type locality of *schlegelii* as "Guaymas, Mexico" was, in fact, without basis and erroneous.

The implication is that, if the eastern Pacific populations turn out to be distinctive, the name *schlegelii* is not available for them, unless it is argued that Temminck and Schlegel's (1834) Japanese specimen illustrated in *Fauna Japonica* derived from an eastern Pacific nesting ground. This is highly unlikely, and not demonstrable by classical morphological techniques.

Brongersma's meticulous identification and description of early museum material allocatable to *Dermochelys* may seem pedantic to modern biologists, especially when the trail leads to type material that is not morphologically distinctive and that often lacks collection data. However, such seeming impasses should be re-evaluated in a more optimistic light now that mitochondrial DNA techniques can be utilized even with minute tissue samples from old museum specimens and potentially allow the elucidation of the specific nesting population from which any given specimen derived.

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Introduction

When dealing with the origin of the name *schlegelii* for a species or subspecies of leathery turtle (in America: trunkback or leatherback), we have to consider two publications by Garman, both dating from 1884. It is not clear to me which was published first.

(a) Garman, S. 1884a. The North American Reptiles and Batrachians. A list of the species occurring North of the Isthmus of Tehuantepec, with references. Bulletin of the Essex Institute, Salem, Vol. 16, Nos. 1, 2, 3; Jan., Feb., March, 1884: 3–46. On p. 6 Garman lists leatherbacks as follows:

Sphargididae

Dermatochelys Blainv., 1816, Bull. Soc. Phil., p. 111.

Testudo coriacea (Rond.) Linn., 1766, Syst., Ed. 12, p. 350.

Tropical Atlantic and adjacent waters.

D. schlegeli

Tropical Pacific and Indian oceans.

The name *Dermatochelys schlegeli* is here introduced as that of a species. No characters are indicated. Indication of the geographical distribution does not validate the name, and it is therefore a *nomen nudum*. The exact date of publication is not known to me. The paper may have appeared in March 1884, but there is no certainty of this.

(b) Garman, S. 1884b. The Reptiles of Bermuda. Contributions to the Natural History of the Bermudas, Vol. 1, Part VI. Bull. U.S. Nat. Mus. 25:285–303. On p. 295 Garman refers to Pacific leatherbacks as *Sphargis schlegelii*. The volume of the Bulletin in which Garman's paper was published contains a preface by G. Browne Goode, dated "Washington, April 2, 1884." This implies that the volume was published after that date, but I do not know how much later. Unless the opposite can be proven, I assume that the paper published by the Essex Institute (Garman, 1884a) preceded the paper in the Bulletin (Garman, 1884b). This question is more or less a purely "academic" one, as the

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name published in the Essex Institute remains a *nomen nudum*. The availability and identification of the name as published by Garman (1884b) is a more complex topic, discussed in the numbered notes below.

Nomenclatural Analysis

1. Garman (1884b:294–295) does not mention any characters by which *Sphargis schlegelii* (as published on p. 295) differs from *Sphargis coriacea*, other than stating: "Certain respects in which the Pacific 'Trunkbacks' differ from those of the Atlantic have induced me to separate them, distinguishing the former by the name *Sphargis schlegelii*, and the latter by which it is commonly known, *Sphargis coriacea*." The indication of a difference in distribution does not, in itself, validate the name *schlegelii*.

2. Garman (1884b:303) states that the "Var. *Schlegelii*" occurs in the "Tropical Pacific and Indian Oceans." Also:

a) The status of *schlegelii*, ranking as a species on p. 295, is reduced to the status of a variety of *Sphargis coriacea* on p. 303.

b) As far as the distribution of *schlegelii* is concerned, it must be noted that its occurrence in the Pacific Ocean is restricted to the "Tropical Pacific," but also that its range is extended to include the Tropical Indian Ocean.

c) Garman does not indicate any features to distinguish between *coriacea* (*sensu stricto*) and *schlegelii*, other than a difference in distribution: "Tropical and temperate portions of the Atlantic" vs. "Tropical Pacific and Indian Oceans."

3. However, Garman (1884b:303) gives references to literature. If we accept the "Var." distinguished by Garman to correspond to the present-day concept of a geographical race or "subspecies" [a term apparently first introduced by Anonymous, 1894, Novit. Zool. 1(1)], the name *schlegelii* becomes acceptable under the International Code of Zoological Nomenclature, at least if the references given by Garman contain the necessary minimum of information on characters that will distinguish between *coriacea* (*sensu stricto*) and *schlegelii*. Whether this is the case will be discussed below in an analysis of the references cited by Garman (notes a – g).

a. "*Sphargis coriacea* Bleeker, 1857, Nat. Tijds. Ned. Ind., 471." (= *Sphargis coriacea*, Bleeker, Natk. Tijdschr. Ned. Ind., 13 (3rd. ser., vol. 3), 1857:471).

In this paper, Bleeker mentions this species in a list of reptiles from Sumatra, indicating that this specimen came from Padang on the West Coast of Sumatra. This same locality is repeated by Bleeker in the Natuurkundig Tijdschrift voor Nederlandsch. Indie in 1858, vol. 15 ([4], 1):260, in 1859, vol. 20 ([4], 6):205, and in 1860, vol. 21 ([5], 1). Bleeker states that the specimen from Padang was a very young one. Whether this specimen is still in existence in some collection I do not know. It is not in the Rijksmuseum van Natuurlijke Historie, Leiden.

b. "*Dermatochelys coriacea* Theobald, 1868, Jour. Linn. Soc., x, 20." (= Journ. Linn. Soc. London).

Theobald mentions the species in a "Table of Burmese Testudinata" as occurring on the "Coast of Arakan and Tenasserim." No characters are mentioned.

c. "*Dermatochelys coriacea* Theobald, 1876, Rept. Ind., 34." (= Theobald, W., 1876, Descriptive Catalogue of the Reptiles of British India. Calcutta: Thacker, Spink and Co.; p. 33: *Dermatochelys*, p. 34: *D. coriacea*).

On p. 33 the shell is stated to be "sub-cordiform with a coriaceous skin, and traversed by seven longitudinal ridges." On p. 34 a brief description of the color pattern is given and some measurements are mentioned. The locality is given as: "Captured on the Tenasserim Coast of the Bay of Bengal, where it is rare." Reference is made to a paper by Tickell: "J.A.S., Vol. XXXI, p. 367 with plate." The paper referred to is: Tickell, S.R. 1862. A rare and little-described species of turtle. Journ. As. Soc. Bengal, vol. 31, no. IV:367–370.

This turtle was taken near the mouth of the Ye River in the Tenasserim Provinces on the sandy beach where she had laid about a hundred eggs. A description of it is given, together with some measurements. Reference is made to specimens caught in European waters, and to its occurrence in Florida.

d. "*Dermatochelys coriacea*..... Swinhoe, 1870, Pr. Zool. Soc., 409." In his paper "Note on Reptiles and Batrachians collected in various parts of China," R. Swinhoe, Proc. Zool. Soc. London, 1870:409–410, under the heading "*Dermatochelys coriacea*," states that "The Green and Tortoiseshell Turtle ... do frequently occur in the warm waters around Formosa," but that "these seldom show themselves in the colder seas of the China coast. During the years I spent at Amoy I never heard of a turtle but once; this was in October 1859. It was a large old specimen of this species, of a yellowish-madder colour." The capture of this turtle was considered a bad omen. After it had "Chinese characters cut on its back, signifying 'set free for ever'," it was dropped into the sea.

The reported "yellowish-madder colour" hardly corresponds to the black with variable whitish spots and markings typical of the leathery turtle, and it seems more probable that Chinese characters would be carved into a hard-shelled (cheloniid) turtle rather than a leathery turtle. However this may be, there is little or nothing to confirm that this turtle was indeed a specimen of *Dermochelys coriacea* (L.).

e. "*Dermatochelys coriacea*.... Krefft, 1871, Aust. vert., 39." (= *D[ermatochelys] coriacea*, G. Krefft, Australian Vertebrata — Fossil and Recent, 1871: 39+). "The Leathery Turtle or Luth is the largest of the tribe; it is herbivorous, and yields a large quantum of oil. A fine specimen in the Australian Museum, perhaps the most gigantic ever taken, was caught off Wollongong, on the coast of Illawarra, and measures 9 feet in length." (9 ft = 274 cm). The enormous size identifies it as being *D. coriacea*. Wollongong is situated at 34°25'S, 150°52'E.

f. "*Sphargis mercurialis*.... Smith, 1849, Zool. S. Africa, app., p. 2." (In fact, Smith misspelled the name "*Spargis*.") References are given to: "Merr. Temm. et Schleg.," to "*Spargis coriacea*, Gray, Dum. et Bibr.," and to

"*Dermatochelys porcata*, Wagl." "Found in the sea to the south and west of the Cape of Good Hope."

g. "*Sphargis mercurialis* Temm. and Schl., 1838, Faun. Jap., Chelon., pl. 1–3." (= *Sphargis*, Temminck and Schlegel, Fauna Japonica, Fasc. 1, January 11, 1834:6, 7, 8, 11, 77; *Sphargis mercurialis*, Temminck and Schlegel, Fauna Japonica, Fasc. 1, January 11, 1834:10, 76 [in explanation of pl. 1], and underlines of pls. Chelonii I, II, III, V fig. 3; and Fasc. 3, after May 1838:139, refers to Fasc. 1, pls. I. II, III, IV fig. 3 [= pl. V fig. 3]).

The dates of publication are those mentioned by L.B. Holthuis, 1970: Von Siebold's Fauna Japonica, pp. 69–78, in: L.B. Holthuis and T. Sakai: Ph. F. von Siebold and the Fauna Japonica. A History of Early Japanese Zoology. Tokyo, Academic Press of Japan, 323 pp.

The date for Fasc. 1 is that upon which copies were presented to the libraries of the Dutch Universities. The possibility cannot be excluded that Fasc. 1 was published before that date in January 1834, perhaps even towards the end of 1833.

The section of the Fauna Japonica dealing with this species (Fasc. 1:6–12) appeared under the heading "*Le Sphargis*," and throughout the text (pp. 6–11) "*le sphargis*" (or "*du sphargis*") is used with the following exceptions: on p. 6 the species is stated to be that which Rondelet (1554) [see translation of this original text in this issue of *Chelonian Conservation and Biology*] named *Testudo coriacea* (this name is also mentioned on pp. 10 and 11). The name *Sphargis mercurialis* first appears on p. 10 as being the name which Merrem (1820) preferred to the older name of *Testudo coriacea*, and which name has been adopted by some "modern" authors. Further synonyms are mentioned: *Coriudo* Fleming (1822); *Dermochelis atlantica* LeSueur (1829), *Dermatochelys porcata* Wagler (1830), and *Testudo tuberculata* Pennant (1800) (which Gravenhorst (1829) considered to be a distinct species). The name *Sphargis mercurialis* as applied to the specimens examined by Temminck and Schlegel is mentioned on p. 76 (explanation of pl. 1), and it appears on pls. I, II, III, and pl. V fig. 3. The scientific names as given here were not printed in italics in the Fauna Japonica; they were given with some spacing between the letters.

The text of Fauna Japonica, Fasc. 1, pp. 6-10 is mainly based upon the examination of two specimens: one of which was an assemblage of remains brought home from Japan by von Siebold (pl. I, pl. II figs. 3–5, pl. III figs. 1–4, pl. V fig. 3) and the other a specimen in the Leiden Museum of unknown origin (pl. II figs. 1, 2).

The description deals with the outward appearance, the coloration, the skeleton, and some features of the esophagus, stomach, and duodenum. Osteological features are compared to those of *Chelonia viridis* (= *Chelonia mydas*), *Chelonia imbricata* (= *Eretmochelys imbricata*), and *Chelonia cephalo* (= *Caretta caretta*).

Besides giving information about the two specimens mentioned above, on pp. 11–12 localities are mentioned from which the species had been recorded (with references to literature): Cornwall and Dorset, England; Bretagne and Loire estuary, French Atlantic coast; Frontignan and Cettes (Sete), French Mediterranean coast; Rhode Island, South Carolina, and coasts of America (materials in the museums of New York and Philadelphia); Gulf of St. Lawrence, Canada; Brazil and Chili, South America; Table Bay, South Africa.

The specimen from Japan described and figured in Fauna Japonica, Fasc. 1, was captured near the Bay of Nangasaki (p. 9) (= Nagasaki). Von Siebold, in his "Preface, suivie d'un Aperçu historique et physique sur les Reptiles du Japon," Fauna Japonica, Fasc. 3, pp. i-xxi, 1838, p. viii, note 1, states that during his stay in Japan he had seen but two leathery turtles ("*La Luth*"). Of one of these (the Nagasaki specimen) he brought home a figure of the complete specimen (left side view), drawn "*ad vivum*" [sic] by "de Villeneuve."

The following remains of the leatherbacks examined by Temminck and Schlegel are present in the Rijksmuseum van Natuurlijke Historie, Leiden (National Museum of Natural History); in the past known to zoologists as the "Musée des Pays Bas" or more correctly as the Muséum d'Histoire Naturelle des Pays-Bas, or in English as the "Leiden Museum."

(1) The incomplete skull, viz., the bones of the roof of the skull: the prefrontals, frontals, parietals, postfrontals, left squamosal, and part of the left quadratojugal, the left maxillary, and the premaxillaries. The left and right halves of the skull are joined together by two pieces of copper wire. The lower jaw is broken into three pieces: symphysis, and left and right ramus (some small fragments are lacking).

These remains are kept in a cardboard tray with a small tray containing some very small fragments, and with a label: "*Sphargis mercurialis*, von Siebold, Japan, 1825."

Th. W. van Lidth de Jeude, in Catalogue Ostéologique des Poissons, Reptiles et Amphibiens. Muséum d'Histoire Naturelle des Pays-Bas, Tome X2, seconde partie, 1898, p. 12, lists these remains as "*c*. Crane. Incomplet." Van Lidth de Jeude does not refer to the origin of these specimens. Recently, these remains of the skull and lower jaw have been entered in the register of the herpetological collections under number RMNH 20354.

Pl. Chelonii 2, fig. 3 gives a figure of the dorsal view of this skull, and this was made either when the skull was still complete, or the artist has added the outlines of the parts now missing.

(2) The seven cervical vertebrae figured in Fauna Japonica, 1, Pl. Chelonii II figs. 4, 5. Label lost.

(3) Bones of the shoulder girdle and of the right foreflipper.

(4) Bones of the pelvis, femur, and some caudal vertebrae: Fauna Jap., Pl. Chelonii III figs. 1, 2.

(5) Fragments of the bony carapace.

These sets of bones (nrs. 2-5; RMNH 20354) are in trays with labels stating that they belong to *Sphargis mercurialis* from von Siebold's collection.

(6) Part of the gut of *Sphargis mercurialis*, von Siebold, Japan. The spirit materials are registered as RMNH 3280.

Fauna Jap., 1, pl. Chelonii III fig. 3 shows the last part of the esophagus and the beginning of the stomach, showing the structure of the internal surfaces. Fig. 4 shows the internal surface of the duodenum, with the orifice of the ductus choledochus.

The skull from Japan (RMNH 20354) may be compared with that of an older specimen of unknown locality, figured as Pl. Chelonii II, figs. 1, 2. This specimen was mentioned by Van Lidth de Jeude as skull "*b*." It has subsequently been catalogued as RMNH 20353.

C.J. Temminck and H. Schlegel are usually cited as the co-authors of the parts of the Fauna Japonica dealing with the Reptiles and Amphibians. Indeed, the title page includes the words "Reptilia, elaborantibus, C.J. Temminck and H. Schlegel." Hoogmoed (Zool. Meded., 53, no. 9, II.VII, 1978:92) doubts whether Temminck really took an active part in the preparation of this part of the Fauna Japonica, and I fully concur with his viewpoint. The third fascicle with the conclusion of the description of the Reptiles (including the Amphibians, on p. 140) is signed by H. Schlegel, and I consider this to be positive evidence that it was Schlegel who in fact was responsible for this publication. Von Siebold, in his preface, p. ii, speaks of "*la cooperation bienveillante de M. Temminck*," and this may mean, as suggested by Hoogmoed, that Temminck's role was merely that of encouraging Schlegel to do the work. But it is also possible that Temminck, having the better knowledge of the French language, played an active part in preparing the text. An argument that Schlegel voluntarily accepted Temminck as co-author may be that he always uses the plural (*nous* = we; *notre* = our) in the text, whereas in his Essay sur la Physionomie des Serpens, 1837, which he definitely authored alone, Schlegel uses the singular (*je* = I; *mon* = my). We have no realistic alternative to accepting the statement of authorship on the title page, unless one elects to resort to the more cumbersome: "Schlegel, *in* Temminck and Schlegel."

Summary

The above discussion (notes a – g) has dealt with the seven publications cited by Garman (1884b:303). Summarizing, we may conclude that three authors (Bleeker, 1857; Theobald, 1868; and Smith, 1849; my notes a, b, and f) mention only a locality record but do not add any information that might serve to validate the name proposed by Garman. Krefft (1871; my note e) gives a locality record and the length of the specimen, and Swinhoe (1870; my note d) gives a locality record, adding that it was a large, old specimen and the color was yellowish madder. These scanty data do not serve to validate the name proposed by Garman.

There remain two more crucial references: 1. Theobald (1876; my note c) gives a locality record and some information about the shape, keels, color pattern, and measurements), and he refers to a paper by Tickell, 1862, where a description of this turtle is given, and illustrated by a color plate; and 2. Temminck and Schlegel (1834; my note g) in Fauna Japonica, where extensive information is given about two specimens, and in which a figure is given of the complete specimen from Japan.

Still, without further comparison of specimens from the Pacific and Indian Oceans with those from the Atlantic Ocean, there is little or nothing in the descriptions of Theobald (1876), Tickell (1862), or Temminck and Schlegel (1834) to distinguish between the Atlantic and Indo-Pacific populations of *Dermochelys coriacea*. Besides, neither Tickell (1862) nor Temminck and Schlegel (1834) attempt to make such a distinction. In both publications, localities from the Atlantic Ocean and the Mediterranean Sea are mentioned as belonging to the same taxon as that recorded from Tenasserim (Tickell, 1862) and from Japan (Temminck and Schlegel, 1834).

If one is convinced that the Atlantic and Mediterranean populations of *Dermochelys coriacea* are distinct from that (or those) occurring in the Indian and Pacific Oceans, it will be necessary to identify appropriate distinguishing characters, and then select a lectotype. In principle, this could be from any locality mentioned by Tickell, or by Temminck and Schlegel.

The fact that the taxon was named in honor of Schlegel does not, in itself, require that the Leiden specimen be selected as the lectotype. The problem is that the two subspecies may differ mainly in shape and color pattern, neither of which can be checked adequately in the Japanese specimen. I have little hope that what remains of the skull and limb bones of the Japanese specimen will be sufficient to establish a distinct subspecies. Plate I, showing the color pattern, may perhaps help. As for Tickell's specimen, one would have to see whether it was still of any value.

The "restriction" of the type locality of *schlegelii* by Smith and Taylor (1950, Univ. Kansas Sci. Bull. 33, Pt. II, no. 8, p. 344) and Smith and Taylor (1950, Bull. U.S. Nat. Mus., 199, p. 13), in both papers "by present restriction" to "Guaymas, Mexico," was unjustified, in the first place because such a restriction has no nomenclatorial value, and secondly because it is a locality neither mentioned, nor even included within the broad statements of range, by any of the authors cited by Garman. The restriction of the type locality must be in agreement with the known or adjudged origins of the lectotype.

Garman (1884a: 6; 1884b: 303) states that *schlegelii* occurs in the "Tropical Pacific and Indian Oceans," and this provides us with a problem. Japan is not situated in the Tropical Pacific Ocean (and, incidentally, neither is Guaymas, Mexico). Smith and Smith (Synops. Herpetofauna Mexico, Vol. VI, 1980:249) suggest that "a sea turtle could well have been taken south of the Tropic of Cancer, and brought to one of the cities of Japan." Apparently they were not aware that *D. coriacea* is a fairly regular visitor to Japanese waters as far north as about 44°N (Nishimura, 1964, Records of occurrence of the leatherback turtle in adjacent waters to Japan. Physiology and Ecology, 12(1/2), September, fig. 1; Nishimura, 1964, Considerations on the migration of the leatherback turtle, *Dermochelys coriacea* (L.), in the Japanese and adjacent waters. Publ. Seto Marine

Biological Lab., 12(2), fig. 1). It has even been reported from the Asiatic mainland coast opposite Hokkaido. Moreover, Temminck and Schlegel (1834) indicate the Japanese specimen to have been captured in the vicinity of the Bay of Nagasaki. In the south this turtle also goes well beyond the tropics, as illustrated by the specimen mentioned by Krefft (1871:39) from Woolongong, New South Wales, Australia, and the specimens found in Table Bay, South Africa.

If we keep strictly to Garman's statement that the distribution in the Pacific Ocean is limited to the tropics, we can only conclude that in this case Garman himself erroneously included references to Temminck and Schlegel (1834), Smith (1849), Swinhoe (1870), and Krefft (1871) in the synonymy of his Var. *schlegelii*. If these are ignored, then only the references to Bleeker (1857), and Theobald (1868, 1876) would remain. As Bleeker (1857) only mentions the locality, this does not help validate the name, and we must turn to the specimen of which Theobald (1876) gives a brief description, apparently based upon the more elaborate description of a specimen caught in the mouth of the Ye River, Tenasserim (Tickell, 1862), which would be the only specimen available for selection as the lectotype (or the holotype?)

There is also, of course, the "type designation" by E.H. Taylor (1970, Univ., Kansas Sci. Bulletin, 59, no. 3, p. 96), who wrote in the synonymy of *Dermochelys coriacea*: "*Dermochelys coriacea schlegeli*, Garman, Bull. U.S. Nat. Mus., 1884, No. 25, p. 303 (type locality, Guaymas, Sonora, Mexico)." And lower down on the same page he wrote: "*Sphargis coriacea* var. *schlegeli* Garman, Bull. U.S. Nat. Mus., No. 25, 1884, p. 303, type locality [restricted], Guaymas, Sonora, Mexico. (The type is figured in Temminck and Schlegel)."

As the figures cited by Garman, 1884b:303 are "pl. 1–3," which are based partially (Pl. Chelonii I, II figs. 3, 4, 5, III, and V fig. 3) on a specimen from Japan, and Pl. Chelonii II figs. I and II on a specimen of unknown origin, then the one syntype of *schlegelii* of which the locality is known (i.e., the vicinity of the Bay of Nagasaki, Japan) comes from a locality different from the restricted type locality selected by Smith and Taylor (1950).

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